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ADDICTIONS FOLLOWING BARIATRIC SURGERY: A CRITICAL REVIEW OF THE LITERATURE

A MASTER'S CAPSTONE PROJECT

SUBMITTED TO THE GRADUATE FACULTY

OF THE GRADUATE SCHOOL

BETHEL UNIVERSITY

BY

ANNA H. BJORK

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FOR THE DEGREE OF

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Addictions following bariatric surgery: A critical review of the literature

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May 2020

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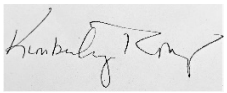
Project Advisor Signature: 

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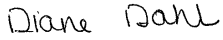
Dean/Chief Nursing Administrator Signature: 

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Abstract

Background: Bariatric surgery has become increasingly common for the treatment of obesity. Research and education are needed to identify and study potential post-surgical risks including alcohol use disorders and other physiological and psychological comorbidities.

Purpose: The purpose of this critical review of the literature was to study and identify addiction after bariatric surgery, specifically alcohol use disorder.

Theoretical/Conceptual Framework: Rosenstock's Health Belief Model (1988) was used to correlate theory and addiction. In particular, how health beliefs differ between patients, and their perception of addiction. This allows nurses to apply strategies that influence or educate patients on making healthy lifestyle changes.

Methods: Twenty-one articles were reviewed for this critical review of the literature. The studies were organized using Garrard's Matrix Method (2011), and evaluated using the Johns Hopkins Evidence Appraisal (2010) level of evidence and quality. Numerous databases were utilized. Fifty-nine articles were found, forty-eight were eliminated, with the focus on prevalence of addiction after bariatric surgery, specifically alcohol use disorders.

Results/Findings: The literature found showed a greater correlation with alcohol use disorders after the second post-operative year. Some subjects had no prior history of alcohol use disorder (AUD). Overall, the prevalence of AUD was higher among patients which had a previous history of alcohol use (Li&Wu 2016). The largest group studied were those who had the Roux-en-y gastric bypass with the highest prevalence being white female subjects (King et al. 2012, 2017; Kleiner et al. 2014; Lent 2013). Ongoing assessment and use of alcohol need to be included in post-surgical follow ups.

Conclusions: The articles conclude bariatric surgical patients are at risk for developing physiological and psychological complications, including alcohol use disorders, specifically Roux-en-y gastric bypass (RYGB) patients. Undergoing RYGB vs laparoscopic assisted gastric banding (LAGB) is associated with twice the risk of developing AUD (King et al. 2017).

Implications/Recommendations: There is a need for increased research and education for bariatric surgical patients, especially those that have a history of AUD. Preventative measures also need to be implemented to prevent and mitigate AUD after bariatric surgery. Long-term support is critical to evaluate post-surgical issues including AUD.

Keywords: Bariatric surgery, addiction, cross-addiction, chemical abuse and bariatric surgery, alcohol and gastric bypass, behavior modification, food addiction, alcohol and bariatric surgery, sleeve gastrectomy, complications.

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CHAPTER ONE

Bariatric surgery for obesity has been increasing in popularity in Western society over the last 20 years. The two most common bariatric surgeries are Roux-en-Y gastric bypass (RYGB) and laparoscopic adjustable gastric banding (LAGB). Additionally, in recent history, the surgical procedure gaining popularity is the sleeve gastrectomy. Cuellar-Barboza et. al. (2014) defines obesity as a major public health problem that includes significant comorbidities with decreased mortality and quality of life. "Over the past several decades, obesity has grown to be a major global epidemic. According to the Journal of the Medical Association (2010) in the United States, the rate of obesity has doubled since 1970 to over 30 percent, with more than two-thirds of Americans now overweight" (Hojjat, 2015, p.81).

It has been noted that some patients are at a higher risk to develop addictions after bariatric surgery. In one study, all instances of alcohol use disorders (AUD) were identified as individuals who had underwent RYGB as opposed to LAGB (Suzuki, et al 2010). What is the correlation between bariatric surgery and addiction; specifically, addiction to alcohol? Are nurses educated enough on the possibility their patients may

have or develop an addiction or cross addiction after bariatric surgery? Cross addiction is developing an addiction to another substance, when the other is not available. (Kleiner, et.al., 2004). It has been suggested that while people are physically unable to overeat following bariatric surgery, they may seek maladaptive coping behaviors (McFadden, 2010). Some of the challenges include both physical and mental health problems postoperatively. The science of neurobiology in severe obesity would correlate disordered eating with other addictive behaviors (Fogger & McGuinness, 2012). Due to ongoing research and personal experiences, the

correlation of bariatric surgery and addictive behaviors will be explored. Some of the topics that will be addressed are the purpose for reviewing the literature, a personal subjective perspective, the evidence demonstrating need for review, how this topic is significant to nursing, and which theoretical model will be used to interpret articles.

Statement of Purpose

This critical review of the literature will demonstrate the high correlation of patients that have had bariatric surgery and therefore, with some procedures, have increased use of alcohol and other drugs post-operatively. Determining differences in prevalence will be explored, as well as determining if certain populations or surgical procedures are at greater risk for increased drug or alcohol use. The literature reviewed will answer specific questions. Practice questions include: How prevalent is increased alcohol and drug use after bariatric surgery? How well are nurses prepared to educate patients on post-surgical complications including addition? Historically, addiction studies are highly geared toward addiction counselors and therapists. By informally interviewing several physicians over the years, physicians typically only receive about three weeks of addiction studies within their medical school education. (A.H. Bjork, personal communication, May 13, 2013). Some healthcare providers specialize in addiction medicine, and therefore have a much greater knowledge base than general practitioners or general surgeons. It would be beneficial for bariatric surgeons to be educated on the potential for cross-addiction as well as other possible scenarios, so patients could be educated on the possibility that cross-addiction that may be a struggle that patients face postoperatively.

I have been a Registered Nurse for many years, and a C.A.R.N. (Certified Addictions Registered Nurse) since 2003. I worked at a large inpatient chemical dependency treatment

facility, where I functioned as staff RN, Charge RN, RN Supervisor, and Nurse Manager. While there, I cared for patients with a history of bariatric surgery who denied chemical dependency concerns prior to bariatric surgery for weight loss. Some noted an increased sensitivity to alcohol and drugs that did not exist prior to surgery. The patients presenting for chemical dependency treatment had developed addictions requiring inpatient treatment. On completing routine assessments of these patients, A large number of them stated that alcohol and drugs had not been problematic for them prior to surgery. I became curious and wondered if these surgical procedures somehow contributed to, or were possibly related to addictions.

Evidence Demonstrating Need

Education is needed for patients and healthcare providers alike. Szalavitz (2012) states that gastric bypass doubles the risk of alcohol problems two years post-operatively. There may be more complications for patients who underwent weight loss surgery than just increased alcohol and drug consumption. Some others were noted to be treated for depression, attempted suicide, and psychosis as well (Morton, 2012). This may demonstrate a correlation between not just increased alcohol and drug use, but other chemistry changes within the body after gastric surgery as well. Some of these changes vary in severity depending on the type of surgery; ie: gastric banding or reduction/rerouting of the stomach.

There are many well documented risks to bariatric surgery. Some of these included problems with wound healing, vitamin deficiencies, and dumping syndrome. Vitamin and mineral supplements are essential. RYGB is restrictive in nature, but also has a component of malabsorption (White, 2011). Dumping syndrome happens when the solid and liquid parts of a meal get “dumped” directly from the small intestine, without being digested (Fincannon, 2014).

This condition can be uncomfortable, and even lead to malnutrition. It is not understood exactly why dumping syndrome occurs, however symptoms can usually be treated with dietary changes. The two different types of dumping syndrome are early dumping syndrome (beginning 10-30 minutes after a meal) and late dumping syndrome (beginning 1-3 hours after eating) (Fincannon, 2014). The symptoms for the two differ, both causing gastrointestinal upset including nausea, abdominal cramping, and diarrhea. Heart palpitations and rapid heart rate can also occur. Finally, "The potential for post-bariatric patients to develop addictions after their surgery is, as yet, poorly documented" (Fogger & McGuiness, 2011, p.10). Some of the literature suggests that patients who specifically had gastric bypass surgery were more than twice as likely to abuse alcohol, compared to those who had the banding procedure (JTO, 2012). Patients not only were found to have a greater risk of abusing alcohol after bariatric surgery, but other drugs such as opiates, methamphetamines, and nicotine. Another complication may be cross addiction. "Patients who are unable to produce neurochemical changes after weight reduction surgery may switch to other substances to achieve the same mood- altering effect previously achieved by food (Fogger&McGuinness, 2011, p. 11).

In addition, malabsorptive and micronutrient deficiencies are well known long-term complications associated with bariatric surgery. Wernicke's encephalopathy, a neurologic manifestation of thiamine deficiency, has been "classically associated with alcoholism or severe malnutrition, but rarely reported after bariatric surgery" (Iannelli, et al. 2010, p. 1594). Other neurologic complications that were discussed are acute and progressive neuropathy, myelopathy, and visual deficits. These and other factors need to be explored further, for knowledge for patients, and healthcare providers alike.

Significance to Nursing

Based on the literature, there was a need to understand and educate patients on the possible correlation of addiction with gastric surgery for weight loss and the potential for increased alcohol or drug use post-operatively. Powell, (2012) states there is increasing evidence that some types of weight loss surgery affect not just the stomach, but the brain as well. These procedures initially were thought to work to reduce the stomach size, therefore allowing them to lose weight by reducing the amount the smaller stomach would be able to hold and process. In recent years, scientists have noticed side effects of the surgery that indicate something else "that the surgery somehow affects not just the stomach, but the body's metabolism, and even the brain" (Mitchell, 2013, p.12).

According to the Journal of the American Medical Association (JAMA), alcohol abuse increased significantly following gastric bypass surgery and that, among those reporting post-surgical alcohol problems, 60.5% hadn't had drinking problems prior to surgery (Powell, 2012). This is an alarming number. These numbers alone are significant enough to show a correlation and to investigate further; not only for the nursing profession, but to help educate other health care professionals and patients that are considering bariatric surgery for weight loss. It is also important to know this correlation for assessments, education and prevention post-operatively. Volkow and Wise (2005) stated "addiction and obesity each result from foraging and ingestion habits that persist and strengthen despite the threat of consequences" (p. 555). Patients with food addictions are harder to assess and treat, because food is necessary to sustain life, where drugs and alcohol are not needed for survival. Thus, it may be vital for susceptible post-bariatric patients to be assessed for the emergence of other compulsive behaviors (Fogger & McGuinness, 2012).

Surgical procedures for weight loss either decrease stomach size by reducing the volume the stomach can hold or by placing a device that blocks the use of part of the stomach. If the maladaptive behaviors that were factors in the initial obesity are not addressed, weight can be regained and other complications may occur (Frank & Crookes, 2010). "Sometimes the inability to eat leads to the development of other addictions such as alcohol" (Fogger & McGuinness, 2012, p. 143). A retrospective study was completed at Mayo Clinic Addiction Program between June, 2004 and July, 2012. The study suggested that RYGB patients develop progressive Alcohol Use Disorder (AUD) several years post RYGB. The study further suggests larger scale longitudinal studies to clarify the association between RYGB and AUD onset (Cuellar-Barboza, 2014).

It is important to be educated on all types of post-operative risks prior to having bariatric surgery. Nurses should take a thorough history, notify physicians of anomalies in chemical use histories prior to surgery, and be aware of signs and symptoms post-operatively as well. In one study, the prevalence of AUD did not significantly differ from one year before to one year after bariatric surgery, but was significantly higher in the second post-operative year (Cuellar-Barboza, 2012). It is also of note that in a majority of patients studied that had bariatric surgeries, a great deal of them specifically had the RYGB surgery. In this study, RYGB patients were 2.3 times as likely to develop AUD than patients who had other types of gastric surgeries (Svensson,, et al., 2013).

Conceptual Model – Theoretical Framework

The conceptual model used to view and critically appraise these articles will be Rosenstock's Health Belief Model, which was developed in 1966. Rosenstock's initial model

looked at what kinds of nursing interventions would be most effective in modifying patients' behavior to reduce the risk of disease (Hood & Leddy, 2006 p. 208). This model explains how people work toward improving their general well-being and health. Kasl and Cobb (1966) extended this model by adding "perceived importance of health matters, and perceived value and perceived threat" (Hood & Leddy, 2006, p. 208). Becker and Maimen (1975) expanded the model by including positive health motivation. Positive health motivation is intrinsic, individual and varies from person to person. It could be a desire to make healthy, informed decisions, or an external recommendation from a healthcare provider or loved one.

This model reviews patients' perception of well-being and health. Patients need to be educated on all of the benefits and risks of gastric surgery for weight loss. This model is strongly related to compliance with medical advice (Vincent & Furnham, 1997). If a patient perceives that a potential for developing addiction is greater with a certain type of gastric surgery for weight loss, they may decide to choose another option. Some of the major concepts of the health belief model are:

- Perceived susceptibility: the patient's perception of likelihood of experiencing a certain illness
- Perceived severity: the seriousness of the illness and its impact on life
- Perceived threat of disease
- Cost of action: the cost, time and effort, inconvenience, possible side effects
- Cues that trigger health seeking behaviors
- Risk for substance abuse postoperatively. (Hood & Leddy, 2006)

The health belief model is relevant to the topic of potential increased alcohol or other drug use due to a great deal of personal perception. The patient needs to consider all of the benefits and risks of these types of surgeries, as well as be mindful of perception of their own risk. How much does the patient perceive the certain condition or illness will impact their life? The patient may consider health, family, employment, or even personal values. In many cases, patients may not perceive that they are in danger of decreased health or well-being until the condition is brought to their attention. Some need further intervention or education in order to make informed decisions on health matters. An informed patient will also consider perceived threat of disease. Is the chosen surgery going to be accompanied by certain complications? The patient will also review the benefits and risks of surgery, and what longer term complications or co-occurring disorders that may result, including the possibility of developing another addiction. Perceived well-being is also individual. If the patient perceives that surgical intervention is the best course of action for obesity, the patient needs to consider cost, time for surgical procedure and healing, potential for missed work, inability to perform some household responsibilities, and possible complications including the for risk of developing a substance use disorder postoperatively.

The final concept is the cues that trigger health seeking behavior. Health seeking behaviors could be factors that lead bariatric patients to consider surgery. Bariatric patients could consider health benefits to weight reduction: including hypertension, chronic pain, sleep apnea complications, possible difficulty with activities of daily living, causing potential for hygiene issues and skin breakdown.

Summary

In this chapter, the concept of prevalence of addiction after bariatric surgery was explored. The statement of purpose and questions to be addressed with this concept were outlined, as well as the significance that this topic has to nursing. Rosenstock's Health Belief Model has been explored and its relevance to the topic discussed.

CHAPTER TWO

Chapter two reviews the methods used to search articles, description of search strategies, criteria for inclusion or exclusion of studies from the review, and the number and types of studies collected for review. Also included are key words for inclusion or exclusion in the critical review of literature. Finally, the Johns Hopkins model will be introduced to discuss the relevance of evaluation of each article and its connection to increased alcohol use after bariatric surgery.

M**ethods**

This critical review of the literature was conducted using an extensive search for articles relevant to the topic of researching addictions after bariatric surgery. Criteria were developed to assist in identification of articles related to the topic. The scholarly articles and journal entries were then evaluated for relevance to the topic, sorted and organized using the Garrard Matrix Method (Garrard, 2011). Garrard's Matrix Method (2011) "is a versatile strategy for reviewing the literature" (pg. 3). The major concept is to evaluate and organize research articles. The matrix method allows for individually tailored columns based on information and topic being researched. For the purpose of this critical review of the literature, the following will be used: source of information, purpose of the study, study design, sample/setting, results, conclusions, strengths, author recommendations, implications, and Johns Hopkins Evidence Appraisal including level and quality of the evidence.

Description of Search Strategies

Scholarly articles, medical journal entries, and general articles were used for this critical review of the literature. Numerous databases were searched. A reference librarian was utilized to

ensure an exhaustive search was done to ensure viability of the literature review. The online databases that were searched include: FREEShare, TCBC, Google Scholar, EBSCO Host, Academic Search Premier, MINITEX Library Information Network (University of Minnesota), Scopus, DOCLINE www.docline.gov, and CINAHL (Cumulative Index to Nursing and Allied Health Literature). Additional individual searches were completed due to relevance, including JAMA (Journal of the American Medical Association) and www.drugfree.org.

Key words used to conduct the searches included the following: bariatric surgery, addiction, cross-addiction, chemical abuse and bariatric surgery, alcohol and gastric bypass, Roux-en-Y, behavior modification, food, addiction, relation and/or addiction, alcohol and bariatric surgery, sleeve gastrectomy, complications. The searches utilized these key words, and numerous combinations.

Criteria for Including or Excluding Studies

Criteria for including studies were the relevance to addiction secondary to bariatric surgery. The studies used included those who had addictions prior to bariatric surgery, and those who had little to no history of addiction prior to surgery. There are various results for these critical reviews of the literature. Numerous studies were critical reviews of the literature, whereas some were clinical studies. As most of the research done was specific to alcohol use after bariatric surgery, studies that were done specific to patients that used drugs including methamphetamine were also excluded.

Articles were excluded that were not relevant to bariatric surgery. Examples of this are stigmas of obesity and exercise. As the focus of this study was addiction after bariatric surgery, a study on pediatric addiction after obesity was also eliminated, as it is not relevant to bariatric

surgery. A study on obesity risk factors also was eliminated, as it did not focus on bariatric surgery or addictions. Some of the articles that were eliminated also included neurologic complications after bariatric surgery, neurologic manifestations due to Wernicke's syndrome, nutritional cerebellar degeneration in relation to alcoholism, impaired metabolism post-bariatric surgery, non-scholar articles, editorials, and professional opinion. A total of thirty-eight articles were eliminated, from fifty-nine originally found.

Number and Types of Studies Collected for Review

Included in the review were twenty-one articles, ranging in date from 2002-2019. Due to the inability to obtain sufficient articles, a few older, relevant articles were included. The article content started by discussing complications after bariatric surgery. Included were studies of drug and alcohol use prior to bariatric surgery. General addiction studies were reviewed, specifically as they relate to addictions and bariatric surgery. There were also numerous studies of neurologic complications that follow bariatric surgery, related to addictions. Cross addiction; also in the literature referred to as "Addiction Transfer" (Sarwer, et al., 2008, p. 54), and the affect that prior maladaptive eating behaviors, and therefore, potential addiction to other substances after bariatric surgery.

The majority of articles that were reviewed were the studies that link weight loss to increased prevalence of substance abuse. This involved smoking, opiate use, and increased alcohol use and even dependence. The Garrard Matrix Method was used to evaluate the articles (Garrard, 2011). From this method, the following criteria and headings were listed: citation, purpose, sample/design, measurement, results, and recommendations. Finally, a Johns Hopkins

level/quality was added to rate the overall quality of the piece of literature being reviewed. Newhouse, et. al. (2007) outlines the strength of the evidence as,

> Level I, Experimental study/randomized controlled trial Level II, Quasi-experimental study/randomized controlled trial, Level III – non-experimental study, qualitative study or meta-synthesis Level IV – expert opinion, based on non-research evidence, literature review, personal clinical expertise or experience. The second category is Quality of the Evidence. These are high, good and low quality of evidence (p. 198).

Contained in this critical review of the literature are two prospective longitudinal studies, one cross-sectional study, six clinical studies, eight critical reviews of the literature, three retrospective studies of medical records, and one professional opinion. The levels of evidence included six Level V, five Level IV, eight level III, one each of Levels II and I. The quality of the studies varied as well. Out of these, nine were rated low quality, eight were rated good quality, and four were rated high quality studies.

Summary

In summation, this chapter discussed search strategies used to identify research studies. It also reviewed criteria for including or excluding research studies or articles. Fifty-nine articles were found initially. Of those, thirty-eight were eliminated due to lack of relevance or outdated materials. Twenty-one articles were selected to be reviewed for this criterial review of the literature.

CHAPTER THREE

After the 21 matrices were found and evaluated, this critical review of the literature was performed with the intent to ask two questions: how prevalent is increased alcohol use after bariatric surgery? And, what preventive measures have been implemented? This chapter will also discuss the concept of addiction transfer (also known as cross-addiction) to better understand a correlation of bariatric surgical patients that may develop an addiction to another substance after having a bariatric surgical procedure. Additionally, this chapter will evaluate and synthesize the major concepts of each article. Each matrix found in the appendix will be shown as a means to organize the literature findings and serve as a way to categorize key topics. There were several major findings for the synthesis: the potential for developing an addiction or substance abuse after bariatric surgery, the potential for psychological changes and medical/nutritional problems following bariatric surgery, and the concept of cross-addiction or addition transfer after bariatric surgery.

Synthesis of Major Findings

The rational for utilizing the matrix method (Garrard, 2011) is to ensure the articles are compiled in an orderly fashion. The matrices bring forth a great deal of information that needed to be categorized, synthesized and summarized. It is clear that the authors of each article have a significant focus with numerous details. This review matrix provided a structured method for summarizing each article, and pulling out key points and data from each one.

There are various results for these critical reviews of the literature. Most of these studies were critical reviews of the literature, and some were actual clinical studies. Bariatric surgery

for weight loss remains somewhat new. Few studies have been done, as was outlined in this critical review of the literature.

Some studies focused on complications that bariatric surgical patients face, including nutritional deficiencies and previous and newly diagnosed comorbidities including Axis I and Axis II diagnoses. Yet, some studies focused on the potential for increased risk of substance abuse disorders, specifically the possibility of developing alcohol use disorders (AUD) following bariatric surgery. Most of the studies focused on the Roux-en-y gastric bypass surgical procedure, although studies were also performed using other bariatric surgical patients that had undergone vertical sleeve gastrectomy and lap-band surgical procedures.

There were some comparative studies completed specifically to understand the addiction potential for various bariatric surgical procedures. Other studies explored the need for the development of a universal addiction monitoring tool that could be utilized for interviewing and evaluating patients by their primary care providers and bariatric surgeons prior to and after bariatric surgical procedures.

The reviewed literature revealed the relatively new correlation between bariatric surgical procedures and the development of addictions following surgery. Much of the literature reviewed post-surgical patients up to 6 months prior to surgery and up to several years after surgery. Most of the literature followed patients that agreed to the study and agreed to follow up as far out as two years post-surgery. There were several themes discovered throughout the literature. The first theme noted was the potential for developing addiction and substance abuse after bariatric surgery. The second theme was the potential for developing psychological

changes and medical/nutritional problems following bariatric surgery. A final theme found in the literature was the concept of cross-addiction/addiction transfer after bariatric surgery.

Potential for developing addiction and substance abuse after bariatric surgery.

A theme noted throughout the articles is the potential for developing addictions and/or substance abuse after bariatric surgery procedures. A great number of articles focused on increased alcohol use after bariatric surgery. One author stated alcohol use disorders were greater during and after the second post-operative year than prior to surgery (King et al. 2012). It should be noted that one study specifically focused on nurses in particular that had undergone bariatric surgery. This particular cross-sectional study was a small sample size of known addicted nurses in a state monitoring program (Fogger & McGuiness, 2012). In more than half of the studies, the participants had no prior history of AUD (Mitchell et al., 2015). King et al. (2012) concluded that the prevalence of alcohol use disorder was greater in the second post-operative year, especially in patients that underwent Roux-en-y gastric bypass surgery. Mitchell et al. (2015) concluded there is substantial risk for developing alcohol use disorders (AUD) after bariatric surgery, specifically RYGB. Steffen et al. (2015) determined the emergence of AUD following surgery is significant after bariatric surgery. Another study compared medical records to determine if RYGB patients had a higher prevalence of AUD than a control group. Spada et al. (2015) conducted a literature review that included data on post-operative alcohol use. King et al. (2017) conducted an observational cohort study utilizing participants that self-reported alcohol use disorder symptoms and concluded undergoing RYGB versus other bariatric surgeries increased the risk for developing AUD post-operatively. Ibrahim et al. (2019) collected data from a state-wide collaborative to determine risk factors for developing AUD after one or two years post-operatively. Svensson et al. (2013) studied Swedish obese subjects that underwent

bariatric surgery and concluded bariatric surgical patients had an increased risk of developing AUD's. Suzuki (2012) conducted a small sample sized study of 51 patients and determined no association was found between weight loss following bariatric surgery or any other Axis I mental health diagnosis.

Potential for psychological changes and medical/ nutritional problems following bariatric surgery.

The next theme found throughout the literature was the potential for psychological changes and medical/nutritional problems or deficiencies following bariatric surgery. A few studies specifically focused on psychological changes that bariatric patients face. Song and Fernstrom (2008) conducted a critical review of the literature focused on postoperative complications for bariatric patients. This research concluded maladaptive behaviors were normal and seeking or continuing psychological treatment after surgery can reduce the risk of returning to prior maladaptive behaviors or developing new behaviors. They also focused on nutritional deficiencies, and their relationship to poor surgical outcomes. A study done in 2018 outlined the psychosocial consequences after bariatric surgery, specifically the increased risk of alcohol use disorder (Hardman & Christianson, 2018). This study also suggested the actual prevalence of alcohol use disorder (AUD) could be underdiagnosed. Sarwer et al. (2008) conducted an extensive critical review of the literature which examined the psychosocial and behavior aspects of bariatric surgical patients. They concluded that poor outcomes were typically due to psychological or behavioral concerns, rather than surgical complications.

Two articles focused on nutritional deficiencies after bariatric surgery. Grace, Alfieri and Leung (1998) concluded RYGB patients were more likely to experience nutrient deficiencies

over other bariatric surgery methods. El-Khoury (2010) reviewed a letter to the editor about the risk of developing Wernicke's encephalopathy secondary to thiamine depletion from alcohol use in one bariatric surgical patient that had under-reported alcohol use prior to surgery.

Concept of cross-addiction/addiction transfer after bariatric surgery.

An additional theme identified in other articles suggested a concept of cross-addiction, also known as addiction transfer. Although some obesity is caused by a food addiction, some is not. "The potential for someone who is addicted to one substance or behavior may become addicted to other substances" (Bak, 2016, p. 675). Steffen et al. (2015) conducted a critical review of the literature focused on the prevalence of AUD post-bariatric surgery, as well as the addiction transfer model, and pharmacokinetics of alcohol use after bariatric surgery and other addictive disorders. They hypothesized that if patients were unable to utilize a previous coping behavior such as eating large amounts of food would engage in different coping behavior, such as beginning or increasing alcohol use after bariatric surgery. Although there were several potential addictions after bariatric surgery, the most common was addiction to alcohol. Other addictions identified were drugs, gambling, shopping, sexual promiscuity or sexual addiction. Kleiner et al. (2004) described addiction as a chronic disease that involves both biologic and environmental variables, particularly with compulsive administration of the substance without regard for consequences. Three studies specifically focused on the psychological changes and or consequences after bariatric surgery. These included the increased risk of alcohol use disorder, as well as numerous psychological effects after surgery such as substance abuse: Hardman & Christianson (2008), Sarwer et al. (2008), and Song & Fernstrom (2008). Hardman & Christianson (2008) hypothesize that poor surgical outcomes are typically due to psychological

complications, rather than physical complications. A final study discussed the relationship between smoking, alcohol and weight loss (Lent et al., 2013).

Strengths and Weaknesses of the Literature

The topic of the prevalence of addiction secondary to bariatric surgery is relatively new. Bariatric surgery for weight loss is itself fairly new within the last 20 years. Of the 21 reviewed articles, they varied in research design and quality.

Some potential post -surgical complications were brought forward, including psychological disorders that may have existed prior to surgery, or some that may have developed after surgery. Some studies in this literature review (King et al., 2012; King et al. 2017; Ibrahim, 2019) utilized a universal tool for each participant, the Alcohol Use Disorders Identification Test (AUDIT). This testing system is approved by the World Health Organization (WHO) so it has a mechanism of widely accepted validity. An additional strength is the large sample sizes included in the studies. For example, King et al. (2017) had 2348 participants begin the study and 2003 participants complete it. Ibrahim et al. (2019) completed a state-wide collaborative study also using the AUDIT tool for participants from a Michigan Bariatric Surgery collaborative including 5724 participants. Li and Wu (2016) utilized 40 studies over a 15-year time frame. Cuellar-Barboza et al. (2015) examined a clinical disorder AUD vs a control group utilizing nine years of medical records of patients seeking chemical dependency treatment after Roux-en-y gastric bypass surgery.

The literature found also had various limitations. For some, a lifetime history of alcohol use was not assessed. King et al. (2019) hypothesized some participants may have under reported alcohol or other drug use prior to surgery due to concerns it may have affected their ability to

have surgery. One study was also performed on addicted nurses. This was a study of known addicted nurses, so the results may be skewed (Fogger & McGuinness 2012). Some studies followed bariatric surgical patients for two years post surgically, whereas other studies followed patients for many years. Li and Wu (2016) followed patients for 15 years, while Cuellar-Barboza et al. (2015) studied 9 years of medical records. Spadola et al. (2015) and Ibrahim et al. (2019) both note failure to follow up after the second post-operative year. Some authors were not able to determine how many actual patients developed alcohol use disorders; therefore, they were unable to make firm conclusions or accurately interpret results. This was specifically seen in the study by Steffen et al. (2015) due to variability in study methodology with no actual numbers of patients that developed AUD. Two studies specifically state data was collected on self-report: Svensson et al. (2013) and Lent et al. (2013). Lent et al. (2013) focused on the potential for addiction after Roux-en-y gastric bypass surgery only, although there are other types of bariatric surgery including vertical sleeve gastrectomy (VSG) and the lap band procedure. A study by King et al. (2017) noted a disproportionately large incidence of white females. Studies that have a more diverse population may be beneficial. As noted above, having standardized assessment tools may be beneficial to gain accurate long -term results, therefore eliminating the need for authors to interpret results. One study by Suzuki (2012) had a particularly small sample size; only 51 out of 530 individuals responded and participated, and only one attempt was made to encourage participation in this study.

Summary

In this chapter, the major articles were presented to evaluate the matrices and demonstrate answers to the posed questions: how prevalent is increased alcohol use after bariatric surgery and what preventative measures have been implemented? This also answers the question about

psychological changes and the possibility of nutritional deficiencies after bariatric surgery and some medical complications that may arise from bariatric surgery, especially those that develop addiction to alcohol. The matrix of the articles summarized studies and was organized in a fashion allowing for comparison and analysis of the studies. Evidence in this critical review of the literature suggested an increased risk for increased alcohol use after bariatric surgery for weight loss, specifically the Roux-en-y gastric bypass. As bariatric surgery remains somewhat new over the last several years, continued studies need to be done to further explore the potential for addiction to alcohol and other substances after bariatric surgery. The matrices are located in the appendix.

CHAPTER FOUR

These reviewed articles demonstrated the need for education on prevention of complications after bariatric surgery, including the potential for addiction. A critical review of the literature was needed to answer the practice questions. Rosenstock's Health Belief Model (1988) was used as a theoretical model for this critical review of the literature. The Health Belief Model helps to offer a better understanding of the two posed questions for this review of the literature. Current trends and gaps in the literature and implications on how this topic affects nursing will be identified. This chapter also discussed recommendations for future nursing research related to the topic of prevalence of addiction after bariatric surgery.

Literature Synthesis

The first question to be answered in this review was, what is the correlation between bariatric surgery and addiction; specifically, addiction to alcohol? Ibrahim et al. (2019) discusses the prevalence of addiction prior to and after surgery. One article was specific to known addicted nurses and their particular prevalence to addiction prior to and after bariatric surgery. This article also focused on prevalence of addiction only after bariatric surgery, implying there was no addiction to alcohol prior to surgery (Fogger & McGuiness 2012). Some articles focused on prevalence of addiction including medical complications after bariatric surgery, whereas some focused on possible psychological issues following bariatric surgery, including new diagnoses or identification of new onset alcohol use disorder (AUD), including Blackburn et al. (2017), Cuellar-Barboza et al. (2015), Fogger & McGuiness (2012), Ibrahim et al. (2019), Ivezaj et al. (2019), King et al. (2012), Lent et al. (2013), Mitchell et al. (2015).

Finally, the second question asked how well are nurses prepared to educate bariatric patients on the possibility of developing an addiction or cross-addiction after bariatric surgery? This is minimally addressed in the literature. Although Bak (2016) completed a study focusing on the potential for developing cross addiction after bariatric surgery, the concept is most likely unknown to other professionals outside the addiction community. Therefore, to answer the question on how prepared nurses are to educate patients on cross-addiction is poor. It is crucial for nurses to have a well-rounded background, including helping to identify the potential for AUD and cross-addiction in post-surgical bariatric patients.

Trends

The first trend found was a noticeable increase in alcohol use after bariatric surgery. Of the studies reviewed, Roux-en-Y gastric bypass surgical patients had the highest prevalence of surgical procedures, however, it was the most studied surgical procedure within the articles. The second trend was the prevalence of AUD within 3 years of having a surgical procedure. Of the patients in this one particular study that had developed AUD after surgery, 43.8% had no prior history of AUD (Mitchell et al. 2015). This particular study followed Roux-en-Y surgical patients only. Some of the published literature for AUD suggests bariatric surgical patients may be at a high risk for developing AUD (Blackburn et al., 2017, Ivezaj et al., 2019). A third trend is the possibility of a reduction in alcohol use in some post- surgical patients (Steffen et al., 2015). However, the authors weren't able to make firm conclusions on this statement. Suzuki et al. (2012) found no association between weight loss following surgery and the development of alcohol use disorders.

Another trend extracted from the literature is the potential for maladaptive behaviors, including drinking and drug use, causing nutritional deficiencies. Two studies concluded gastric bypass patients specifically had increased alcohol use after surgery, whereas sleeve gastrectomy patients and lap band patients remained within the World Health Organization (WHO) of acceptable alcohol use (King et al., 2012, Svensson et al. 2013). Some patients were known to have previously diagnosed or recognized maladaptive behaviors prior to surgery, therefore increasing their risk of ongoing maladaptive behaviors or mental health exacerbations. Some patients developed nutritional deficiencies after bariatric surgery, including the development of Wernicke's encephalopathy post bariatric surgery. El-Khoury (2010) wanted patients to seek education on the consideration of alcohol induced thiamine deficiency. Another study by Grace et al. (1998) found gastric bypass produces long term sustained weight loss but it increases the chance of nutritional deficiencies over other bariatric surgery methods.

Several articles focused on increased alcohol use after bariatric surgery. One author stated alcohol use disorders were greater during and after the second post-operative year than prior to surgery (King et al. 2012). It should be noted that one study specifically focused on nurses in particular that had undergone bariatric surgery. This particular cross-sectional study was a small sample size of known addicted nurses in a state monitoring program (Fogger & McGuiness, 2012). King et al. (2012) concluded that the prevalence of alcohol use disorder was greater in the second post-operative year, especially in patients that underwent Roux-en-y gastric bypass surgery. Mitchell et al. (2015) concluded there is substantial risk for developing alcohol use disorders (AUD) after bariatric surgery, specifically RYGB. Cuellar-Barboza et al. (2015) compared medical records to determine if RYGB patients had a higher prevalence of AUD rather than a control group. Spadola et al. (2015) conducted a literature review that included data on

post-operative alcohol use. King et al. (2017) conducted an observational cohort study utilizing participants that self-reported alcohol use disorder symptoms and concluded undergoing RYGB versus other bariatric surgeries increased their risk for developing AUD post-operatively. Ibrahim et al. (2019) collected data from a state-wide collaborative to determine the risk factors for developing AUD after one or two years post-operatively. Steffen et al. (2015) conducted a critical review of the literature focused on the prevalence of AUD post-bariatric surgery, as well as the addiction transfer model, and pharmacokinetics of alcohol use after bariatric surgery and other addictive disorders. Svensson et al. (2013) studied Swedish obese subjects that underwent bariatric surgery and concluded bariatric surgical patients had an increased risk of developing AUDs. Suzuki (2012) conducted a small sample sized study of 51 patients and determined no association was found between weight loss following bariatric surgery or any other Axis I mental health diagnosis.

Gaps

There were several significant gaps in the literature. The reviewed literature had common themes of limitations. The first gap in the literature was the failure of most authors to assess lifetime alcohol use prior to bariatric surgery. Noted in addition to this was varied and small sample sizes, reliance on self-reporting, more than one substance used, and lack of follow up data.

In most of the reviewed studies, a patient's presurgical prevalence of alcohol use wasn't assessed prior to bariatric surgery. Either a thorough lifetime history wasn't assessed or patients had potentially under-reported alcohol use prior to surgery because it may have affected their eligibility to qualify for surgery (King et al., 2012). Mitchell et al., (2015) focused on the

probability of higher prevalence of addiction due to patient self-report. The study from Svensson et al. (2013) also relied on self-reported consumption by participants and only included inpatient data.

One study in particular had a larger than normal prevalence of addiction following bariatric surgery; however, this study was completed on known addicted nurses (Fogger & McGuiness, 2012). The participants had a large prevalence of addiction after bariatric surgery. In this study, of the twenty-five known addicted nurses to have surgery, seventeen of those developed an addiction to drugs or alcohol (Fogger & McGuinness, 2012). These numbers are most likely skewed due to the fact all the nurses involved in this study were known to have previous impairment due to being included from a state monitoring program. This particular study also had a small sample size. Although Svensson et al. (2013) had a long follow-up time after bariatric surgery, this study had differing characteristics between the control group and the surgical groups and also included only those that were self-reporting their usage history prior to surgery. Lent et al. (2013) also determined their data were due to self-report and had a fairly low response rate. Some authors also only focused on data following one type of bariatric surgery for weight loss, most of these focusing primarily on Roux-en-y gastric bypass surgery.

A few studies were noted to benefit from a larger sample size of gender and ethnic backgrounds. Spadola et al. (2015) identified the need for inclusion of a larger base of participants, as most were noted to be white females. This was also noticed in King et al. (2017) and Kleiner et al. (2004). Although Kleiner et al. focused on the analysis of 298 charts, the study was focused on only female subjects.

Noticed in the literature review was the lack of standardized testing and data collection. King et al. (2012) utilized an AUDIT tool, used by the WHO. Other studies did not always use an accepted assessment tool to gather information on alcohol use prior to or following bariatric surgery. Few studies followed patients after the second post-operative year. Some studies did use standardized assessments; however, a second attempt to contact participants was not often made. Suzuki, Himovici and Chang (2012) sent out an invitation asking 530 individuals to participate but only 51 of the 530 agreed to participate. This study, however, did include questions about prevalence of lifetime use of alcohol prior to bariatric surgery. Ivezaj et al. (2019) didn't use the same or similar questions for all participants in the survey(s), therefore leaving gaps in their findings. This study also varied on design, sample size and methodology. Finally, Steffen (2015) was unable to draw firm conclusions on the prevalence of addiction after bariatric surgery due to lack of follow up of study participants and lack of general findings.

Implications for Nursing Practice

There are numerous implications for nursing practice in recognizing and educating patients on the potential for AUD after bariatric surgery. Nurses should recognize and assess patients' risk of AUD and other mental health concerns. Utilizing a standardized tool for patient assessment has proven to be beneficial for accurate data collection and patient assessment. As bariatric surgery for weight loss becomes even more common, so too should be ongoing chemical dependency assessments. The reviewed studies show a higher prevalence of addiction after the second postoperative year, increasing over time rather than decreasing. Preventative measures need to be developed to mitigate the change of post-bariatric AUD. In addition, nurses need to be aware of the potential for metabolic problems after surgery. Metabolic concerns may be a direct result of nutrient deficiencies due to alcohol use. Long term support is also needed to

minimize the potential for AUD. Another nursing implication for nursing practice is to recognize several authors noted a higher prevalence of post-surgical AUD in the RYGB patient population than other bariatric surgeries. In addition, per the reviewed literature, this population has a higher probability of seeking chemical dependency treatment. Mechanisms for developing AUD are still not fully understood. Finally, it is imperative that nurses also recognize that AUD and addiction disorders may be an increased risk for nurses and other higher stress professions.

In addition to the importance of utilizing a standardized tool for monitoring usage histories prior to and after bariatric surgery, nurses must be mindful of reminding patients and the assessment tool used not to cause or imply personal judgment. A nurse that is compassionate during the assessment interview is much more likely to gain trust from the patient.

Another major component in the significance for potential AUD following bariatric surgery is education. Educating patients on compliance with pre-operative and post-operative monitoring is a key component in reduction and elimination of barriers to remaining healthy after bariatric surgery. Nurses need to identify patients that are at risk and make appropriate referrals when warranted. Standardized alcohol screening and ongoing education to patients and fellow healthcare professionals are imperative for giving safe compassionate care.

Recommendations for Nursing Research

There were several areas noted for future nursing research. Additional studies are needed to clarify and identify how bariatric surgery may increase alcohol use and lead to the development of AUD. Further research is needed to evaluate alcohol use prior to and after bariatric surgery, including problematic alcohol use prior to surgery. Research is needed to determine how bariatric surgery may affect alcohol use long term. Also, ongoing research is needed to explore

patient populations at risk for AUD. Accurate data from larger studies need to be completed in order to fully understand AUD after bariatric surgery. Research efforts also need to be increased to identify risk factors of substance abuse in the bariatric surgical population. In addition, research needs to be continued on examining psychosocial, psychological, and physiological metabolic concerns for bariatric surgical candidates. Finally, ongoing research on this topic going forward should focus on inclusion of age, sex, cultural and ethnically diverse patient population.

Integration and Application of Theoretical Framework

Irwin Rosenstock's Health Belief Model depends on personal motivation, perceived threat of illness, and taking actions or removing barriers from the action (Rosenstock 1988). This theory is based on a public health model. There is a great deal of perception in this model. One patient perceives one behavior to be healthy, whereas another patient may not. Contained within this theory may be numerous differing opinions and perspectives. If a patient has been advised to refrain from drinking alcohol prior to or following bariatric surgery yet does consume alcohol, their perception of the threat of physiological or psychosocial/mental health consequences may differ from another patient. "Many health educators have found it useful to address educational needs partly in terms described in the Health Belief Model" (Rosenstock et al., 1988, p.181).

Another component in the Health Belief Model is communicating the steps needed to obtain the desired result. This will also differ from patient to patient, depending on beliefs. Respectful, helpful communication between nurse and patient is imperative to increase the potential for a safe, effective and agreeable treatment plan. Rosenstock's theory also extended to self-efficacy; teaching patients and completing ongoing assessments with the provider or nurse will allow the

patient to make educated and healthy decisions regarding their health. This model would also be effective in early detection of alcohol use disorder, primarily focusing on teaching improved health beliefs to patients that are at risk or may become at risk for having or developing an addiction to alcohol after bariatric surgery.

Rosenstock's Health Belief Model (1988) is helpful for each step of the nursing process; assessment, nursing diagnosis, developing a plan, implementing the plan, and finally, evaluating the plan. Nurses and educators can reach out to patients, use public health to teach healthy behaviors, develop educational pamphlets, and use standardized tools to follow up with bariatric patients. Five concepts were discussed in chapter one including: perceived susceptibility; the likeliness of developing an illness: perceived severity of the illness and its impact on life; perceived threat of disease; cost of action, including possible side effects; and cues that trigger health seeking behavior. In addition, Rosenstock's model is instrumental in assisting in the direction of patient education and developing interventions that are tailored to meet the needs of bariatric surgical patients based on individual needs.

Summary

As noted in this critical review of the literature, understanding the potential for addiction to alcohol after bariatric surgery is imperative to the nursing assessment of the patient population. In total, twenty-one articles were reviewed for this critical review of the literature. Two questions were posed in order to answer the questions of the correlation between bariatric surgery and addiction specifically to alcohol, and the preparedness of nurses to recognize the possibility of addiction or cross-addiction after a bariatric surgical procedure. Chapter one introduced the statement of purpose, including the need for ongoing education for patients and

providers, challenges bariatric patients face postoperatively, the evidence demonstrating the need for review, its significance to nursing, and tied Rosenstock's Health Belief Model as a theoretical framework for understanding how patient's perception of health vary individually. This nursing theory gives an understanding to assist with educating patients and others. The perception of addiction varies socially and culturally.

The methods that were used to identify research studies were also explored. Criteria were added, which helped to determine the relevance to the topic, therefore narrowing the topic further. The majority of articles used linked weight loss surgery to an increased prevalence of alcohol use.

Next, a synthesis of the major findings was organized and the matrices were placed in an index and categorized based on the various themes found throughout the literature. The articles feature several areas: prevalence of alcohol use disorders prior to and after bariatric surgery; the change in use history prior to and after bariatric surgery; post-surgical complications including nutritional deficiencies; psychological concerns after bariatric surgery, including addiction; and finally, the potential for cross addiction in post-surgical patients.

Finally, the information was brought together with implications and gaps in the literature. Implications for nursing practice were identified. The most prevalent concern is the ongoing education needed with regard to the somewhat unexplored issues some bariatric surgical patients face, including addiction to alcohol. Recommendations for nursing research were made. Rosenstock's Health Belief Model was explained to understand differing perspectives on the meaning of health. Ongoing studies need to be continued to gain increased understanding of the potential correlation of the prevalence of addiction after bariatric surgery. It would also be

beneficial for ongoing research on this topic, as per the difficulty in finding specific scholarly articles. The concept of addiction after bariatric surgery appears to be in its infancy.

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Appendix – Matrix of the Literature

Source:
King, W. C., Chen, J. Y., Mitchell, J. E., Kalarchian, M. A., Steffen, K. J., Engel, S. G., Yanovski, S. Z. (2012). *Prevalence of alcohol use disorders before and after bariatric surgery*. Chicago, Illinois: American Medical Association. 307(23):2516-2525 doi:10.1001/ jama.2012.6147

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
Level of Evidence: **Purpose:** To review the prevalence of alcohol use disorders before and after bariatric surgery, and independent factors of postoperative AUD (alcohol use disorder). **Sample/Setting:** 2458 participants, of those, 87% white female **Johns Hopkins Evidence Appraisal** **V** **Quality:** Good	A prospective longitudinal cohort study of adults who underwent bariatric surgery at 10 US hospitals. Patients were at least 18 years old, seeking first bariatric procedure between 2006 and 2009. All participants gave written informed consent. Participants each had a preoperative research visit within 30 days of surgery.	Alcohol use disorder was greater the second post-operative year than the year of and year before surgery. **Conclusion:** Prevalence of alcohol use disorder was greater in second post-operative year than the year prior to surgery. Male sex, younger age and other preoperative variables such as smoking, recreational drug use, lower interpersonal support, and those that have undergone Roux-en-Y gastric bypass procedure.	**Strengths:** 2458 participants. AUDIT 10 tool was used, an instrument used by WHO (world health organization) to assess alcohol use and related consequences. Tool used has established validity and reliability. Prospective design, large sample size. **Limitations:** Lifetime history of alcohol use disorder (AUD) was not assessed. Some participants may have underreported their alcohol use due to concerns it may affect their ability to have surgery. This study also did not have a control group.

Author Recommendations: The authors acknowledge hypothesizing the likelihood of preoperative and postoperative alcohol use disorder, and alcohol use disorder prior to bariatric surgery would have increased odds of alcohol use disorder postoperatively.

Implications: Second year post- operative patients were more likely to develop alcohol use disorder. (King, et.al 2012). Educate patients about potential side effects of alcohol use disorder. Create referrals for those at risk. Alcohol screening and possible referral should be offered as a part of routine preoperative and postoperative care.

Source:
Fogger, S. A., & McGuinness, T. M. (2012). *The relationship between addictions and bariatric surgery for nurses in recovery*.
Malden, Massachusetts: Wiley-Blackwell doi:10.1111/j.1744- 6163.2010.00298.x

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
Purpose: Emerging science supports a comparison of disordered eating with other addictive substances. **Sample/Setting:** 172 participants. 372 surveys sent to a Southern U.S. state nursing monitoring program. This study includes RN, LPN and advanced practice nurses. **Johns Hopkins Evidence Appraisal** **Level of Evidence:** III **Quality:** Low	This study used a sub-analysis cross-sectional study of nurses in a state monitoring program.	Of the 173 participants in the monitoring program for impaired nurses, 25 participants in the study had bariatric surgery. Of those, 17 developed an addiction after bariatric surgery. **Conclusion:** 68% of nurses reported substance abuse was problematic after their surgery.	**Strengths:** 382 surveys were mailed, 173 returned the questionnaire. **Limitations:** This was a small sample size of known addicted nurses. Of the original 25 that had bariatric surgery, 17 of those developed an addiction to drugs or alcohol. However, these participants had already been in a monitoring program for previous impairment. The type of surgery was not identified.

Author Recommendations: Ongoing assessment and use of substances needs to be included in post-surgical bariatric follow up.

Implications: Evidence from this study shows some participants may benefit from chemical dependency treatment. Nurses may be particularly vulnerable due to job stressors potential for diversion, and possible limited coping skills.

Source:
Mitchell, J. E., Steffen, K., Engel, S., King, W. C., Chen, J., Winters, K., . . . Elder, K. (2015). Addictive disorders after Roux-en-Y gastric bypass. *Surgery for Obesity and Related Diseases, 11*(4), 897-905.

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To establish the prevalence of addictive behaviors following Roux-en-y gastric bypass (RYGB). **Sample/Setting:** The sample setting for this study was 2 university hospitals and 1 not-for-profit research institute. **Johns Hopkins Evidence Appraisal** **Level of Evidence:** III **Quality:** Good	Patients that had undergone RYGB surgery. 241 identified participants. 201 provided data and submitted self-reports for up to 3 years post-operatively.	8% of participants developed alcohol use disorder (AUD) within 3 years, and of those, 43.8% had no prior history of AUD. No differences were found between sex, race, or ethnicity. **Conclusion:** The author concludes there is a substantial risk for development of AUD after surgery, specifically RYGB.	**Strengths:** Reasonable size, and the study uses interview and self-report measures. **Limitations:** Most data were collected at two time points. All were based on self-report. Some data may be skewed due to the potential for under-reporting.

Author Recommendations: Understanding the risk for addictive disorders requires more data from larger studies.

Implications: There is a substantial risk for developing AUD after RYGB, especially for those participants that had a previous history of AUD.

Source:

Li, L., & Wu, L. (2016). Substance use after bariatric surgery: A review. *Journal of Psychiatric Research, 76*, 16-29.

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To study comorbidities associated with obesity and substance abuse disorders. Obesity is associated with physiological and psychological comorbidities (Saules, et al, 2010). **Sample/Setting:** Researched articles from 2010-2015 using scholarly articles from databases, utilizing a research question. **Johns Hopkins Evidence Appraisal** **Level of Evidence: IV** **Quality:** Good	Literature review of scholarly articles using 11 sources. Articles used were published between 1990 and 2015 using numerous databases. Search outcomes focused on substance use, alcohol use and tobacco use among those who underwent bariatric surgery. The results were limited to peer-reviewed articles, using human subjects, with no limits on gender or age.	The proportion of new-onset substance users among bariatric patients after surgery ranged from 34.3% to 89.5% (Li & Li-Tzy 2016). Overall, the prevalence of post-operative alcohol use was higher among patients with preoperative history of alcohol use and patients that underwent RYGB as compared to those without. Of those seeking treatment, 62.3% for alcohol use, opiates 13.2%, alcohol plus another drug; 9.4%, benzodiazepines 7.5% (Coneson et. al., 2013). **Conclusion:** Substance abuse correlates with poor health in bariatric patients. Pre-op assessments should be included to prevent use or initial use (Li, 2016).	**Strengths:** Articles from 15 years. 40 studies in review. 26 studies focused on more than one substance used **Limitations:** Wide, multifactorial study including alcohol, cigarettes, drug use and/or polysubstance abuse. Of the 40 articles studied, some focused on one particular substance; 9 studies on alcohol, 3 studies on cigarettes, 2 studies on drug use.

Author Recommendations: Health care providers should recognize potential psychiatric comorbidities prior to bariatric surgery. Health care providers should assess bariatric surgery patients' substance use status and risk, especially individuals with a history of substance abuse or mental health concerns.

Implications: There is a need to increase research effort to prevalence and risk factors of substance use or substance use disorders in this patient population (Li and Wu, 2016).

Source:
Cuellar-Barboza, A. B., Frye, M. A., Grothe, K., Prieto, M. L., Schneekloth, T. D., Loukianova, L. L., Abulseoud, O. A. (2015). Change in consumption patterns for treatment-seeking patients with alcohol use disorder post-bariatric surgery. *Journal of Psychosomatic Research, 78*(3), 199-204.

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: The goal of this study is to describe the clinical phenotype of alcohol use disorder (AUD) treatment seeking patients with Roux-en-y gastric bypass surgery compared to AUD control group. **Sample/Setting:** Search of medical records of all patients 30-60 years old seeking chemical dependency treatment at Mayo Clinic. **Johns Hopkins Evidence Appraisal** **Level of Evidence:** III **Quality:** Good	This is a retrospective study of medical records of patients that had been treated at Mayo Clinic Addiction Treatment Program between 2004-2012. The first survey was 6 months prior to surgery, and patients had 3 follow-up surveys to determine alcohol use prior to surgery; when alcohol use resumed after bariatric surgery, usage patterns and changes to sensitivity to alcohol after surgery.	41 out of 823 patients had RYGB history (4.9%), 122 controls were selected. Most patients that had developed alcohol use disorder (AUD) were female. The prevalence of addiction was 1.2% at 2 years, up to 5.4% 3 years postoperatively. **Conclusion:** The results suggest that some patients develop AUD between 17 months after surgery and 37 years after surgery; and admission to a chemical dependency treatment center by 65 months post bariatric surgery.	**Strengths:** This study utilized 9 years of medical records from Mayo Clinic. **Limitations:** This study focused on only those patients that underwent gastric bypass surgery specifically. No other types of bariatric surgeries were included. Most subjects were white females. One contributor received grant money from a pharmaceutical company.

Author Recommendations: Further longitudinal studies are needed to clarify the association between RYGB surgery and the onset of AUD. Patients need to be aware of the potential for increased alcohol consumption after surgery.

Implications: The implications for this study is to develop preventative measures for the mitigation or prevention of AUD after gastric bypass surgery.

Source: Spadola, C.,Wagner, E.,Dillon, F.,Trepka, M., De La Cruz, N.,Messiah, S. (2015) Alcohol and drug use among postoperative bariatric patients: A systemic review of the emerging research and its implications. *Alcoholism Clinical and Experimental Research* August, 2015 1582-1601. doi# 10.1111/acer.12805 Source: PubMed			
Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To study patients that may be at risk for post-surgical addiction potential. **Sample/Setting:** Electronic scholarly databases including Medline, Psych INFO, and Social Work abstracts. **Johns Hopkins Evidence Appraisal** **Level of Evidence:** V **Quality:** High. Literature review	An exhaustive literature review was conducted in January, 2015 that included data on post-operative alcohol use, alcohol use disorders, and illicit drug use among patients that underwent bariatric surgery. The studies' samples were primarily non-Hispanic white females in their upper 40's.	23 studies reported on alcohol and/or substance abuse among bariatric patients. Of these 23 studies, 6 were longitudinal studies; 6 studies were cross-sectional, 2 studies assessed medical records and 5 studies assessed admissions to substance abuse treatment. Bariatric patients post-surgery are remarkably at risk for alcohol use disorder problems. **Conclusion:** Bariatric surgical patients are potentially at risk for alcohol use disorders. The large sample size and longitudinal design indicate patients that had bariatric surgery are at an elevated risk of alcohol use problems.	Data abstracted independently by 6 authors to assure reliability of data. Authors have between 42-83 publications collectively. **Limitations** Study should have included a larger base of participants, as most were white females. Study samples with greater racial/ethnic diversity and wider age ranges are needed. It would also benefit to follow post bariatric surgical patients longer than 2 years. Also, some of the cross-sectional studies failed to use standardized assessment instruments, essentially making the authors interpret results.
Author Recommendations: The authors recommend the inclusion of younger and racially/ethnically diverse weight loss patients. The research studied used mostly non-Hispanic white females. Other racial populations need to be studied. Younger and racially/ethnically diverse patients and male patients should be included. Almost 40% of			

studies reviewed did not include race/ethnicity information. It would also be of benefit to separate studies of alcohol and illicit drug use and also to include marijuana use as well.
Implications: Continued studies of alcohol use disorders post-operatively are needed.

Source:
King, W. C., Chen, J., Courcoulas, A. P., Dakin, G. F., Engel, S. G., Flum, D. R., Mitchell, J. E. (2017). Alcohol and other substance use after bariatric surgery: Prospective evidence from a US multicenter cohort study. *Surgery for Obesity and Related Diseases, 13*(8), 1392-1402.

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To report substance abuse related outcomes following patients that had RYGB or LABG; to identify associated factors. **Sample/Setting:** 2348 participants who underwent RYGB or LABG surgery. Of those, 2003 completed initial study and annual follow ups. 79.2% women, median age 47. **Johns Hopkins Evidence Appraisal** **Level of Evidence**: IV **Quality:** High	Observational cohort study. This study utilized participants that self-reported alcohol use disorder symptoms, illicit drug use and substance use treatment (those that had counseling or hospitalization for alcohol or drugs) prior to surgery and annually for up to seven years. The study ended in January, 2015.	5-year cumulative incidence of postsurgical onset of alcohol use disorder, drug use and treatment were 20.8% post RYGB, and 11.3% post LAGB. **Conclusion:** Undergoing RYGB vs. LAGB is associated with twice the risk of AUD symptoms.	**Strengths:** Numerous participants in the study over several years. 2348 participants began the study, 2003 participants completed the study. Patients answered identical questions for each year. The test that was used (AUDIT) has established validity and reliability. Longitudinal study, detailed and standardized data collection. **Limitations:** Study was primarily females, and only those that agreed to the initial study and follow ups were included. Also, follow up data is missing from the study.

Author Recommendations: AUD education, screening, evaluation, and treatment referral should be incorporated into pre-operative and post-operative care.
Implications: Having RYGB surgery specifically is associated with higher prevalence of developing alcohol disorders, illicit drug use, and seeking substance use disorder treatment.

Source:
Ibrahim, N., Alameddine, M., Brennan, J., Sessine, M., Holliday, C., & Ghaferi, A. A. (2019). *New onset alcohol use disorder following bariatric surgery*. Springer Nature. doi:10.1007/s00464-018-6545-x

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To characterize patients and incidence of alcohol use disorder (AUD) following sleeve gastrectomy as compared to Roux-en-y bariatric surgery. **Sample/Setting:** 5724 patients from Michigan Bariatric Surgery Collaborative Registry. **Johns Hopkins Evidence Appraisal** **Level of Evidence:** III **Quality:** High	Collected data from state-wide quality collaborative. A standardized tool was used to identify patient characteristics that may predispose patients to development of AUD at 1 and 2 years post-operative bariatric surgery.	Overall incidence of AUD 9.6% per-operative, up to 14% at 2 years post-operative, sleeve gastrectomy was 14.4% at 2 years, Roux-en-y gastric bypass (RYGB) was 11.9%. **Conclusion:** The majority of participants that developed alcohol use disorder did so following the second post-operative year.	**Strengths:** Large study, standardized testing used for all subjects. Alcohol Use Disorders Identification Test for Consumption (AUDIT-C). Trained data extractors consistently assessed and reassessed data for accuracy. 30 references. **Limitations:** Study is done pre-operative, 1 year and 2 years post-operative. There is no noted follow-up after the second post-operative year.

Author Recommendations: Providers and patients having awareness of AUD risks for each bariatric surgical candidate.
Implications: Understanding the role of altered brain reward processing is crucial to developing therapeutic interventions for prevention or treatment for bariatric patients in regard to AUD.

Source:
Blackburn, A. N., Hajnal, A., & Leggio, L. (2017). *The gut in the brain: The effects of bariatric surgery on alcohol consumption*. Malden, Massachusetts: Wiley-Blackwell. doi:10.1111/adb.12436

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To better understand the relationship between bariatric surgery and the potential for later development of alcohol use disorder (AUD). **Sample/Setting:** Various studies studying the relationship between bariatric surgery and alcohol use prior to and after bariatric surgeries. **Johns Hopkins Evidence Appraisal**	Literature review including bariatric surgery and alcohol abuse, alcohol drinking, or alcohol consumption.	Most of the published literature of AUD after bariatric surgery suggest bariatric patients may be at a high risk for developing AUD, especially those who underwent Roux-en-y gastric bypass (RYGB). **Conclusion:** The majority of these studies suggest a potential risk for AUD after bariatric surgery on various levels.	**Strengths:** Numerous references. 20 reviewed studies. Two of the studies used prospective longitudinal design and large sample sizes. **Limitations:** The number of articles used for results was not disclosed.

Level of Evidence: V **Quality:** High			
Author Recommendations: Additional research is needed, as well as further information on how bariatric surgery may affect alcohol use long term.			
Implications: Additional studies are needed to clarify and identify how bariatric surgery may increase alcohol use and lead to development of AUD.			
Source: Ivezaj, V., Benoit, S. C., Davis, J., Engel, S., Lloret-Linares, C., Mitchell, J. E.,Sogg, S., (2019). *Changes in alcohol use after metabolic and bariatric surgery: Predictors and mechanisms.*: Springer Nature. doi:10.1007/s11920-019-1070-8			
Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To review literature related to predictors and mechanisms of post-bariatric surgery alcohol problems to guide future research. **Sample/Setting:** The author summarized 16 published studies. The studies used various participants, interview questions and surveys. **Johns Hopkins Evidence Appraisal** **Level of Evidence:** III	Literature review. Reviews vary by study design, size, follow up and surgical type; Roux-en-y, Sleeve Gastrectomy, or lap band surgery.	Certain bariatric surgeries elevate the risk of alcohol misuse or dependence post-operatively. **Conclusion:** Risk for post-surgical alcohol use disorder (AUD) vary by type of surgical procedure.	**Strengths:** Recent publication (2019). **Limitations:** 10 cited sources. The studies vary on design, methodology, and sample size. Most studies did not use the same or similar interview questions or surveys.

Quality: Low			
Author Recommendations: The author suggests more studies need to be performed to determine what are the metabolic changes and changes to brain pathways following bariatric surgery.			
Implications: The evidence from this study shows that alcohol use disorders (AUD) actually increase over time, rather than decrease. The author(s) are disputing the "cross addiction" or "addiction transfer" hypothesis that states when a bariatric patient changes from a food addiction to another substance.			

Source:
Steffen, K. J., Engel, S. G., Wonderlich, J. A., Pollert, G. A., & Sondag, C. (2015). Alcohol and other addictive disorders following bariatric surgery: Prevalence, risk factors and possible etiologies. *European Eating Disorders Review, 23*(6), 442-450.

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To explore the prevalence of alcohol and other addiction disorders and potential etiology to post-surgical bariatric patients. **Sample/Setting:** Numerous sample sizes from various literature reviews. **Johns Hopkins Evidence Appraisal** **Level of Evidence:** V	Critical review of the literature reviewing numerous articles including: prevalence of alcohol use disorders (AUD) post bariatric surgery, animal models of bariatric surgery and alcohol, addiction transfer model (cross addiction), neurobiology and alcohol, pharmacokinetics of alcohol following bariatric surgery, and other addictive disorders following bariatric surgery.	Some studies showed an increase in alcohol use after bariatric surgery, while some studies showed a decrease in post-operative alcohol use. **Conclusion:** Some patients who undergo bariatric surgery develop alcohol use disorders. The literature also suggests that there may be a reduction in alcohol use in some post-surgical patients.	**Strengths:** 58 references. 5 contributing authors from various universities. **Limitations:** Variability in study methodology. No actual numbers of patients that developed AUD. Therefore, the authors aren't able to make firm conclusions.

Quality: Good			
Author Recommendations: The author recommends ongoing research to explore which patient populations would be at risk for post-surgical AUD.			
Implications: The mechanisms responsible for alcohol use disorders after bariatric surgery are not understood at the present time.			

Source: Svensson, P., Anveden, A., Romeo, S., Peltonen, M., Ahlin, S., Burza, M. A., Carlsson, L. M. S. (2013). *Alcohol consumption and alcohol problems after bariatric surgery in the Swedish obese subjects study*. Malden, Massachusetts: Wiley-Blackwell. doi:10.1002/oby.20397			
Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: The goal of this study is to investigate whether bariatric surgery is associated with the development of alcohol use problems. **Sample/Setting:** 2010 patients recruited between 1987 and 2001. **Johns Hopkins Evidence Appraisal**	Swedish Obese Subjects studied that underwent bariatric surgery with 2037 matched controls. Data on alcohol abuse diagnoses, self- reported alcohol consumption and prevalence were obtained from the National Patient Register.	Compared to the control group, the gastric bypass patients specifically had increased alcohol abuse, sleeve gastrectomy was within the World Health Organization (WHO) guidelines, lap banding surgical patients had no difference from control group. **Conclusion:** Alcohol consumption, alcohol problem and alcohol abuse are increased after gastric bypass and those with	**Strengths:** Long follow-up time, from 8 to 22 years post-operative. 25 surgical departments across Sweden, 480 primary healthcare centers participated in the study. **Limitations:** Self-reported consumption by participants. The study contains only inpatient data. The study could not be randomized, and subjects also had

Level of Evidence: II **Quality:** Good		vertical sleeve gastrectomy.	differing patient baseline characteristics between control and surgical groups (ie: sex of participant, tobacco use).
Author Recommendations: The authors suggest patients should be informed about the risk for increased post-operative alcohol use prior to choosing bariatric surgery for weight loss.			
Implications: Ongoing education, follow up care preoperatively and postoperatively.			

Source: Song, A., Fernstrom, M.H. (2008). *Nutritional and psychological considerations after bariatric surgery.* New York, New York: Oxford University Press, 195-199 doi: 10.1016/j.asj.2008.01.005			
Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: This study focuses on complications that bariatric surgical patients face, including nutrition deficiencies and previous psychiatric diagnoses, including Axis I and Axis II diagnoses; one of them being binge eating disorder. **Sample/Setting:** Research from the past several decades.	Expert opinion, critical review of the literature.	Maladaptive behaviors are normal. If the patient had previous deficiencies or mental health concerns, there will be more probability for complications post operatively. Consistent, long-term follow up is essential to minimize complications from nutritional deficiencies. Seeking or continuing psychological treatment after surgery will reduce risk to return to prior eating behavior, or develop other behaviors. **Conclusion:**	**Strengths:** Surgical journal, 62 references. Discusses common nutritional and psychological issues related to weight loss surgery, including maladaptive coping. **Limitations:** Somewhat outdated article. Article focused on nutritional deficiencies rather than specific substance use concerns following

Johns Hopkins Evidence Appraisal **Level of Evidence:** IV **Quality:** Expert opinion		Seeking or continuing psychological treatment after surgery will reduce risk to return to prior eating behaviors or to develop other behaviors.	surgery. Expert opinion is lower level evidence.
Author Recommendations: Proper nutrition and sustained long term healthy habits. Long term follow -up is needed.			
Implications: Identifying psychological concerns prior to surgery. The author suggests long term follow up is needed to minimize psychological and medical complications.			

Source: Suzuki, J., Haimovici, F., & Chang, G. (2012). Alcohol use disorders after bariatric surgery. *Obesity Surgery, 22*(2), 201-207.			
Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To determine the prevalence of current and lifetime alcohol use disorder (AUD) in patients that have undergone bariatric surgery. The authors also want to hypothesize that greater weight loss is associated with a higher incidence of AUD following bariatric surgery. **Sample/Setting:**	Subjects who went through bariatric surgery between 2004 and 2007 were recruited for inclusion in the study. The diagnosis of current and lifetime prevalence of AUD was assessed using a structural clinical interview for DSMIV. Patients were selected that went through a required psychiatric evaluation from one of the various authors.	A total of 51 individuals were included. The prevalence of lifetime and current AUD was no higher than the general population. **Conclusion:** No associations were found between weight loss following surgery and the development of alcohol use disorders or any other Axis I diagnosis.	**Strengths:** 530 individuals were contacted by mail to participate. A standardized assessment was used for all participants. All authors were psychiatrists at Harvard Medical School. **Limitations:** Small sample size. Only 51 of 530 individuals agreed to participate. No further attempts were made to potential study

51 participants, although 530 individuals were invited to participate. **Johns Hopkins Evidence Appraisal Level of Evidence:** III **Quality:** Low			participants. One attempt only was made to encourage participation in the study.
Author Recommendations: Further studies are needed to evaluate current alcohol use prior to bariatric surgery as well as lifetime history of alcohol use.			
Implications: The need for a trial that **uses** a prospective design sample with a larger sample size.			

Source: El-Khoury, J. (2010) The alcohol factor in Wernicke's encephalopathy post bariatric surgery *Annals of Surgery 2010 May; 251(5) p. 992-993*			
Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**

Purpose: Education – consideration of alcohol induced thiamine depletion post bariatric surgery. **Sample/Setting:** Letter to the editor **Johns Hopkins Evidence Appraisal** **Level of Evidence: V** **Quality:** Low	Professional psychiatrist opinion; Letter to the Editor.	Development of Wernicke's encephalopathy post bariatric surgery. **Conclusion:** Recommending adding comprehensive alcohol use history to presurgical assessment.	**Strengths:** Learning of patient thiamine deficiency. **Limitations:** Professional opinion on one patient.
Author Recommendations: More research needed regarding the prevalence of problematic alcohol use prior to bariatric surgery.			
Implications: There is a lack of evidence connecting Wernicke encephalopathy exists more prevalently in patients that have had alcohol problems that have had bariatric surgery than alcohol abusers that haven not had surgery.			

Source:
Grace, D., Alfieri, M., & Leung, F. (1998) Alcohol and poor compliance as factors in Wernicke's encephalopathy diagnosed 13 years after gastric bypass. *CJS Vol 41, No 5;*

October 1998			
Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: Review Wernicke's encephalopathy 13 years after gastric bypass surgery. **Sample/Setting:** Literature review **Johns Hopkins Evidence Appraisal** **Level of Evidence: III** **Quality:** Low	Literature review with 15 references.	Gastric bypass produces long term sustained weight loss, but increases chance of nutrient deficiencies over other bariatric surgery methods. **Conclusion:** Patients considering weight loss surgery should receive counseling prior to and after surgery. Long term nutritional counseling is recommended.	**Strengths:** Follow and review one patient; extensive medical history from 1983 to 1998. **Limitations:** Following only one patient.
Author Recommendations: Long term monitoring for possible co-morbidities in patients seeking weight loss surgery.			
Implications: The need to consider the possibility of metabolic problems post-bariatric surgery.			

Source:
Hardman, C. A., & Christiansen, P. (2018). Psychological issues and alcohol misuse following bariatric surgery. *Nature Reviews Endocrinology, 14*, 377+. Retrieved from https://link-gale.com.ezproxy.bethel.edu/apps/doc/A572615328/PPGS?u=clic_bethel&sid=PPGS&xid=81838c04

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To examine psychosocial consequences of alcohol misuse after bariatric surgery, including the increased risk of alcohol use disorder. Sample/Setting: Article only, no sample setting Johns Hopkins Evidence Appraisal Level of Evidence: V Quality: low	Systematic review of 33 qualitative studies investigating psychosocial challenges that patients experience after bariatric surgery.	The actual prevalence of alcohol use disorder (AUD) outside of research studies could Possibly be underdiagnosed. Conclusion: All patients need to be informed about the potential for increased risk.	Strengths: Article stresses studies differ with respect to how data is being collected, correlated and evaluated, and how studies do not clearly define what constitutes alcohol abuse. Limitations: The author used only 5 references from obesity surgical journals. Authors received funding from American Beverage Association, which may be a conflict of interest.

Author Recommendations: The author suggests that more quantitative, longitudinal studies need to be done to examine psychological and psychosocial side-effects after bariatric surgery.

Implications: Long-term psychological support beyond the second post-surgical year will be critical in reducing and addressing psychological issues including increased alcohol use.

Source:
Sarwer, D.B., Fabricatore, A.N., Jones-Cornielle, L.R., Allison, K.C., Faulconbridge, L. N., Wadden, T.A. (2008). *Psychological issues following bariatric surgery* The International Journal of Neuropsychiatric Medicine (2008); 15, (8) 50-55 Communications. Retrieved from https://ezproxy.bethel.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=105663127&site=ehost-live&scope=site

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: Understanding psychological changes after bariatric surgery. The authors are attempting to determine their role in caring for the patient population that has weight loss surgery. **Sample/Setting:** Critical review of the literature **Johns Hopkins Evidence Appraisal** **Level of Evidence:** IV **Quality:** Good	Critical review of the literature with 81 references. This comprehensive review of the literature examines the psychosocial and behavioral aspects of bariatric surgical patients.	Numerous psychological side effects post - surgery including substance abuse. **Conclusion:** Recommendation for ongoing psychological evaluations before and after bariatric surgery. Most times, sizeable weight loss is sustained without psychological complications. Poor outcomes are typically due to psychological or behavioral concerns, rather than surgical complication.	**Strengths:** Number of references used. Peer reviewed by two professors of psychiatry at 2 different schools of medicine. **Limitations:** Very few studies have been done on postoperative mental health care. This was designed as a CME for primary care physicians and psychiatrists. Some studies relied on small sample sizes, failure to use validated assessments, and absence of appropriate comparison groups. Patients may minimize psychological distress prior to surgery due to possibility of being denied surgery based on mental health evaluation.

Author Recommendations: Consideration of mental health professionals in caring for post- operative bariatric patients.

Implications: With respect to healthcare, more studies need to be done prior to, and following bariatric surgery for weight loss.

Source:
Bak, M. (2016). *The potential for cross-addiction in post-bariatric surgery patients: Considerations for primary care nurse practitioners*. Malden, MA

Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: The purpose of this study is to develop recommendations for monitoring an addiction screening tool to be used by primary care providers prior to and after patients have bariatric surgery. **Sample/Setting:** Patients that were 18 years or older with bariatric surgery at least one year prior. The actual age range for this study was 31-65 years of age. **Johns Hopkins Evidence Appraisal** **Level of Evidence:** IV **Quality:** Low	Qualitative descriptive design of literature, 12 post-bariatric surgical patients that agreed to participate in a focus group. 8 were female, 4 were male.	Participants admitted to alcohol, gambling, shopping, exercise, and increased sexuality. **Conclusion:** Several themes were identified including various addictions to alcohol, gambling, shopping, exercise and sexual activity after bariatric surgery.	**Strengths:** 3 content experts were utilized. **Limitations:** The study had 12 patients total. The tool used for screening was not universal. All were Caucasian from upstate New York. The sample would benefit from a larger, diverse population.

Author Recommendations: The findings suggest more long-term screening is needed. It should be noted that participants of the study requested ongoing follow up during their post-surgical appointments.

Implications: Further investigation for potential mental health concerns are needed for bariatric surgical candidates.

Source: Kleiner, K., et al (2004) Body mass index and alcohol use *Journal of Addictive Diseases Vol 23, No. 3, (2004) p. 105-118*			
Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
Purpose: To study the relationship between eating, overeating and addiction. **Sample/Setting:** 374 charts, demographics, labs, psychiatric diagnoses, interview, drug and alcohol history. **Johns Hopkins Evidence Appraisal** **Level of Evidence: I** **Quality:** Good	374 charts reviewed from patients being monitored for weight management. Study was over a 12-month period. Detailed alcohol use was in 298 charts.	The lower the patient BMI, the less alcohol they consumed. **Conclusion:** Obese females with BMI over 30 have lower rate of alcohol use than females with higher BMI.	**Strengths:** 74 references 298 total charts analyzed. **Limitations:** Study focused primarily on female subjects. No listing as to how many patients were actually interviewed vs chart review.
Author Recommendations: None noted.			

Implications: The author discusses the theory that addiction is a chronic disease. Some patients may continue to drink alcohol after bariatric surgery, without regard for possible negative consequences.

Source: Lent, M. R. (2013). *Smoking and alcohol use in gastric bypass patients*. Amsterdam: *Eating Behaviors* (14) 2013, 460-463			
Purpose/Sample	**Design (Method/Instruments)**	**Results**	**Strengths/Limitations**
To assess smoking and alcohol use prior to RYBG (Roux-en-y gastric bypass), identify preoperative characteristics associated with postoperative alcohol use and smoking; and examine the relationship between smoking, alcohol use, and weight loss. **Johns Hopkins Evidence Appraisal** **Level of Evidence: V** **Quality:** Low	Data extracted from survey included gender, pre-surgical BMI, surgery date, age, and race/ethnicity. Identical surveys were sent to patients 6 months preoperative, and 6 months and 12 months postoperatively. Surveys were not anonymous. Participants provided written informed consent.	High proportion of participants that responded were female, Caucasian, with a mean age of 50.1. Post-operative alcohol use increased 63.6% for those with higher BMI pre-surgery. Smoking was reduced by 6% after surgery, and continued to decrease with older age. Despite overall reduction in alcohol use, 23% of patients that didn't use alcohol prior to surgery reported using alcohol after surgery. **Conclusion:** Patients experienced alcohol use disorder in Roux-en-y patients only. 23.2% of patients that used alcohol hadn't used alcohol prior to surgery reported alcohol use. Smoking rates decreased postoperatively.	**Strengths:** University sponsored scholarly research. Study began with 899 RYGB patients from large rural health system. **Limitations:** Authors did not assess clinical criteria for alcohol use disorders. Data were subject to self-report. Interpretation of findings were possibly limited due to relatively low response rate. Results may not truly be representative of nationwide bariatric surgery population.

Author Recommendations: Data was limited to self -report. It is the authors hypothesis that patients that smoke and drink are less likely to complete pre or post- surgical surveys. Data collected was to use to help identify at risk patients prior to surgery.
Implications: Higher BMI correlates with higher chance of alcohol use disorder.