

# THE ALCOHOL CONSUMPTION IS AMENDED AFTER BARIATRIC SURGERY? AN INTEGRATIVE REVIEW

*O padrão de consumo de álcool é alterado após a cirurgia bariátrica? Uma revisão integrativa*

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**ABSTRACT - Background:** Bariatric surgery has been an alternative when conservative methods of weight loss fail. Patients undergoing bariatric surgery have an increased risk of up to 6.5% of problems related to alcohol. **Objective:** Integrative review out to analyze the change of alcohol consumption in this public. **Method:** Database was accessed from June of 2015 to January of 2016 by searching "bariatric surgery" AND "alcoholism", and their Portuguese equivalents. ScienceDirect, PubMed, Lilacs and Medline, besides manual search, were searched. To be included, the paper should have been published between 2005-2016 and related to bariatric surgery and alcoholism. Theses, dissertations, unpublished papers, case reports and theoretical studies were excluded, and a database was subsequently composed. **Results:** In 2005 there was only a review of change in alcohol metabolism in patients undergoing bariatric surgery. There were no publications in 2006. In 2007, only one study was published, and it did not meet the inclusion criteria. In 2010, there was an increase of 13% in publications and of 20% in 2012, reaching 40% in 2013. **Conclusion:** The prevalence and incidence of alcohol consumption in relation to the postoperative time was six months to three years with higher incidence for follow-up treatment by men. Roux-en-Y gastric bypass showed greater association with increased consumption of alcohol during the postoperative period. Alcohol consumption proved to be essential to be faced in bariatric surgery.

**HEADINGS** - Substance-related disorders. Bariatric surgery. Alcoholism.

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**DESCRITORES:** Transtornos relacionados ao uso de substâncias. Cirurgia bariátrica. Alcoolismo.

**RESUMO - Introdução:** A cirurgia bariátrica tem-se mostrado alternativa para o insucesso dos métodos conservadores de emagrecimento. Pacientes submetidos a ela têm 6,5% aumento do risco de terem problemas relacionados ao álcool. **Objetivo:** Realizar revisão integrativa para verificar alteração do consumo de álcool neste público. **Método:** A base de dados Science Direct, PubMed, Lilacs, Medline e busca manual foram acessadas entre os meses de junho de 2015 a janeiro de 2016 com os descritores "cirurgia bariátrica" e "alcoolicismo" e equivalentes em inglês. Os critérios de inclusão foram publicações entre junho de 2005 a janeiro de 2016 relacionadas à cirurgia bariátrica e ao consumo de álcool. Foram excluídas teses, dissertações, trabalhos não publicados, relatos de casos e estudos teóricos. **Resultados:** No ano de 2005 houve somente uma revisão relacionada à alteração do metabolismo do álcool em pacientes submetidos à cirurgia bariátrica. Não houve publicações em 2006. Em 2007, houve uma publicação fora dos critérios desta revisão. Em 2010, observou-se aumento de 13% e 20% em 2012, atingindo 40% em 2013. **Conclusão:** A prevalência e a incidência do consumo de álcool em relação ao tempo de pós-operatório foi de seis meses a três anos com maior seguimento do tratamento por homens. O bypass gástrico em Y-de-Roux apresentou maior associação com o aumento do consumo de álcool durante o pós-operatório. O consumo de álcool é problema que deve ser enfrentado na realização da cirurgia bariátrica.

## INTRODUCTION


About 3.4 million adult deaths annually with cases of obesity and the prevalence of adult obesity is 11% globally and 35% in the United States<sup>1</sup>

In cases in which patients do not show positive responses to conventional weight loss attempts as diet, physical activity and drug therapy, surgery has been taken into account, more precisely the bariatric surgery (BS)<sup>24</sup>.

Aiming to better health conditions, and following strict standards to be performed, the BS has been an alternative and an effective treatment for morbid obesity, in cases that body mass index  $\geq 40 \text{ kg/m}^2$  or  $\geq 35 \text{ kg/m}^2$  with associated comorbidities, failure of well conducted conservative weight loss methods, and absence of alcohol consumption and psychiatric disorders<sup>21</sup>.

A situation to be observed before and after the surgery that calls more attention is the alcohol consumption in patients undergoing BS for weight loss<sup>11,16</sup>, which can increase the risk of developing problems related to alcohol abuse in up to 6.5%<sup>26</sup>.

Among the problems, can be highlighted the possibility of transferring compulsive eating to alcohol abuse<sup>22,23</sup>. The prevalence rates indicate an increase of 7.6-9.6% in 12 months after BS<sup>15</sup>. Studies also show that there is not the intent on correcting the

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problematic<sup>2,16</sup>.

The use of alcohol prevents regular glycemic control<sup>5</sup> and causes poisoning and changes with less dosage, compared to the period before the surgery<sup>15</sup>, being considered a challenge in the rehabilitation process<sup>15</sup>.

Considering this problematic for research, the need for an integrative review on alcohol consumption in patients undergoing BS come to light, with the following guiding questions: "Does the pattern of alcohol consumption change in patients undergone BS?"; "What do the investigations about this subject reveal?"

The objective of this review was to summarize the scientific knowledge produced on the pattern of alcohol consumption in patients undergoing BS between the years 2005 to 2015.

## METHOD

This is an integrative review<sup>20</sup> guided by the question of alcohol abuse among individuals who have undergone BS, inquiring about the change or not in the pattern of this substance use in this population. Therefore, ScienceDirect, PubMed, Lilacs and Medline were accessed.

The search in the databases was conducted between June and August 2015 simultaneously by two researchers. Was used the terminology adopted by Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH), identifying the descriptors the English and Portuguese version "bariatric surgery" AND "alcoholism". Later, with the selected items, was proceeded with a manual search (hand-search) in their references.

The inclusion criteria for the selection of manuscripts were: results of research that addressed the theme, that is, the relationship between alcohol consumption in patients undergoing BS; field investigations, as original articles and short communication; publications between the years 2005 to 2016 in English, Spanish and Portuguese. Theses, dissertations, unpublished papers, case reports and theoretical studies were excluded, as well as manuscripts that were repeated in databases.

The studies were organized in Excel 2007<sup>®</sup> with records of information guided by the data collection instrument: title, author/year, journal, year of publication, objective, study design, population, level of evidence and main results and conclusions found.

The level of evidence was assigned according to the classification by study design in seven categories<sup>24</sup>: level 1, for systematic reviews and meta-analysis of relevant randomized controlled clinical trials or derived from clinical guidelines based on systematic reviews of randomized controlled trials; level 2, for evidence derived from at least one randomized controlled clinical trial and well-designed; level 3, for evidence from well-designed clinical trials without randomization; level 4, for evidence of cohort studies and well-designed case-control; level 5, for evidence of systematic review of descriptive and qualitative studies; level 6, for evidence from a single descriptive or qualitative study; and level 7, for evidence from officials opinion and/or expert committees report<sup>19</sup>.

After this step, the observational analysis was carried out, with assessment of the main types of studies; and observation of the relationship between the alcohol consumption and the type of procedure performed.

A database was built with information about changes in the pattern of alcohol consumption and substance abuse in patients undergoing BS, in order to facilitate access to major developed research on this topic

## RESULTS

In Pubmed were initially found 33 articles and after observational analysis were selected 10. The themes addressed

by the articles were: characterization of the prevalence of alcohol consumption pre- and postoperative check with the independent predictors; description of the disorder phenotypes by alcohol abuse by the AUDIT and analysis of the relationship between the degree of weight loss the incidence of AUDIT.

In Science Direct were initially selected 53 articles and after observational analysis were selected four articles that met the requirements for this review. The issues addressed highlighted the verification of the change in alcohol metabolism after bypass; characterization of alcohol consumption pre- and postoperative follow-up for two years of surgery and determination of the associated factors and absorption of alcohol before and after laparoscopic sleeve gastrectomy.

In the Lilacs and Medline were found respectively four and 15 articles, but they were in duplicate.

In the manual search two articles were selected. The themes were addressed to prospective evaluation on the relationship between the consumption of alcohol and smoking before and after bariatric surgery through the AUDIT, and analysis of the sensitivity of patients to alcohol consumption after surgery, as well as changes in the pattern of consumption during the postoperative.

In total were selected for this review 16 articles describing the title, objectives, level of evidence, instruments used, number of participants and the main aspects and results of each study.

Figure 1 shows the main studies in the past 10 years relating to bariatric surgery to alcohol consumption with emphasis in relation to the objectives, scientific evidence, the instruments used in the studies, number of participants and main characteristics and results.

In 2005 there were just a review of alcohol absorption and metabolism in non-surgical and bariatric surgical patients. In 2006<sup>6</sup> there were no publications<sup>6</sup>. In 2007 was found a quantitative study that suggested provide caution regarding alcohol use by gastric bypass patients<sup>14</sup>. In 2009 was found an interventional observational study but it was not included in this integrative review because it was not in the inclusion criteria<sup>9</sup>.

From 2010, the number of publications increased with prevalence of 13%<sup>18,26</sup> and this increase continued in 2012, with 20% of publications<sup>10,15,28</sup>.

The year with the highest percentage of publications was 2013, with a prevalence of 40%<sup>2,7,16,17,23,29</sup>.

From 2013 there was an increase in the number of longitudinal studies (level of evidence IV), in order to respond, with more robust methodologies and greater scientific nature, changes in the pattern of consumption, association of type of procedure with alcohol, and interventionist attitudes regarding the reduction of alcohol consumption during the postoperative period<sup>3,7,8,16,17,23</sup>.

## DISCUSSION

Studies regarding the use of psychoactive substances in patients undergoing BS showed limitation about the sample size, as 53% of the studies analyzed showed an average of 90 participants<sup>2,7,11,17,18,26,27,28</sup> in addition to the restriction of not being considered probabilistic or population-based samples. Five studies were guided by retrospective data collection, which can interfere with the quality of information that, in turn, is dependent on the quality of previous records<sup>8,11,26,28,29</sup>.

Likewise, methodological limitations were observed: 33% of the studies were of cross-sectional type, which makes the causality between effect and exposure/impact<sup>5,11,18,26,28</sup>. However, relevant associated factors for the production of knowledge of this subject could be observed.

At the same time, 43% of studies analyzed presented robust epidemiological methods, such as the longitudinal ones<sup>7,8,10,15,16,17,23,29</sup> and one with population-based sample<sup>23</sup>.

Still considering the methods, is highlighted the existence

Reference	Title	Objective	Evidence	Instrument	Participants	Main aspects and results
Ashton et al.2	Pilot evaluation of a substance abuse prevention group intervention for at-risk bariatric surgery candidates	To assess the substance abuse in a risk group of patients undergoing BS	Qualitative focus group Level 6	AUDIT	86	A significant number of patients reported intention to consume alcohol after surgery (X <sup>2</sup> =16.18; p<0.001) and the more likely reported health reasons as motivation and therapeutic advice for abstinence (X <sup>2</sup> =102.89; p<0.001)
Buffington et al.5	Alcohol use and health risks: survey results	To check sensitivity to alcohol after surgery, and change and control in relation to consumption of alcohol after BS	Quantitative, transversal and prospective Level 4	Questionnaire semi-structured	318	Increased sensitivity to the effects of alcohol in bypass patients. Of the sample, 28.4% patients had difficulty in controlling the effects of alcohol in the postoperative period. Surgery performance time interval was not significant in sensitivity to alcohol. Higher alcohol consumption was observed in 14% of patients compared to the period prior to surgery
Burgos et al.3	Prevalence of alcohol abuse before and after bariatric surgery associated with nutritional and lifestyle factors: a study involving a Portuguese population.	Characterize the preoperative alcohol consumption with follow-up of 2 years post-surgery and to identify associated factors.	Quantitative Longitudinal Level 4	AUDIT	659	Association with alcohol use in males (p=0.001)/age ≥ 45 years (p=0.018) and in preoperative with BMI <40 kg/cm <sup>2</sup> .Prevalence of alcohol use was low during the postoperative independent of clinical factors, surgical technique and weight loss percentage.
Conason et al.7	Substance use following bariatric weight loss surgery	To check whether patients undergone WLS have increased substance use (drug use, alcohol use and smoking) after surgery to compensate for the reduction in food intake	Quantitative, longitudinal and prospective Level 4	AUDIT	155 (100 patients for RYGB and 55 adjustable gastric banding)	Frequency of alcohol use increased only in patients who have undergone RYGB
Cuellar-Barboza et al.8	Change in consumption patterns for treatment-seeking patients with alcohol use disorder post- bariatric surgery	To describe the clinical phenotype disorder of alcohol of patients with RYGB history, and to compare it to non-obese, by the AUDIT; to establish the clinical profile of patterns of alcohol consumption at the time of admission and prior to BS; and to compare those patients with a group of obese patients without a history of BS treatment in the same environment	Quantitative, longitudinal and retrospective Level 4	AUDIT Expired alcohol peak	823	Some RYGB patients developed progressive alcohol consumption. Men looked for treatment earlier than women
Davis et al.10	Gastric bypass surgery attenuates ethanol consumption in ethanol-preferring	To check the hypothesis that the RYGB attenuate ethanol intake and rewards within the context of common ethanol consumer	Quantitative, longitudinal Level 4	Self-report database of patients undergoing RYGB	6,165	Patients who reported frequent consumption of ethanol before RYGB reported decrease in consumption after the surgery
Ertelt et al.11	Alcohol abuse and dependence before and after bariatric surgery: a review of the literature and report of a new data set	To assess the prevalence of alcohol abuse and alcohol dependence in a sample of BS patients for bypass before and after surgery, 6 to 10 years of surgery	Quantitative, transversal and retrospective Level 4	Questionnaire semi-structured	70	3% of patients undergoing surgery would develop problems related to alcohol dependence. On the other hand 20% of respondents reported intoxication with less alcohol compared to the period prior to surgery
Hagedorn JC et al.14	Does gastric bypass alter alcohol metabolism?	Verify the alcohol metabolism changes after bypass surgery	Quantitative, longitudinal and retrospective Level 4	An alcohol breath analysis every 5 minutes-symptoms, initial peak alcohol breath level, time for alcohol breath levels to normalize.	36	Alcohol metabolism was significantly different between the postgastric bypass and control groups. The gastric bypass group did not experience more symptoms than the control group.This study suggest provide caution regarding alcohol use by gastric bypass patients
King et al.15	Prevalence of alcohol use disorders before and after bariatric surgery	To determine the prevalence of pre and postoperative AUDIT, as well as independent predictors of postoperative AUDIT	Quantitative, longitudinal and prospective Level 4	AUDIT	1,945	Increased frequency of alcohol use for patients undergoing RYGB and adjustable gastric banding. The prevalence of AUDIT did not differ between 1 year pre-surgery to 1 year after surgery (7.6%; p=0.98); however, an increased prevalence (9.6%; p=0.01) was found after 2 years of postoperative
Kudsi et al.16	Prevalence of preoperative alcohol abuse among patients seeking weight-loss surgery	Characterize the use of alcohol in patients candidates to bariatric surgery during the pre-operative.	Quantitative and longitudinal Level 4	AUDIT	650	High prevalence of high-risk behavior in patients seeking WLS. Attention to alcohol preoperatively
Lent et al.17	Smoking and alcohol use in gastric bypass patients	To evaluate prospective smoking and alcohol use features before and after BS; to identify associated factors with the use of alcohol and smoking; and to examine the use of the substance and weight loss	Quantitative and longitudinal Level 4	AUDIT	155	Patients with higher BMI increased the likelihood of alcohol consumption in the postoperative period
Maluenda et al.18	Alcohol absorption modification after a laparoscopic sleeve gastrectomy due to obesity	To determine the absorption of alcohol in a group of patients with morbid obesity before and after LSG	Quantitative Level 4	AlcoScan - AL-6000 (AlcoMate Alcotest): level of exhaled air	12	Alcohol absorption was altered in morbidly obese patients after LSG
Ostlund et al.23	Increased admission for alcohol dependence after gastric bypass surgery compared with restrictive bariatric surgery	To evaluate hospitalization for alcohol abuse before and after BS and to compare with restrictive surgery (gastroplasty gastric)	Quantitative, longitudinal and population-based Level 4	Code registration record	11,115	Patients who undergone bypass had twice the risk of alcohol abuse and dependence compared to those who did restrictive surgery
Saules et al.26	Bariatric surgery history among substance abuse treatment patients: prevalence and associated features	To assess the prevalence of substance abuse treatment admissions	Quantitative, transversal and retrospective Level 4	Questionnaire	108	Patients undergoing BS and control groups were predisposed to diagnosis of alcohol dependence; 2- 6% of admissions to treatment were positive for substance abuse in bariatric patients; 6.5% of bariatric patients could develop dependence and alcohol abuse; higher prevalence of hospital bariatric patients to women and non-smokers
Suzuki et al.28	Alcohol use disorders after bariatric surgery	To determine the prevalence of current AUDIT and other diagnostics instruments in patients who have undergone BS; to check if higher weight loss is associated with a higher incidence of AUDIT	Quantitative, retrospective Level 4	AUDIT	51	There were no associations between weight loss surgeries with development of alcohol consumption
Wee et al.30	High-risk alcohol use after weight loss surgery	To characterize the high-risk alcohol consumption before and after BS (WLS)	Quantitative and longitudinal Level 4	AUDIT	541	71% of patients underwent gastric bypass and reported improvement of alcohol consumption when compared to gastric banding (48%)

BS=bariatric surgery; AUDIT=Alcohol Use Disorders Identification Test; WLS=weight loss surgery; RYGB=Roux-Y gastric bypass; LSG=laparoscopic sleeve gastrectomy.

FIGURE 1 - Scientific studies published between 2005 and 2016 and selected for this review

of a qualitative study<sup>2</sup>.

Taking into account the surgical indications and in accord to the objectives of this integrative review, we have intended to list the high risk criteria that contraindicate the procedure, through the guidelines of American Society for Metabolic and Bariatric Surgery. Abusive history of psychoactive substances; regular use of alcohol pre-surgery; the realization of the Roux-in-Y gastric bypass surgery procedure and smoking<sup>21</sup> are some of these criteria.

Among the high-risk criteria, checking the real prevalence of alcohol abuse during the postoperative period has been observed<sup>5,11,15,16,28</sup>. There is evidence that 3.0%<sup>11</sup> of individuals undergoing the surgery will develop problems resulting from the use of alcohol. At the same time, was observed an incidence of alcohol consumption of 4.9%<sup>8</sup> and a 6-6.5%<sup>11</sup> variation of prevalence in the postoperative period<sup>26</sup>.

Considering the pattern of alcohol consumption during the postoperative period, changes in this period are described<sup>5,11,18,26,28</sup>. There is a correlation between the use of alcohol with time after surgery, with an increase of 2% of alcohol consumption rate in two years in the postoperative<sup>15</sup>.

The postoperative time relationship was also described. Study found a lower prevalence of substance use in the period up to six months after surgery, while those who had a higher intake of alcohol were in over one year of the procedure. This can be justified by the discouraging alcohol consumption in the prior period to six months<sup>5</sup>.

With reference to the change in the pattern of alcohol use, its increase has been reported in 33% of cross-sectional studies selected in this integrative review<sup>7,15,16,23,28</sup>. On the other hand, in 13% of the studies, more precisely in the longitudinal studies<sup>10</sup> the reduction of alcohol consumption after BS was estimated with a decrease of 9.1%<sup>17</sup>.

Two studies addressed the reduction of alcohol use after weight reduction surgery referring to patients submitted to RYGB<sup>10,14</sup>. However, these are individuals or database studies, which contained only patients who were submitted exclusively to such surgical procedure. In this integrative review, 40% of the studies investigated patients undergoing various techniques and showed different results, that is, we identified an increase in alcohol consumption in the postoperative with the RYGB procedure<sup>7,8,15,23,27,28</sup>.

Other findings observed were related to hypoglycemic episodes, due to the reduced availability of glucose, by suppressing gluconeogenesis, a situation that gets worse with alcohol consumption<sup>5</sup>. Individuals are more sensitive to the effects of alcohol<sup>5,23,27</sup> resulting in intoxication because of the quantity of alcohol ingested after BS<sup>11</sup>. We also noted an increasing prevalence of hospitalizations resulting from alcohol consumption, with men seeking more treatment compared to women<sup>11</sup>. In contrast, a higher prevalence of hospitalization in female and nonsmokers bariatric patients was also observed<sup>26</sup>.

Other remarks are about the possibility of transferring eating to alcohol consumption, which would strengthen the dependency status of this substance<sup>22,23</sup>. Patients with high body mass index are more likely to develop alcohol consumption during the postoperative period<sup>17</sup>. Also the weight loss appears as a risk factor for the consumption of alcohol during postoperative<sup>13</sup>.

The instruments used in the integrative review to verify the consumption of alcohol were Alcohol Use Disorders Identification Test (AUDIT)<sup>2,3,7,8,15,16,17,28,29</sup> with a prevalence of 53.3%; the Self-Report Questionnaire<sup>5,10,11,26</sup> with 26.6%; and the level of exhaled air with AlcoScan - AL-6000 (AlcoMate Alcotest)<sup>18</sup> with 6.6%, as well as records<sup>23</sup>, with 6.6% of prevalence. Interventional observational analysis was also performed, representing 6.6% of the studies<sup>27</sup>.

AUDIT<sup>4</sup>, originally developed as a collaborative project of the World Health Organization (WHO) in the late 1980s and validated in Brazil in 1999, is configured today as one of the methods employed worldwide for early detection screening

of risk to the harmful use of alcohol. The same applies to the tracking of alcohol abuse in clinical samples and the general population<sup>12,25</sup>.

The AUDIT was used in different ways in these studies. Some applied this tracker before and after the surgical procedure<sup>15,17,29</sup>; others, at the time of data collection, generating risk estimates or dependence at the time of the survey<sup>7,8,28</sup>. Finally, the AUDIT was applied comparing bariatric patients with non-obese individuals suggesting the realization of a preventive AUDIT in patients who should undergo RYGB<sup>8</sup>.

We emphasize the importance of pre-operative advice regarding the consumption of alcohol as a protective factor against the risk of alcohol abuse<sup>16</sup>. We should let the patients know about the adverse effects of alcohol, with the intention of reducing the consumption during the postoperative period. These studies also observed that the search for improvement in health figured as a motivation to reduce alcohol consumption<sup>7,16</sup>.

## CONCLUSIONS

In principle, was found differences in postoperative period and gender related to the use of alcohol. The prevalence and incidence of alcohol consumption had a variation of about six months to three years in postoperative period. As to gender, both sexes were involved, but there was a higher incidence of men seeking treatment because of alcoholic substance use.

However, there was no consensus about sensitivity to the use of alcohol, which increases after the BS. Smaller alcoholic doses cause greater toxicity, compared to the period prior to the surgery. Likewise, research studies have addressed more frequently studies on BS that used RYGB technique, because this is the most usual procedure for the surgical treatment of obesity. The RYGB technique was more associated with increased alcohol consumption during the postoperative period. The studies had mainly presented the comparison between laparoscopic adjustable gastric banding and sleeve gastrectomy. In the studies analyzed, there was no comparison between the sleeve technique and RYGB.

Another relevant point was the transfer of binge eating to alcohol consumption, but was found that this dimension was addressed only theoretically.

In synthesis, the evaluation of patient pattern of alcohol consumption is important for treatment strategies and to contribute to health care and, also, to confront the obesity problem.

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