Frontal Incomes and Quality of Life in Obese Patients With and Without Binge Eating Disorder

Fátima Gameiro *, Beatriz Rosa , Miguel Faria

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Article

Frontal Incomes and Quality of Life in Obese Patients with and Without Binge Eating Disorder

Fátima Gameiro [1,*], Beatriz Rosa [2] and Miguel Faria [3]

[1] Instituto de Serviço Social, Lusófona University/Research Center in Social Work and Social Intervention (CISIS); fatima.gameiro@ulusofona.pt
[2] Escola de Psicologia e Ciências da Vida, Lusófona University; beatriz.rosa@ulusofona.pt
[3] Escola Superior de Saúde Ribeiro Sanches, Lusófona Polytechnic Institute; p60714@ipluso.pt
* Correspondence: fatima.gameiro@ulusofona.pt; Lusófona University—University Center of Lisbon, Campo Grande, 376, 1749-024 Lisbon, Portugal

Abstract: Frontal incomes play an important role in human behavioral regulation and can be a determinant of eating behavior. The aim of this study was to analyse the frontal incomes in obese patients with and without Binge Eating Disorder (BED), compared to normoweight (NW) subjects and to analyse the effect of sex and binge disorder on quality of life, with age and BMI as covariates. A total of 114 participants comprised three different groups (NW, obese without BED, obese with BED) completed the Frontal Assessment Battery (FAB) and Impact of Weight on Quality of Life (IWQOL-lite). The results showed that obese patients, with and without BED, have poorer frontal functioning than NW persons. Obese patients with BED have lower performance in frontal income than obese patients without BED. Male participants have a higher perception of quality of life in all dimensions, with women showing lower values in self-esteem and sex life. Obese with BED show greater weaknesses in physical function. These results suggest that low frontal incomes and worse quality of life characterize obese patients, more evident in obese patients with BED.

Keywords: frontal incomes; quality of life; obesity; binge eating disorder

1. Introduction

In the field of global public health, obesity is one of the biggest challenges, and has been considered the "epidemic of modern times". According to World Health Organization (WHO) [1], over one billion people worldwide are obese, including 650 million adults, which is 13% of the worldwide population. Obesity is the second preventable cause of death which justifies the urgency of intervention in this area [1].

Eating behavior, when pathological, is a multifactorial and complex phenomenon [2]. The literature indicates that many obese individuals have eating and intake disorders [3,4]. Eating and intake disorder is described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR) as a persistent disorder on intake or diet that results in altered food absorption or consumption, which causes significant deficits in psychosocial functioning or physical health [5]. These severe mental disorders are incapacitating and are frequently associated with over-evaluation of form and weight and purging behaviors [6]. Based on DSM-5 [7], misericism, pica, avoidant/restrictive food intake disorder, bulimia nervosa, anorexia nervosa, and BED are included in pathological eating behavior. It is estimated that 23.9% of patients who have binge eating disorder (BED) seek treatment for obesity [8].

Binge eating (BE) is characterized by a sense of loss of control while consuming unambiguously large amounts of food and is reported by 9–29% of adults with obesity [9]. The etiology of BED is complex, including genetic and environmental factors as well as neuroendocrinological and neurobiological contributions. Recent data from the worldwide prevalence of BED between 2018 and 2020 revealed rates from 0.6–1.8% in adult women and from 0.3–0.7% in adult men [10].

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The understanding of the role of cognitive functions and the neuronal mechanisms in the control the additive and hedonic components of intake has generated a high interest in neuropsychology [11]. According to Lu and colleagues [12], normoweight individuals showed higher global cognitive functioning, assessed compared to obese subjects. Obesity has been related with a decrease in total brain volume [13], specifically in frontal lobe areas [14].Volkow et al. [15] found a negative correlation between Body Mass Index (BMI) and metabolic activity in prefrontal cortex and anterior cingulate gyrus measured with PET (Positron Emission Tomography), which is positively correlated with executive performance. It is known that cognitive processes, specifically executive functions (EF), are engaged in eating behavior. EFs are mental processes required to solve external and internal problems [16] and includes a wide set of self-regulation functions that allow the organization, control, and coordination of other cognitive functions, behavioral and emotional responses [17].

A number of studies have shown that when compared to normal-weight (NW) adults, obese (OB) adults have lower EF [18–21], particularly in planning and problem solving [22], cognitive flexibility [14,22–24] inhibitory control [25,26], and decision making [22,27]. Results from the study of La Marra et al. [28] have shown that morbidly obese patients reported even lower EF than obese, overweight, and normal-weight subjects.

In same line, the presence of cognitive deficits in obese patients with BED has been confirmed in different domains [8,29,30], such as attention, memory, and EF. In this last domain, obese patients with BED when compared with obese patients without BED, reveal poorer results [2,4,29–34], more precisely, capacity of planning [30], higher difficulty in decision-making [30,32], lower inhibitory control [33,35], lower psychomotor performance [33], poorer cognitive flexibility [30,32,33], and increased levels of impulsivity related with food [32,36]. These findings can be an explanation for why individuals with BED experience considerable impairment in functioning and work productivity compared with individuals without BED [37]. According to Costa et al. [38], executive deficits can spill over into maladaptive eating behavior and these changes can impact increased adiposity and consequently could lead to obesity.

Neurobiological findings highlight impairments in reward processing, inhibitory control and emotion regulation in individuals with BED [10]. A study developed by Estella et al. [39] which aimed to analyze white matter (WM) microstructure in obese women with BED, revealed that these women show white matter alterations in axial diffusion in fronto-limbic and parietal pathways that are important in decision-making processes. As BMI was a covariate in the analyses, alterations in BED may be part of the pathology, but whether they are a cause or effect of illness is unclear [39]. Results of a 2022 study by Xinyuan and colleagues [40], suggested that altered functional connections between medial frontal cortex and regions associated with reward and maladaptive eating may be a key of neural mechanisms of food-specific intentional inhibition in overweight status [40].

An association between obesity and psychopathological symptoms and emotional problems has been widely documented: depression and anxiety symptoms [41], peer and interpersonal problems [42], low self-esteem [43,44]. In this way, the impact of obesity is not only limited to health issues but also to quality of life (QoL) indicators that are characterized by social interaction, low self-esteem, social isolation, stress, and mental illnesses [45]. According to Patrick et al. [46] QoL is defined as an individual's own assessment of well-being. In research, the quantification of QoL related to health status is referred to as health-related QoL (HRQoL), that is, a multidimensional concept that represents general self-perception of the impact of an illness and its treatment on physical, psychological, and social aspects of life. In a recent study it was found an association between QoL and its components in **overweight** and obese women. It seems that women, in comparison to NW, tend to express lower QoL [47]. Chu et al. [48] found differences, in the same way, in QoL between obese and non-obese women.

Subjects with BED also experience comorbid mental-health problems. For instance, a systematic review found that BED is significantly associated with depression [49] and it was found that BED was associated with and anxiety disorders [50]. BED can also be associated with HRQoL. Some studies have shown reduced HRQoL in people with BED compared to people without BED [10,51–53]. In the study of Vancampfort et al. [53] it was concluded that obese subjects with BED experience

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poorer HRQoL than normoweight subjets. In addition, QoL can be particularly poorer in women with BED compared to men with BED [53]. In sum, there is a significant link between BED and poor mental health (i.e., depression, anxiety, psychological stress, and QoL).

There has been a growing interest in the study of the relationship between frontal incomes and obesity, and frontal incomes and disorders in eating behavior, however there is a lack of studies looking at the role of frontal incomes in obese patients with and without BED. Given that obesity is an epidemic with serious biological and psychosocial repercussions and BED is commonly associated with obesity and with somatic and mental health comorbidities, it is important additional knowledge in order to understand the role of frontal incomes in eating behavior.

Because the majority of studies investigating the relationship between OB and domains of frontal incomes are cross-sectional rather than longitudinal, the question of directionality of the relationship remains uncleared [54]. Changes in EF can predict weight gain [26] and may be an important determinant of dietary behavior throughout lifespan [55]. Taken together, these findings support evidence of a robust association between obesity and frontal incomes impairment, and suggest that neuropsychological evidence can provide an accurate understanding of the determinants of eating behavior.

The main aim of this study was to compare the frontal incomes of obese patients, with BED and without BED, and with NW persons. A second purpose of this study was to analyze the effect of sex and binge disorder on the dimensions of quality of life, with age and BMI as covariates. We hypothesized that obese patients with and without BED, had poorer frontal functioning than NW persons. It was also hypothesized that obese patients with BED were also predicted to perform worse in frontal income than obese patients without BED. Regarding QoL, it was expected that obese patients with BED would have a lower level of QoL than obese patients without BED.

2. Materials and Methods

2.1. Participants

In this study participated a total of 114 individuals of both sexes aging from 20 to 60 years old (M =42.3, SD =9.7). The majority were female (69.3%), married (65.8%) and were actively working (80.7%). Thirty-eight participants had normal weight, 38 were obese without binge and 38 were obese with binge (see Table 1). Three groups were constituted according to their weight and clinical conditions as follows: 1) Normoweight (NW), composed of 38 participants (27 female and 11 male), who did not present a medical diagnosis of obesity or BED, based on the score equal to or lower than 17 that means no periodic binge eating) on the Periodic Binge Eating Scale [56] and their BMI ranges between 18 kg/m² to 24.9 kg/m²; 2) Obesity without BED (O), composed of 38 obese patients (26 female and 12 male), who do not present BED, evaluated by physicians specialists in Psychiatry, and scored equal to or below than 17 (without periodic binge eating) on the Periodic Binge Eating Scale [56] and their BMI is higher than 30 kg/m²; and 3) Obesity with binge eating disorder (O+BED), composed of 38 obese patients (26 female and 12 male), who present BED clinically diagnosed, scored equal to or above than 27 (severe periodic binge eating) on the Periodic Binge Eating Scale [56] and their BMI are higher than 30 kg/m² (see Table 1). All of the obese individuals had the diagnosis of obesity for at least six months and were in the process of evaluation for bariatric surgery.

Table 1. Characteristics of the groups (N=114).

	Groups								
	NW (n=38)			**O (n=38)**			**O+BED (n=38)**		
	Min	Max	M (SD)	Min	Max	M (SD)	Min	Max	M (SD)
Age	20	60	40.5 (10.8)	23	60	43.9 (9.2)	25	60	42.5 (9.0)
Weight	43	85	60.7 (9.3)	76	184	123.9 (23.4)	83	149	116.9 (13.9)
Height	147	189	164.8 (8.3)	147	180	163.3 (9.4)	144	180	162.0 (7.9)
BMI	18.75	24.91	22.2 (1.8)	31.7	64.1	46.6 (8.1)	35.5	61.7	45.1 (5.1)

Note: NW: Normoweight subjects; O: Obese Without BED; O+BED: Obese With BED.

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Participation in this study required compliance with the following criteria: over 18 years of age and a minimum of 4 years of formal education; not performing any type of diet at the moment of this study; no history of neurological, neuropsychological and/or psychopathological disorders clinically diagnosed; no prior history of alcohol or drug abuse or dependence on psychotropics; not having undergone any surgical intervention in the context of obesity; do not present bulimia or anorexia nervosa symptomatology, scored equal to or lower than 20 on Eating Attitudes Test -26 (EAT-26) [57]; not having emotional maladjustment (scored equal to or below 2.5 on the Severity Index in the Global Symptom Check-List- 90- R, Portuguese version [58]; no mild cognitive decline assessed by the Portuguese version score of the Mini-Mental State Examination (MMSE) [59].

2.2. Instruments

The Frontal Assessment Battery (FAB) [60] was used to assess the functions of the frontal lobe. It is a tool validated for the Portuguese population by Lima et al. [61] and it´s ability to evaluate executive functions has been replicated in some studies [61,62]. It consists of six sub-tests: Similarities, Lexical Fluency, Motor Series, Conflicting Instructions, Go No Go, and Prehension Behavior, scored from 0 to 3. Total scores range from 0 to 18 with higher scores corresponding to better functioning. The FAB presented optimal interrater reliability (k = .87; p<.001) and a Cronbach's α = .78 and good discriminant validity (89.1%) [61].

The Impact of Weight on Quality of Life-Lite (IWQOL-lite; Kolotkin et al. [63]; Portuguese version of Engel et al. [64). This is a specific questionnaire for the evaluation of quality of life for subjects diagnosed with obesity, developed by Kolotkin et al. [63]. This instrument asks subjects to describe the effects their weight has on five areas of functioning: (1) physical functioning (11items), (2) self-esteem (7 items), (3) sex life (4 items), (4) distress in public (5 items), and (5) work (4 items). This is a self-response instrument consisting of 31 items. It presents responses on a Likert-type scale, where the option "Always" is worth 5 points; "Usually", 4 points; "Sometimes", 3 points; "Rarely", 2 points; and "Never", 1 point. A total score for each dimension and the whole scale is obtained summing all the items, with higher scores corresponding to worse quality of life. The IWQOL-lite presents strong psychometric properties [65]. The internal consistency, measured with Cronbach´s alpha varied from .82 to .94 for the several dimensions and .96 for the total score. The test-retest confidence ranged from .81 to .88 for the scales and .94 for the total score. The results of the internal consistency and the test-retest for obese subjects were similar to those obtained in the total sample. It presents convergent validity and discriminant validity in obese subjects [65]. As in previous studies conducted in obese persons who have sought treatment, the IWQOL-Lite is a valid and reliable measure of the specific quality of life of obese subjects who do not seek treatment. As in the original version, the Portuguese version presents alpha coefficients that ranged from .77 (work) to .95 (total) [64].

2.3. Procedure

The psychiatry services, as well as endocrinology and obesity services of different hospitals were contacted. The Ethics Committee of the Hospital de Santa Maria, and the Scientific Councils of the Santarém and Fernando da Fonseca Hospitals approved this study. To get the control group, we had the authorization of the Instituto do Emprego e Formação Profissional of Santarém.

Participants signed an informed consent and were informed about the study prior to participation. Anonymity and confidentiality were guaranteed, and participants were aware that they could quit at any time during participation. Participants were assessed individually by a trained clinical neuropsychologist during a 60-minute session. An anamnesis was performed in order to obtain demographic and clinical information and the BMI was reassessed. The SCL-90-R, MMSE and EAT-26 were used in order to define exclusion criteria.

All obese patients were diagnosed by endocrinologists, according to the criteria of the WHO International Classification of Diseases (ICD-10; Obesity), the BMI was defined, and by psychiatrists, according to the DSM-5-TR; Binge Eating Behavior.

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2.4. Data Analysis

The statistical analyses were performed with the Statistical Package for the Social Sciences (IBM, SPSS Statistics, version 28.0 of Windows). To compare the results in the FAB subtests across the three groups, an ANOVA was performed, with the FAB subtests and total score as dependent variables and group belonging as factor. Then, the effects of sex and binge disorder in the quality of life of the obese were evaluated, and in order to reduce possible effects of age and BMI, these variables were introduced as covariates. A full factorial model was used, acquainting for both main effects as well as interaction effects.

3. Results

3.1. Descriptive Values and ANOVA of the FAB

The scores of the six subtests of the FAB, as well as the total score, were compared across the three groups – normal weight, without and with binge disorder In Table 2 is clear that in all subtests and total score the normal weight group performed better than the groups with obese participants, and in these, the group with binge disorder performed worse in all subtests and total score than the group of participants without binge disorder.

The results of the ANOVA show significant differences between groups in all subtests and total score. In subtests 3 ("Motor series"), 4 ("Conflicting instructions"), 6 ("Prehension behavior) and in the total score, significant differences occur between the NW group and the two obese groups. In subtests 1 ("Similarities") and 5 ("Go–No Go"), the group with binge disorder differs significantly from the normal weight, while in the subtest 2 ("Lexical fluency"), the difference is between the binge disorder group and the other two (see Table 2).

Table 2. Analysis of Variance to the FAB subtests and total by group.

	Group				
	NW (n=38)	O (n=38)	O+BED (n=38)		
FAB subtests	Mean (SD)	Mean (SD)	Mean (SD)	F (2,111)	p
FAB 1 Similarities (conceptualization)	2.6 (.6) [a]	2.2 (.8) [a,b]	2.1 (.7) [b]	4.24	.017
FAB 2 Lexical fluency (mental flexibility)	2.9 (.3) [a]	2.7 (.6) [a]	2.1 (.8) [b]	18.80	<.001
FAB 3 Motor series (programming)	2.9 (.3) [a]	2.4 (.8) [b]	2.1 (1.1) [b]	8.71	<.001
FAB 4 Conflicting instructions (sensitivity to interference)	2.9 (.3) [a]	2.1 (1.3) [b]	2.1 (1.4) [b]	6.91	.001
FAB 5 Go–No Go (inhibitory control)	2.7 (.7) [a]	2.3 (1.2) [a,b]	1.9 (1.4) [b]	5.51	.005
FAB 6 Prehension behavior (environmental autonomy)	3.0 (.0) [a]	2.7 (.5) [b]	2.5 (.6) [b]	12.42	<.001
FAB_Total	17 (1.2) [a]	14.3 (3.3) [b]	12.9 (3.4) [b]	21.55	<.001

Note: Different superscripts identify significantly different groups. Note: FAB – Frontal Assessment Battery; NW: Normoweight subjects; O: Obese Without BED; O+BED: Obese With BED.

3.2. Multivariate Analysis

A multivariate analysis of covariance (MANCOVA) was performed to analyze the effect of sex and binge disorder on the dimensions of quality of life, with age and BMI as covariates. Type III sum of squares was used with a full factorial model.

Multivariate tests revealed that sex (Wilks' λ = .697, p <.001) and group (Wilks' λ = .835, p =.035) were significant main effects, while interaction between sex and group (Wilks' λ = .936, p =.501) was not significant.

The descriptive scores for the dimensions considered are shown in Table 3. When sex is the comparison factor, we can see that quality of life is superior (corresponding to lower scores) in all its dimensions in male participants, while when group belonging is used to compare participants, those

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without binge disorder also present lower mean scores in all dimensions of quality of life when compared to those participants with binge disorder. With regard to sex, the dimensions where significant differences occur are the self-esteem (F (1,69) = 20.15, p < .001) and sexual life (F (1,69) = 8.04, p = .006), in both cases with females presenting higher values corresponding to worse quality of life (see Table 4). When groups are compared according to the presence or absence of binge disorder, the only significant difference occurs in the physical function, with higher mean values in participants with binge disorders (F (1,69) = 8.10, p = .006).

Table 3. Means (SD) of the dimensions of the IWQOL by sex and binge disorder.

	Sex * Group				**Total**			
	Male		**Female**		**Sex**		**Group**	
	O (n=12)	**O+BED (n=12)**	**O (n=26)**	**O+BED (n=26)**	**Male (n=24)**	**Female (n=52)**	**O (n=38)**	O+BED (n=38)
IWQOL Subtests	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Physical function	2.8 (1.4)	3.5 (0.8)	3.3 (0.9)	3.6 (0.9)	3.1 (1.2)	3.4 (0.9)	3.1 (1.1)	3.5 (0.8)
Self-esteem	2.2 (1.1)	2.5 (0.9)	3.4 (1.2)	3.6 (1.0)	2.3 (1.0)	3.5 (1.1)	3.0 (1.3)	3.3 (1.1)
Sexual life	1.8 (0.8)	1.8 (1.3)	2.7 (1.5)	2.9 (1.4)	1.8 (1.1)	2.8 (1.5)	2.4 (1.4)	2.5 (1.4)
Public distress	2.1 (1.2)	2.3 (0.9)	2.6 (1.2)	2.8 (1.3)	2.2 (1.1)	2.7 (1.2)	2.4 (1.3)	2.6 (1.2)
Work	2.2 (1.2)	2.3 (1.0)	2.4 (1.3)	2.7 (1.4)	2.2 (1.1)	2.6 (1.4)	2.3 (1.3)	2.6 (1.3)
Total	2.3 (1.0)	2.7 (0.7)	3.0 (1.0)	3.3 (0.8)	2.5 (0.9)	3.1 (0.9)	2.8 (1.0)	3.1 (0.8)

Note: IWQOL - Impact of Weight on Quality of Life; O: Obese Without BED; O+BED: Obese With BED.

Table 4. Results of the Between-Subjects Effects of the Multivariate Analysis of IWQOL by Sex and Group (BMI and Age covariates).

	Dependent Variables									**Covariates**					
	Sex			**Group**			**Sex*Group**			**BMI**			**Age**		
IWQOL	**MS**	**F (1,69)**	**p**	**MS**	**F (1,69)**	**p**	**MS**	**F (1,69)**	**p**	**MS**	**F (1,69)**	**p**	**MS**	**F (1,69)**	**p**
Physical function	0.71	0.95	0.333	6.07	8.10	0.006	0.71	0.94	0.335	0.71	0.94	0.335	0.38	0.50	0.481
Self-esteem	22.31	20.15	<.001	1.01	0.92	0.342	0.01	0.01	0.932	2.04	1.84	0.179	1.32	1.19	0.279
Sexual life	15.23	8.04	0.006	0.28	0.15	0.703	0.06	0.03	0.865	2.69	1.42	0.237	2.19	1.15	0.286
Public distress	3.23	2.36	0.129	0.91	0.66	0.418	0.02	0.01	0.908	1.92	1.4	0.241	0.88	0.64	0.425
Work	1.92	1.23	0.270	0.25	0.16	0.689	1.08	0.69	0.409	2.65	3.21	0.075	2.86	1.41	0.239
Total score	5.47	7.76	0.007	1.93	2.74	0.103	0.01	0.01	0.913	2.12	3.01	0.087	1.34	1.90	0.173

Note: IWQOL - Impact of Weight on Quality of Life Questionnaire; BMI – Body Mass Index.

4. Discussion

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The main aim of this study was to compare the frontal incomes of obese patients, with and without BED, and NW persons. Our results from the FAB confirms the hypothesis that obese patients with and without BED had poorer frontal functioning than NW persons and that obese patients with BED had lower performance in frontal income than obese patients without BED. Our findings are in line with previous literature [2,4,18–21,28–34] and can help to explain the alterations in the eating behavior of obese patients, with and without BED, and their difficulties in changing and maintaining the motivation that may exist. Specifically, in this study it was found that what most differentiates the NW group from two obese groups were the frontal dimensions of "Motor series", "Conflicting instructions" and "Prehension behavior", which reflects the lower global frontal functioning of obese patients, especially in planning, inhibitory control and dependence on the environment.

The motor programming difficulties are consistent with results from by [22], who concluded that there are differences at the level of planning between normoweight and obese patients. The results of the obese group show that there are no differences in motor programming depending on the presence or absence of BED. Regardless of whether or not they binge eat, the obese have difficulties in programming their behavior, which may include eating behavior. A diet and the act of ingestion require the development of a prospective plan, anticipation of outcomes and testing of complex sequences of eating behavior. This finding may explain the difficulty of obese patients in programming a diet, such as what they will eat, how and when they will do it, since they have to take into account not only intra-individual variables (cognitions and affects), but also the family, the guidelines given by professionals, the social context and the environment in which they are located [66].

Regarding the differences between the group of NW and the obese with BED, the obese with BED are characterized by greater difficulties in "Similarities" and "Go-No-Go", because these patients have greater difficulties in abstract thinking than NW. It is possible that the difficulties of obese with BED may contribute to understand why they do not consider the emotional state that emerges after the binge (research criteria for the diagnosis of BED: C. Profound discomfort when recalling binge eating, DSM-V-TR) [5] and eat until they feel unpleasantly full and dissatisfied with themselves, depressed or feel guilty. These results also could explain their difficulties in understand the causes and consequences of dieting, the repercussions of a balanced diet, and the costs and benefits of a given eating behavior. This fragility, indirectly, can potentiate or be enhanced limitations by at the level of capacity of planning [30], in decision-making [30,32] and poorer cognitive flexibility [30,32,33].

Obese patients with BED also showed more inhibitory control difficulties when compared to NW individuals. These results are in line with the literature, more specifically with the results obtained by Eneva et al. [33], by Córdova [35] and even by Eichen et al. [32] and Kollei et al. [36] who reported higher rates of impulsivity related with food in obese with BED. By presenting difficulty in inhibiting responses, these individuals are vulnerable to uncontrolled food intake. Our results provide evidence that obese patients with BED have difficulty in inhibiting the act of food intake in the face of a food exposure situation. Taken together, the data suggest that low inhibitory capacity and resistance to interference characterize BED.

On the other hand, the obese with binge disorder group, differs from the obese without BED and the NW group with respect to "Lexical fluency", which translates their weaknesses in mental flexibility. Similar results were found by Eneva et al. [33], Eichen et al. [32] and Solano-Pinto et al. [30]. Obese patients with BED present more difficulties in updating, change and inhibition in planning and in the component of "access" to the contents stored in long-term memory than obese without BED and NW subjects.

A second purpose of this study was to analyze the effect of sex and binge disorder on quality of life, with age and BMI as covariates. The results revealed that both sex and group belonging had significant effect on quality of life. Our findings show that males had a higher quality of life in all its dimensions than females and that obese with BED also present poorer quality of life in all dimensions when compared to those participants without binge disorder. With regard to sex, females show worse quality of life for the self-esteem and sexual life dimensions. The results of the present study are in

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line to Vancampfort et al. [53], who reported that QoL can be particularly poorer in women with BED compared to men with BED. According to Castanha et al. (2018), the impact of obesity impacts quality of life (QoL), indicators that are characterized by lower social interaction, low self-esteem, social isolation, stress, and mental illnesses [45,47,48]. Also Appolinario et al. [51], Giel et al. [10], Singleton et al. [52] and Vancampfort et al. [53] mentioned that subjects with BED experience more comorbid mental-health problems, more specifically, depression [49] and anxiety disorders [50]. Also Wu and Berry [67] concluded that in BED weight-related poor self-esteem and Meseri et al. [68], report that self-esteem is an important factor affecting eating disorders. According to Monteleone et al. [69] individuals with BED show limited access to emotion regulation strategies, which may suggest that for these individuals eating may be a strategy that helps to cope with negative affect.

According to literature obese women had a remarkable tendency to dissociate during sexual contacts with partners when their body esteem is negative [70]. Women who verbalized dissociation during sexual activities and had greater tendency toward binge eating showed higher cortisol levels when faced with sexual stimuli. Impulsivity appears to increase sexual behaviors in women with binge eating [71]. It was found that when there are more binge eating episodes there are fewer orgasms, sexual function is worse, and sexual dissatisfaction increases [72]. Women with binge eating episodes were generally characterized by poor sexual functioning and a negative sexual self-concept [73]. This statement is supported by the results of a study by Castellini et al. [70] with sexually active women, which shows that women with BED and obesity have lower sexual function compared to those without BED and obesity, and to controls. The results of the present study, which reveal that women have a worse quality of life in the dimension of sexual life, are in line with the literature.

When compared with obese without binge eating, the obese participants with BED show lower quality of life just for the physical function. This finding suggests that patients with BED have a poorer perception of their physical health than those without BED, which may be a consequence of the sense of loss of control while consuming large amounts of food.

5. Conclusions

In sum, results of this study showed that obese patients, with and without BED, had poorer frontal functioning than NW persons and obese patients with BED had even lower performance in frontal income than obese patients without BED. More specifically, it was found that what most differentiates the NW group from two obese groups were translated into difficulties in global frontal functioning, motor programming, sensitivity to interference, and dependence on the environment. From the analysis of the results of the two obese groups, it was found that those with BED are characterized by greater difficulties in abstract thinking and in inhibitory control. Obese with BED differs from the obese without BED and the NW group, revealing more difficulties in mental flexibility.

As for the quality of life, the male gender reveals higher levels of quality of life in all dimensions studied than the female gender. In addition, obese participants without BED also present higher quality of life than obese with BED in all dimension. Regarding gender, the dimensions in which significant differences are found are self-esteem and sex life, in both cases with females presenting worse quality of life. When the groups are compared according to the presence or not of BED, the only significant difference occurs in physical function, which is lower in participants with BED.

The results of this study reinforce the importance of assessing frontal income and quality of life as variables to be taken into consideration in understanding and defining intervention strategies for obesity. As limitations of this study, it is important to notice at first that we used a convenience sample that may not be representative of the obese population. Secondly, the BMI was the only indicator used to measure the level of adiposity.

Comparative studies regarding frontal incomes between obese patients, with and without BED, waiting for clinical treatment and obese patients that did not look for treatment, should be considerate in the future. Additionally, the use of anthropometric measures and the inclusion of data from neuroimaging techniques may contribute for an accurate understanding of the directionality of the link between obesity and frontal between obesity and frontal incomes.

Obesity projections, as well as patients and BED, indicates its increase which highlights the need of a multidisciplinary interventions that includes psychological and medical domains. We believe that the accurate knowing of the profile of executive functioning of obese individuals could play an important role in the detection of its changes and in design therapies and rehabilitation processes and promote their quality of life.

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