

# Use of alcohol before and after bariatric surgery

## *Uso de bebida alcoólica em períodos pré e pós-operatório de cirurgia bariátrica*

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### A B S T R A C T

**Objective:** to assess alcohol intake in the bariatric surgery pre and postoperative periods. **Methods:** Patients were interviewed at Surgery Clinic of the Hospital das Clínicas da Universidade Federal de Pernambuco - HC/UFPE (Brazil) from July 2011 to March 2012. We analyzed socioeconomic, anthropometric and clinical variables. We used the Alcohol Use Disorders Identification Test (AUDIT C). **Results:** One hundred nineteen patients were enrolled (mean age: 41.23+11.30 years), with a predominance of the female gender (83.2%), non-Caucasian race (55%), married individuals or in a stable union (65.5%), with a high school education (40.3%) and active in the job market (37%). Weight and body mass index (BMI) were 128.77+25.28Kg and 49.09+9.26Kg/m<sup>2</sup>, respectively in the preoperative period (class II obesity) and 87.19+19.16Kg and 33.04+6.21Kg/m<sup>2</sup>, respectively in the postoperative period (class I obesity) (p<0.001). Hypertension was the most frequent disease in the pre (66.6%) and postoperative (36.5%) periods. The prevalence of alcohol use was 26.6% in the preoperative period, of which 2.2% of high risk, and 35.1% in the postoperative period, of which 1.4% of probable dependence; this difference did not achieve statistical significance (p=0.337). **Conclusion:** The prevalence of abusive alcohol intake and/or probable dependence was low in both the pre and postoperative periods, with little evidence of risky consumption among the patients submitted to bariatric surgery.

**Key words:** Obesity, Morbid. Bariatric Surgery. Alcoholic Beverage. Ethanol. Weight Loss.

### INTRODUCTION

Obesity is a non-transmissible chronic disease characterized by excessive accumulation of body fat<sup>1</sup>. It is a multifactorial condition that involves genetic, behavioral, psychological, social, metabolic and endocrine components<sup>2</sup>.

In its most severe form, it is called morbid obesity, where the body mass index (BMI) is above 40 kg/m<sup>2</sup> and it is a risk factor for developing type 2 diabetes mellitus, hypertension, congestive heart failure, dyslipidemia and atherosclerosis, arthropathies, hypoventilation, sleep apnea syndrome and other diseases that diminish patients' quality of life and self-esteem<sup>2,3</sup>.

Nutritional counseling, the practice of regular physical activity and the use of anti-obesity drugs are the basis for weight loss. However, patients with morbid obesity are unable to maintain this weight loss and therefore do not reduce comorbidities. In this scenario, bariatric surgery has shown to be the best treatment with regard to weight loss and maintenance of long-term and comorbidities<sup>4</sup>.

In recent years, some reports have hypothesized that individuals who underwent surgical treatment of obesity could be at increased risk for alcohol abuse after the

operation. This could occur due to inability to continue past eating habits and consume large amounts of palatable foods, generating a search for reward in food like substances, such as alcohol<sup>5-10</sup>. Some authors also hypothesized to be a correlation between weight loss after the operation and the consumption of alcohol<sup>5,7</sup>, but there is still no consensus in the literature.

Given the contradictory results and the lack of Brazilian studies on this subject, the objective of this study was to investigate the prevalence of alcohol consumption in bariatric surgery pre and postoperative periods and if there is difference in alcohol consumption between these periods.

### METHODS

We conducted a prospective, case-series study involving 119 patients (45 preoperatively to 74 postoperatively), undergoing Roux en-Y gastric bypass at the surgical clinic of the HC/UFPE from July 2011 to March 2012. We included patients of both genders, aged over 20 years, and excluded those with severe psychiatric disorders, reoperation for complications of the previous procedure and those who underwent abdominoplasty.

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The research was conducted after approval by the Ethics in Research Committee of the Universidade Federal de Pernambuco, registry SISNEP FR 410 772, in obedience to the 196/96 Resolution of the National Health Council on "Research involving Human Subjects". Participation in the study was voluntary, after obtaining the consent of the patients by signing of a consent form.

Data collection was done through interviews and transcription of information from medical records. The socioeconomic variables studied were: city, age, gender, ethnicity, marital status, educational level and occupational status. The anthropometric assessment was carried from data on height and the higher weight achieved preoperatively, collected from medical records, to calculate the body mass index (BMI), classified according to the criteria of the American Society for Bariatric Surgery<sup>11</sup>.

We measured the preoperative weight and current weight in times d" 3 months, 3-6 months, 6-12 months and 12-18 months postoperatively. The percentage of loss of excess weight was calculated using the equation: % loss of excess weight = (preoperative weight - current weight x100) / preoperative weight - ideal weight. The classification followed the criteria of Higa *et al.*<sup>12</sup>, who consider appropriate the loss of 15% in three months, 35% at six months and 65% to 75% between 12 and 18 months after the procedure. The clinical data assessed were: diabetes mellitus, dyspnea, sleep apnea, dyslipidemia, gastroesophageal reflux, menstrual changes, endocrine disorders and hypertension. These were referred to by patients at the time of the interview.

For assessment of alcohol consumption, the interviewee was initially questioned whether he/she made use of alcohol and, in positive cases, the questionnaire AUDIT C<sup>13</sup> was applied; we further assessed the type of drink, how the patient used and its association with or without food.

We used the Pearson's Chi-square test or Fisher's exact test when the conditions for the Chi-square

test were verified, and the Student t test, for independent samples.

## RESULTS

Among the 119 patients studied, 79 (66.4%) were in the Metropolitan Region of Recife, with a mean age 41.23 + 11.30 years<sup>60</sup> (50.4%) between 20 and 39 years. Females presented in greater proportion, 83.2% of patients, 55% non-white, 65.5% were married or were in stable union, 40.3% attended up to high school and 37% were in the active labor market. The weight in the preoperative period was 128.77 ± 25.28Kg and the BMI, 49.09 ± 9.26Kg/m<sup>2</sup>, classified as class III obesity, and in the postoperative period, 87.19 ± 19.16Kg and BMI, 33.04 ± 6.21Kg/m<sup>2</sup>, classified as class I obesity, with  $p < 0.001$ . Hypertension was the most common associated disease (Table 1).

We found that in the preoperative period 26.6% of patients consumed alcoholic beverages, and in the postoperative period, 35.1%. There was no statistical difference between groups,  $p = 0.337$ . The risk classification of alcohol use according to the AUDIT C showed that the majority of patients were at low risk, both before and after the bariatric procedure (Table 2).

The most widely used type of beverage before (91.6%) and after surgery (88.5%) was beer. Among the respondents, 91.6% of the preoperative group and 88.5% of the postoperative group consumed food during alcohol intake. The peanut was the most consumed food before surgery (91.6%) and the whole cheese, after (73.1%). A low percentage did not eat before drinking, and 16.6% in the preoperative period and 11.5% in the postoperative one. We have not found any significant result between drinking habits in the pre and postoperative periods and their association with the socioeconomic variables studies (Tables 3 and 4).

The percentage of excess weight loss in the times < 3 months, 3-6 months, 6-12 months and 12-18

**Table 1 -** Prevalence of diseases and clinical disorders pre and postoperatively.

Associated diseases, clinical disorders	Pre (N=45) N (%)	Post (N=74) N (%)
Hypertension	30 (66.6)	27 (36.5)
Dyspnoea	21 (46.6)	5 (6.8)
Menstrual Changes	16 (42.1)	8 (10.8)
GastroesophagealReflux	17 (37.7)	8 (10.8)
Sleep Apeia	13 (28.8)	1 (1.4)
Dyslipidemia	12 (26.6)	7 (9.5)
Diabetes Mellitus	11 (24.4)	3 (4.1)
Endocrine Diseases	2 (4.4)	5 (6.8)

**Table 2 -** Classification of AUDIT C in patients who drank alcohol.

Classification of AUDIT C	Pre (N=12)		Post (N=26)	
	N	(%)	N	(%)
Low Risk/Abstemious	9	75.0	17	65.4
Risk	2	16.7	8	30.8
Harmful/High Risk	1	8.3	-	-
Likely Dependence	-	-	1	3.8

months showed no association with alcohol consumption (Table 5).

## DISCUSSION

In 2005, people drank up the equivalent of 6.1 liters of pure alcohol per person all over the world<sup>13</sup>. Brazil ranks fourth in alcohol consumption in the Americas, with an average of 18.5 liters of pure alcohol / year. According

to the Ministry of Health<sup>14</sup>, in 2011 16% of the Brazilian population used alcohol. Data in obese patients<sup>9</sup> suggest that less than 3% of patients may develop alcohol problems.

Among the socioeconomic variables, we saw a predominance of females, similar to the Brazilian studies of Prevedelloet *al.*<sup>2</sup> and Barhouchet *al.*<sup>3</sup>. This is probably due to the greater concern of women with weight, health, in addition to the high prevalence of overweight in Brazilian patients, especially among those of less favorable conditions<sup>15</sup>. The average age and race

**Table 3 -** Association of the use of alcoholic beverages in the preoperative period with socioeconomic factors.

Variable	Habit of alcoholism				TOTAL	p value	
	Yes		No				
	n	%	n	%	n	%	
Total Group	12	26.7	33	73.3	45	100.0	
·Age group							
Up to 39	9	34.6	17	65.4	26	100.0	p <sup>(1)</sup> = 0.458
40 to 49	2	16.7	10	83.3	12	100.0	
50 or more	1	14.3	6	85.7	7	100.0	
·Gender							
Male	2	28.6	5	71.4	7	100.0	p <sup>(1)</sup> = 1.000
Female	10	26.3	28	73.7	38	100.0	
·Race							
Caucasian	5	38.5	8	61.5	13	100.0	p <sup>(1)</sup> = 0.285
Non-Caucasian	7	21.9	25	78.1	32	100.0	
·Marital status							
Single	1	33.3	2	66.7	3	100.0	p <sup>(1)</sup> = 1.000
Married	11	26.2	31	73.8	42	100.0	
·Schooling							
Elementary school	5	25.0	15	75.0	20	100.0	p <sup>(1)</sup> = 0.817
High school	4	23.5	13	76.5	17	100.0	
Higher education	3	37.5	5	62.5	8	100.0	
·Occupation							
Employee/Self-employed	6	37.5	10	62.5	16	100.0	p <sup>(1)</sup> = 0.339
Unemployed	2	13.3	13	86.7	15	100.0	
Retired/Benefit	1	14.3	6	85.7	7	100.0	
Of home	3	42.9	4	57.1	7	100.0	
·Origin							
Recife/Surroundings	8	28.6	20	71.4	28	100.0	p <sup>(1)</sup> = 1.000
Upstate	4	23.5	13	76.5	17	100.0	

(1) Fisher's exact Test.

**Table 4 -** Association of use of alcoholic beverages in the postoperative period with socioeconomic factors.

Variable	Habit of alcoholism						p value
	Yes		No		TOTAL		
	n	%	n	%	n	%	
Total Group	26	35.1	48	64.9	74	100.0	
<b>·Age group</b>							
Up to 39	15	44.1	19	55.9	34	100.0	p <sup>(1)</sup> = 0.288
40 to 49	6	31.6	13	68.4	19	100.0	
50 or more	5	23.8	16	76.2	21	100.0	
<b>·Gender</b>							
Male	6	46.2	7	53.8	13	100.0	p <sup>(2)</sup> = 0.361
Female	20	32.8	41	67.2	61	100.0	
<b>·Race</b>							
White	7	30.4	16	69.6	23	100.0	p <sup>(1)</sup> = 0.570
White not	19	37.3	32	62.7	51	100.0	
<b>·Marital status</b>							
Single	10	26.3	28	73.7	38	100.0	p <sup>(1)</sup> = 0.103
Married	16	44.4	20	55.6	36	100.0	
<b>·Schooling</b>							
Illiterate	2	40	3	60	5	100.0	p <sup>(2)</sup> = 0.902
Elementary school	7	33.3	14	66.7	21	100.0	
High school	10	32.3	21	67.7	31	100.0	
Higher education	7	41.2	10	58.8	17	100.0	
<b>·Occupation</b>							
Employee/Self-employed	12	42.9	16	57.1	28	100.0	p <sup>(2)</sup> = 0.524
Unemployed	7	30.4	16	69.6	23	100.0	
Retired/Benefit	3	21.4	11	78.6	14	100.0	
Of home	4	44.4	5	55.6	9	100.0	
<b>·Origin</b>							
Recife/ Surroundings	19	37.3	32	62.7	51	100.0	p <sup>(2)</sup> = 0.871
Another State	4	30.8	9	69.2	13	100.0	
Upstate	3	30	7	70	10	100.0	

(1) Pearson Chi-square Test; (2) Fisher's exact Test.

differ from the findings of Costa *et al.*<sup>16</sup>, who observed, in a group of patients in the pre and postoperative periods, an average age of  $36.07 \pm 10.16$  years, with a predominance of Caucasians (86.53%). Herman *et al.*<sup>17</sup>, detected a predominance of married individuals with professional activity in a bariatric population, data similar to ours. On the other hand, they reported a prevalent low level of education, differing from our results, since most of our patients had completed high school. The preoperative weight average found by Costa *et al.*<sup>18</sup> was  $138 \pm 28.8$ kg and BMI,  $52 \pm 8.6$ kg/m<sup>2</sup>, while 12 months after surgery, these were  $90 \pm 19.5$ kg and  $34 \pm 6.6$  kg/m<sup>2</sup>, respectively, higher than our findings. Hypertension was the most common associated disease, corroborating other studies, where its prevalence was 21.97%<sup>17</sup> and 35.9%<sup>19</sup>.

Ertelt *et al.*<sup>9</sup> observed a low preoperative alcohol consumption, 7.1% of individuals having alcohol dependency and 1.4% abusing it, when assessed by the Diagnostic and

Statistical Manual of Mental Disorders IV (DSM IV). In our work, with the AUDIT C we found that 2.2% of patients were high risk alcohol users preoperatively. In the postoperative period we obtained a percentage of 1.4%, with likely dependency. These are much lower results than the ones of Buffington<sup>10</sup>, according to whom 84% of patients consumed alcohol after surgery. Data from the First Brazilian survey of alcohol consumption patterns in the Brazilian population<sup>20</sup> showed that the most consumed beverage in the country was beer (61%), confirming the pattern found in our patients. According to Wendling *et al.*<sup>8</sup>, after surgery, compulsive individuals unable to consume excess food can replace it with alcohol. In our study group, there was no replacement, but the association, with food. When associated with fat or protein foods, there is significant reduction in alcohol absorption<sup>21</sup>, this being a beneficial habit.

As for the use of alcohol and socioeconomic factors, it is evident that although there was no significant

**Table 5** - Classification of the percentage of excess weight loss (% EWL) associated with the use of alcohol.

Classification of % EWL	Yes		No		Total Group		p value
	N	%	N	%	N	%	
<b>&lt; 3 months</b>							
Suitable	19	100.0	30	93.8	49	96.1	p <sup>(1)</sup> = 0.523
Inappropriate	-	-	2	6.3	2	3.9	
TOTAL	19	100.0	32	100.0	51	100.0	
<b>3-6 months</b>							
Suitable	17	94.4	23	79.3	40	85.1	p <sup>(1)</sup> = 0.225
Inappropriate	1	5.6	6	20.7	7	14.9	
TOTAL	18	100.0	29	100.0	47	100.0	
<b>6-12 months</b>							
Suitable	2	20.0	8	42.1	10	34.5	p <sup>(1)</sup> = 0.414
Inappropriate	8	80.0	11	57.9	19	65.5	
TOTAL	10	100.0	19	100.0	29	100.0	
<b>12-18 months</b>							
Suitable	2	33.3	4	66.7	6	50.0	p <sup>(1)</sup> = 0.567
Inappropriate	4	66.7	2	33.3	6	50.0	
TOTAL	6	100.0	6	100.0	12	100.0	
<b>End</b>							
Suitable	11	57.9	17	53.1	28	54.9	p <sup>(2)</sup> = 0.741
Inappropriate	8	42.1	15	46.9	23	45.1	
TOTAL	19	100.0	32	100.0	51	100.0	

(1) Pearson Chi-square Test; (2) Fisher's exact Test.

association with drinking habits, those who drank were aged up to 39 years (44%), predominantly male, a fact common at this age in our region in non-operated in men. Higher percentages in this gender were seen in the Ministry of Health research<sup>20</sup>, where 11% of men consumed alcohol very often and 28%, often.

There is evidence that the consumption of palatable foods produces in the brain effects similar to those produced after alcohol intake<sup>22</sup>. Substances such as sugar or fat cause an increase of endogenous opioids in the mesolimbic reward system and dopamine, although not as

dramatically as alcohol and other drugs<sup>23</sup>. The use of alcohol is not predictive of proper weight loss<sup>24</sup>. The percentage of excess weight loss after surgery and its association with alcohol, similar to other studies<sup>7,25</sup>, showed no positive nor negative association with weight loss.

In this sample of bariatric patients in pre and postoperative periods, there was alcohol use prevalence higher than that detected in the Brazilian population. However, we did not observe high risk consumption / probable dependence, or consumption increase in the postoperative period.

## R E S U M O

**Objetivo:** avaliar a ingestão de bebidas alcoólicas nos períodos pré e pós-operatório de cirurgia bariátrica. **Métodos:** os pacientes foram entrevistados no ambulatório de Cirurgia Geral do Hospital das Clínicas/UFPE, no período de julho/2011 a março/2012. Foram analisadas variáveis socioeconômicas, antropométricas e clínicas. A avaliação do consumo de álcool nos últimos 12 meses, foi realizada pelo questionário AUDIT C (alcohol use disorders identification test). **Resultados:** foram estudados 119 pacientes com média de idade de 41,23+11,30 anos, com predominância do sexo feminino (83,2%), raça não branca (55%), casados ou em união estável (65,5%), com ensino médio (40,3%) e ativo ao mercado de trabalho (37%). O peso no período pré-operatório foi 128,77+25,28Kg e IMC 49,09+9,26Kg/m<sup>2</sup>, classificado em obesidade classe III, e no pós-operatório foi 87,19+19,16Kg e IMC 33,04+6,21Kg/m<sup>2</sup>, classificado em obesidade classe I, com p<0,001. A doença mais frequente no pré (66,6%) e pós operatório (36,5%) foi a hipertensão. No período pré-operatório 26,6% faziam uso de álcool, sendo 2,2% uso de alto risco e no pós-operatório 35,1%, sendo 1,4% provável dependência, não sendo encontrada diferença significativa entre os grupos de pré e pós-cirúrgico (p = 0,337). **Conclusão:** foi encontrada uma prevalência do uso alcoólico superior àquela detectada na população brasileira, no entanto não foi evidenciado consumo de alto risco/provável dependência, nem elevação deste consumo em período pós-operatório.

**Descritores:** Obesidade Mórbida. Cirurgia Bariátrica. Bebidas Alcoólicas. Etanol. Perda de Peso.

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