

FOOD SELECTION PATTERNS AND ATTITUDES
OF
JEJUNOILEAL AND GASTRIC STAPLE PATIENTS

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INTRODUCTION

Obesity was considered a symbol of affluence in the last century. Today obesity is recognized as a major health hazard and is considered the number one nutrition and health problem in the country (Patterson, 1978). Life expectancy is reduced when weight is increased 5% above the ideal weight (Blackburn, Dustan, Stunkard, Farquhar, & Levy, 1978). Between the ages of twenty and sixty-four, mortality is 50% greater among the obese than among the non-obese. Within this same age group, the obese have a 50% higher rate of death from renal and cardiovascular diseases, while mortality from liver cirrhosis is 10% more prevalent (Patterson, 1978).

Obesity is a multifaceted disease with a network of contributing factors. Bleicher, Cegielski, and Saporta (1974) state that of 31% of the U.S. population categorized as obese, only 1% of this obesity is attributed to endocrine dysfunction, while the remaining 30% is due to a complex of psychological, social, and possible ethnic factors which lead to overindulgence with food. Hamburger (1978) states that no studies on obese patients in the medical literature have revealed any consistent etiologic cause for the usual case of obesity. The literature has stated that obesity is due to an imbalance in calories consumed and calories expended. Blackburn et al. (1978) stated that obesity is not caused as much by increased consumption as by decreased activity. On the other hand, Hamburger (1978) states that overeating is the primary cause for obesity and that muscular inactivity may also contribute to the disproportion between intake and outflow of energy.

In cases of morbid obesity (defined as 100 lbs or more over ideal weight) the increased incidence of coronary heart disease, hypertension, diabetes mellitus, and respiratory distress is well documented (Halstead & Stern, 1979; Van Itallie & Burton, 1980). The stress of excess body weight may restrict movement of the joints resulting in osteoarthritis and may decrease pulmonary and respiratory function by restricting movement of the chest. Liver function is impaired by elevated triglyceride and lipid levels in the blood. Gallbladder disease is also common among obese individuals.

Beyond physical problems encountered by the obese are social problems. According to Bleicher et al. (1974), the morbidly obese person has difficulty performing routine tasks at home and at work. Life is complicated by the inability to dress and cleanse the body. The opportunity for employment is limited along with the prospect for marriage. The adverse effects of obesity are not only suffered by the obese, but also by children of obese parents who have a greater than twenty-to-one chance that childhood obesity will persist into adulthood (Halstead & Stern, 1979).

A variety of dietary programs have been used in the treatment of obesity with limited success. Only 10% - 20% of individuals considered successful at weight loss are able to maintain the loss for more than a few years (Van Itallie & Burton, 1980). Because most morbidly obese have failed to respond to conventional methods of weight reduction, surgeons have turned to the surgical treatment of morbid obesity.

The jejunoileal (JI) bypass is the standard against which all other surgical procedures for weight loss are compared. Gastric stapling (GS) is an alternative to the hazardous side effects of JI bypass surgery. The original rationale for JI

bypass treatment was that reduction of the length of the absorptive area of the intestine would lead to fewer calories being absorbed, thereby resulting in weight loss. Recent studies have suggested that most of the observed weight loss occurs because of voluntary restriction of food intake (Blackburn et al., 1978; Buckwalter, 1979; Rodin, 1980). The reduction in food intake of JI bypass patients is sometimes related to reduced appetite and at other times intake is restricted because of diarrhea which is aggravated by fried, fatty, and liquid foods (Buckwalter, 1979). Mason, Printen, Blommers, Lewis, & Scott (1980) suggested that JI bypass patients reduce the intake of food because eating causes an ill feeling.

Rauen and Tseng (1979) found a change in food selections and food-related behavior of JI patients as a result of post-operative gastrointestinal complications. They also found changes in patient attitudes as a result of surgery. This study will attempt to determine if there is a consistent pattern in food selection changes between GS and JI patients. Because few studies adequately address the changes in food selections and food-related behaviors of the obese, further research is indicated. A conference and summary on the surgical treatment of morbid obesity indicated that the behavioral effects of surgical treatments should be studied in greater detail (Van Itallie & Burton, 1980). The effects of surgical therapy on the control of food intake also needs more attention (Halstead & Stern, 1980; Van Itallie & Burton, 1980).

Statement of the Problem

A need exists to inform health care members working with JI and GS patients of the changes in food selection behaviors so that these members may be of assistance in helping these difficult patients. Awareness of gastrointestinal disturbances

and food intolerances can help dietitians prepare appropriate counseling plans for use in patient consultations. Patient awareness of gastrointestinal disturbances and food intolerances as a result of surgery may help patients anticipate changes in food habits. This study will attempt to investigate food selection patterns of GS patients and determine how these changes relate to changes reported to occur in JI patients. The study was limited to fifty each JI and GS patients who were a minimum of six months post-operative. Patients were under the medical care of a single surgeon to reduce variance in surgical techniques and post-operative results.

REVIEW OF LITERATURE

The review of literature presents the relationship of obesity to eating behavior. Eating patterns and specific food preference of the obese along with a discussion of attitudes toward obesity are presented. Various types of surgery are described and dietary implications of JI and GS surgery covers prescribed diets and post-operative changes in food habits. Nutritional problems resulting from surgery will conclude the review of literature.

Food-Related Behavior of the Obese

According to Bruch (1957), food is used indiscriminately as a universal pacifier early in life, which changes a state of discomfort into a state of contentment. Schafer and Yetly (1975) state that food serves an individual in a variety of ways beyond satisfying physiologic needs. Food behavior is defined as the result of the mutual influence of environmental, personal, and biological factors (Schafer & Yetley, 1975).

Differences in food behavior are the result of various external and internal cues affecting the individual and the manner in which these cues are patterned by the individual. Attitudes and values of the individual establish the frame of reference for interpreting stimuli regarding food and food-related information. A model presented by Schafer and Yetley (1975) explaining the frame of reference for observed food behavior is presented in Table I.

Once a food behavior pattern is established, any disruption in the pattern will upset stability and result in tension. As the individual seeks to re-pattern his

food behavior, the contribution of external factors increases. These external factors include friends, advertisements, television programs, and educational programs. Bruch (1957) states:

We must learn to recognize that for many people overeating and being fat is a balancing figure in their adjustment to life. Ineffective as it is, it represents the best form of adaptation that such people have been able to make.

Table 1

MODEL EXPLAINING REFERENCE OF OBSERVED FOOD BEHAVIOR

EXTERNAL FACTORS	INTERNAL FACTORS
Friends	Attitudes
Family members	Personal Values
Advertisements	Self-Concept
TV Programs	Beliefs
Educational programs	Sociologic Needs
	Biogenic Needs

Eating habits are influenced by external cues from the environment and affect all people to some extent. Obese individuals can be highly responsive to external cues which relate to food intake. Rodin (1980) found that JI patients who were highly responsive to external cues prior to surgery remained so after bypass, while those who were non-responsive prior to surgery remained unchanged post-operatively. A reduced preference for sweets, fewer food cravings, and an increased experience of satiety which has been reported in some JI patients may counteract the external cue interaction to some extent and result in a reduced food intake (Rodin, 1980).

While GI patients tend to change eating behaviors as a result of post-operative complications, GS patients are forced to change eating habits because the creation of a small gastric pouch limits food capacity and intake ("Gastric Stapling Helps Obese," 1978). The upper gastric pouch allows the ingestion of only 60 ml of food at any one time which creates early satiety and slow gastric emptying. Consuming 84g of food causes abdominal pain, while 112g causes vomiting (Elliot, 1978). If high calorie foods and beverages are consumed, weight reduction will not occur. Most GS patients feel satisfied with small quantities of food and therefore, eat less. Overloading the pouch with food can cause stretching which will result in the need for ingestion of larger quantities of food to feel satisfied. Dietary counseling is crucial in order to avoid emesis due to overeating and to ensure that proper nutrient intake is provided in the diet.

Deviant eating behaviors and body image disparagement are disorders reported with greater incidence among obese than among non-obese individuals (Rand, 1978). "Body image" refers to the picture a person has of the physical appearance of his body. Disturbances in body image may range from gross depersonalization through distorted thoughts and feelings about the body, to distorted perceptions (Stunkard & Mendelson, 1967). Body image distortions do not occur in emotionally healthy obese persons.

Eating Patterns

Examination of an obese individual's eating behavior reveals various eating patterns, according to Stunkard (1978). The following feeding patterns are considered typical of the obese: night eating syndrome, the eating binge, and eating without satiation.

Night eating syndrome is characterized by morning anorexia, evening hyperphagia, and insomnia. A night eating syndrome occurs when an individual is under stress. The syndrome seems to reduce stress. No symbolic representation is associated with night eating syndrome.

In contrast to a night eating syndrome, an eating binge involves consumption of large amounts of food in relatively short time periods. Eating binges also occur during stressful times and are followed by severe discomfort and expressions of self-condemnation. Eating binges are often associated with a specific event and have a personalized symbolic meaning. Hamburger (1974) notes that binges are usually indulged in by dieters on weekends as rewards for faithful dieting during the week. Stunkard (1978) describes a case study of a patient who consumes as much as 20,000 calories per day during a binge. Although binges occur infrequently, binges along with overeating play a major role in continuing obesity.

Eating without satiation is another feeding pattern typical of the obese. Without hunger or a desire to eat, the patient who eats without satiation has difficulty stopping eating. Eating without satiation is not related to stress and no symbolic meaning is associated with this pattern of food intake. Many obese with extensive brain damage are reported to follow this pattern of eating. Although incidences of the eating patterns described were found among only a small number of obese patients treated by Stunkard from 1972 - 1978, characteristic eating patterns provide criteria to distinguish different types of obesity and further an understanding of obesity.

Hamburger (1974) describes the gross overeaters who eat too much food at meals and between meals. Overeating may be described as eating more food than the body requires. Efforts at weight reduction for gross overeaters are usually

unsuccessful, as food is so important that deprivation is threatening. Weight reduction for these persons requires a restructuring of their personalities.

The typical pattern of eating among many obese according to Hamburger (1974) is a minimal caloric intake at breakfast and lunch with an emphasis of caloric intake at dinner and evening snacks. The obese justify a large caloric intake in the evening because the feeling is after all, I have not eaten all day. Rodin (1978) states that the obese eat fewer meals and more food per meal than normal weight people.

Debry (1978) notes that the majority of studies concerning meal frequency patterns indicate that a reduction in the number of daily meals produces an increase in weight and fatty mass, and a decrease in protein turnover. A study of 119 obese patients was conducted by Debry (1978). A hypocaloric diet divided into three meals was consumed by one group, while a hypocaloric diet consisting of seven meals was consumed by the other group of patients. After one month, a greater weight loss was found among the group consuming seven meals per day. Young, Hutter, Scanlan, Rand, Lutwack, and Simko (1972) found similar results in eleven obese subjects. In this study, 63% of subjects lost more weight on seven versus three meals per day. Weight reduction resulting from consumption of small frequent meals is only successful when caloric intake is reduced (Debry, 1978).

Food behaviors and patterns are formed within the family; therefore, any change in the individual's habits requires support of the family. Family members should be included in the planning of food behavior changes so that a long-term prognosis will be successful. Nutrition information should be evaluated within the individual's frame of reference. Nutrition educators must be aware of the patient's patterning of food behaviors and self-needs so that support will be given to both

social and psychological needs of the client (Schafer & Yetley, 1975).

Food Preferences of the Obese

Hamburger (1974) notes that even a cursory investigation into the dietary habits of the obese reveals a preference for breads, potatoes, other starches, and sweets. For the obese, a compulsive craving for sweets may start in early childhood, independent of external events. Milstein (1978) studied the visual and taste responsiveness of one and three day old babies whose parents were either both obese or both of normal weight. Babies who weighed less demonstrated a weaker preference for a sweet taste as compared to heavier weight babies. Babies of overweight parents were more responsive to sweet taste and more compelled by visual stimuli than babies of normal weight parents. This information suggests that babies of obese parents have a greater risk of becoming obese by having an increased preference for sweet taste soon after birth. Cabanac (1971) found that pleasantness of sweet taste is increased when an individual is deprived of food.

GS patients have reported specific changes in food preference and tolerance levels. Meats, spicy foods, and high carbohydrate foods are least well tolerated (Buckwalter, 1979; Schaff 1979; Saltzstein & Gutmann, 1980). A pilot study on GS patients by Schaff (1979) found the following post-operative changes in food consumption: the most pronounced decrease was found in fat intake which was followed by a decrease in sweets and meat intake, no change in the consumption of fruits or vegetables, and a closer compliance to the recommended intake of two cups of milk per day.

Changes in food preferences and eating habits have also been found among JI patients. Buckwalter (1977) found that JI patients increased the intake of salads,

vegetables, and fruits post-operatively, while snack foods were not consumed as frequently as before surgery. Mills and Stunkard (1976) found the following changes among post-operative JI patients: decreased eating binges, less night eating, less snacking, less difficulty stopping eating, reduced craving for sweets, decreased food consumption in general, fewer meals, and increased breakfast consumption. A decreased intake of fried foods was found by Castelnovo-Tedesco and Schiebel (1976). Mills and Stunkard (1976) found a reduced craving for sweets. Rauen and Tseng (1979) found that sweets were still desired post-operatively among JI patients.

Emotions and Attitudes of the Obese

The association between obesity and emotional disturbances has been a controversial issue for the past fifty years (Halmi, Stunkard, & Mason, 1980). A limited understanding of the effect of surgical treatments for obesity and emotional responses to these treatments exists. The incidence of emotional responses, particularly anxiety and depression, among morbidly obese persons approaches 100% (Halmi et al., 1980). In an effort to lose weight by dieting, most obese patients experience pre-occupation with food, irritability, anxiety, and depression. Research has shown that of patients with mild to moderate obesity, little difference in emotional status was demonstrated between obese as compared to non-obese patients (Halmi et al., 1980; Mills & Stunkard, 1976). In contrast, Moore, Stunkard, and Srole (1962) report that in a population of 1660 patients, emotional disturbance was higher among patients 35% or more overweight than among patients of normal weight. A study of the emotional responses to weight reduction by gastric bypass, jejunoileal bypass, and diet was conducted by Halmi et al. (1980). Research indicated that patients who

ate less because of physiological regulation may have fewer emotional consequences than patients who ate less in response to dietary restrictions.

Eating as a strategy for relieving fear or anxiety can be developed at any point in life (Rand, 1978). Tension and irritability resulting from hunger are relieved by eating in infants. When the association between eating and the diminution of anxiety is established, anticipation of these emotions can motivate eating (Rand, 1978). The obese may confuse fear or anxiety with hunger and eat indiscriminately (Rand, 1978).

Many people are not aware of the extent to which eating is emotionally motivated. The distinction between awareness of an emotion and understanding the motivation underlying the self-observed emotion is essential to understanding food behaviors (Rand, 1978).

Non-Surgical Treatments of Obesity

Treatment of obesity has remained a difficult problem for both patient and physician because of a lack of knowledge of the etiological factors of obesity. According to Debry (1978), the modern concept of obesity treatment propounds two goals: (1) To assure a long-term physical and psychological well-being of the subject with a minimum of pathological risks and (2) To produce a rapid weight loss without risks to health in a comprehensive manner. Treatment of obesity should entail a permanent, long-term control best suited for the patient's lifestyle. A compromise must be established between an optimum weight level and the imposed life-long constraint of dieting.

Various techniques have been proposed for treating obesity such as diet clubs, fasting, fad diets, drugs, exercise, behavior modification, and psychotherapy.

Evaluating the success of these treatments as based on published articles is difficult because results are rarely based on long-term treatment.

Restriction of caloric intake and an inclusive program of exercise has continued to be the basis for successful weight reduction programs (Blackburn et al., 1978). Groups of patients studied by Mills and Stunkard (1976) tried dieting many times with short-term success, but never with lasting success. Fewer than 5% of moderately obese people who join diet clubs lose as much as 18kg of body weight (Kark & Burke, 1979).

According to Bruch (1957), most individuals are able to lose weight under controlled conditions such as lengthy hospitalization. Most hypocaloric diets advocate a slow weight loss of one-to-two pounds per week, but are most often successful in highly motivated patients who have the support and follow up of a physician and dietitian.

Numerous diets have been published and promoted which are not nutritionally balanced, yet have been popular as a quick method to lose weight. The problem with fad diets is that weight lost in dieting is regained as the individual inevitably returns to prior eating habits. A change in eating habits to control caloric intake is essential in following a life-long diet to prevent obesity.

The use of drugs in treating obesity produces side effects and also has the tendency to cause dependency on drugs. Discontinuation of drug intake results in weight gain as prior eating habits resume. Although many drugs on the market have anorexic effects on appetite, drugs cannot improve the results of dietary control (Kark & Burke, 1979).

Psychotherapy has been useful in treating binge eating syndrome and body image distortion (Blackburn et al., 1978). The current belief is that psychological

factors have only a small role in producing obesity in people (Blackburn et al., 1978).

Behavior modification has been used for the past ten years as therapy for weight control. Behavior modification is proving to be more effective than traditional hypocaloric diets (Krause & Mahan, 1979). An individual may gain insight into factors influencing the eating behavior displayed and learn the method for controlling the eating response through the use of behavior modification techniques. Weight loss is achieved by creating new eating behaviors. The motivation and change in eating behavior may be successful in treating obesity if the return to former eating behaviors is diminished.

The dietary techniques discussed above have not been successful in treating many morbidly obese patients. For this population of morbidly obese for whom all conventional forms of weight reduction have failed, surgeons have turned to the surgical treatment of obesity.

Surgical Treatment of Obesity

The rationale for the surgical treatment of obesity is based on the dual premise that severe obesity is a life-endangering disorder and that long-term medical treatment often yields unsatisfactory results (Dean, Scott, Shull, & Gluch, 1977). Surgical treatment of morbid obesity is considered a last effort after failure at all other attempts at weight control.

Although surgery for morbid obesity has been performed for twenty years, the most popular operations in the past ten years are the JI bypass and GS (Halverson, 1980). The JI bypass allows a patient to lose weight while continuing to eat large volumes of food by creating a short bowel syndrome which results in malabsorption.

GS produces weight loss by reducing the caloric intake as food intake is limited by a small gastric pouch. The JI and GS procedures show similar post-operative weight loss (10 kg in one month, 14 kg in two months, and 38 kg in one year), operating times (60 - 70 minutes), and immediate post-operative morbidity (Alden, 1977). Complications associated with JI are greater in frequency and seriousness than complications associated with GS. The greatest difference between JI and GS is seen in the absence of metabolic sequelae in GS (Halverson, 1980). In both JI and GS the risk of weight gain after two to three years is dependent upon the caloric intake of the patient. Surgery either alters absorption or capacity for food intake, but does not directly attack the cause of overeating (Buchwald, 1979).

History of Surgery for Morbid Obesity

Various surgical procedures have been developed for the treatment of morbid obesity. Experience with and evaluation of surgical treatments provided the basis for modifying surgical techniques to allow weight loss with fewer risks to the patient. Following are the types of surgery performed for morbid obesity.

Jejuno-colic bypass. The original procedure was an anastomosis of 15 inches of jejunum to the transverse colon, bypassing the ileum. The jejunum length was later increased to 20 inches because diarrhea and loss of electrolytes were common. Regardless of the increased length of the jejunum, complications of diarrhea, liver failure, electrolyte depletion, and often death outweighed the effectiveness in weight reduction.

End-to-side bypass. This surgical procedure, developed by Payne, joins the proximal 10 inches of jejunum to the distal 20 inches of ileum. The defunctioned ileum is anastomosed to the colon for drainage of gastrointestinal secretions.

The end-to-end and end-to-side shunts have decreased malabsorption complications of the jejunocolic bypass by preserving the ileocecal valve and ascending colon. Preservation of the ileocecal valve allows a slower transient time and greater water absorption so that less diarrhea and electrolytes are lost (Balfour, 1978). Preservation of the terminal ileum has made parenteral B12 administration unnecessary.

Gastric bypass. Mason suggested the gastric bypass in 1966 as an alternative to the JI bypass. The original bypass created a 15% - 20% proximal gastric pouch by transecting the stomach and used a 12 - 15 ml retro-colic gastroenterostomy. Gastric bypass was not performed until 1971 as it was technically more difficult and time consuming than the JI bypass (Buckwalter, 1979). The dumping syndrome occurred in 30% of patients who ate too much food or ate food quickly. In 1975, the volume of the upper pouch was reduced to 50 ml with a 1.2 cm stoma to prevent inadequate weight loss.

Gastric restriction. In the past ten years gastric restriction procedures (gastroplasty and gastric stapling) have become popular. The concept of creating a small (45 - 100 ml) proximal gastric pouch limits food capacity and allows early satiety. Outflow from the pouch occurs through a gastrojejunostomy between the pouch and jejunum in the gastric bypass, or through a channel into the distal stomach as in gastroplasty or gastric stapling.

The gastric pouch must be small enough to restrict food intake severely, and the outflow tract small enough to prevent rapid emptying of ingested food from the proximal gastric pouch to the distal gastric pouch. Current recommendations include a 45 - 100 ml proximal pouch which is equal to 10% of normal gastric volume, and an outflow tract measuring 1.2 - 1.5 cm in diameter (Halverson, 1980). Pace, Martin, Tetirick, Fabri, & Carey (1979) state that the criteria for success

of gastric restriction operations includes continued weight loss of at least five pounds per month and rapid satiety. The most important consideration is whether or not weight loss is permanent in JI and GS patients.

Criteria for Patient Selection

The criteria for the selection of patients for JI bypass and GS is essentially the same. Patients must not have any endocrine abnormalities which relate to obesity, have uncontrolled eating habits, and exhibit medical problems which threaten life. Alden (1977) requires that patients be examined by a psychiatrist and that the patient has been obese for at least five years. The University of Iowa (1975) requires that GS patients have the willingness to make necessary changes in eating habits and that motivation to lose weight is apparent.

The majority of surgeons base criteria for patient selection on the following:

1. patient is twice the normal weight or 100 pounds overweight.
2. all reputable methods of weight control have failed.
3. the patient understands and accepts all surgical risks and metabolic disorders created by the surgery.
4. the patient is willing to undergo constant post-operative evaluation, both clinical and laboratory.
5. there must be careful evaluation of each patient's motivation, environment, lifestyle, and family by the surgeon and internist.

Included with the above criteria are a stable life pattern, absence of renal failure, serious myocardial disease, inflammatory disease, pulmonary embolization, and cirrhosis of the liver (Bray, Greenway, Barry, Benfield, Fiser, Dahms, Atkinson, & Schwartz, 1977). Presence of one or more of the following is required by Bray et al. (1977) hypertension, Pickwickian syndrome, diabetes mellitus,

congestive heart failure, infertility, degenerative arthritis, and hyperlipidemia.

Various physicians have set age limits as an additional criteria for patient selection. Crisp (1977) and Mills and Stunkard (1976) advise age twenty to thirty because of a cooperative nature and ability to alter behavior and attitudes (Car-ruth, 1977). Other physicians require the patient to be less than 50 years of age for JI surgery (Phillips, 1978; Printen & Mason, 1977).

Nutritional Complications of Surgery

The operative mortality rate for both JI and GS is 1 - 2% (Buckwalter, 1979), while the rate of rehospitalization for the first post-operative year is 12% for GS patients as compared to a 32% rate for JI patients (Alden, 1977). Although weight loss achieved by JI and GS is similar, alteration of the gastrointestinal tract in JI patients produces a state of malabsorption resulting in chronic complications such as hepatic dysfunction, vitamin and electrolyte deficiencies, and liver disease. GS avoids these complications by retaining components of the gastrointestinal tract necessary for normal absorption and digestion of foods. As noted previously, the greatest difference between JI and GS is the absence of metabolic problems seen in GS patients (Halverson, 1980).

Common nutritional complications of JI patients are diarrhea, fat malabsorption, protein malabsorption, vitamin deficiencies, electrolyte deficiencies, and liver disease. Each complication will be discussed briefly and will be followed with the nutritional complications encountered by GS patients.

Diarrhea is a universal occurrence among JI patients, while absence of diarrhea is an indication of an inadequate bypass since weight loss will be unsatisfactory (Phillips, 1978). Diarrhea is the result of malabsorption and an excess of

bile salts in the colon (Bray et al., 1977; Husemann, 1977; Phillips, 1978). Lactose intolerance is considered an additional cause of diarrhea according to MacLean (1976). Patients with persistent diarrhea are found to have an excess of fat in the diet (Phillips, 1978). Diarrhea causes losses of fluid, sodium, and potassium.

Malabsorption of fat is common among JI patients. Steatorrhea results from decreased ileal absorption of bile acids (Bray et al., 1977). Prior to JI bypass, patients on a 100g fat diet absorb 95% of the fat, while only 50% - 60% of fat is absorbed after JI bypass surgery (Balfour, 1978).

Malabsorption of fat inhibits absorption of the fat-soluble vitamins A, D, E, and K. Fat-soluble vitamins must be supplemented in water-soluble form or by injection. Significant vitamin A, E and/or 25-hydroxy D deficiency was found in 76% of patients studied up to six years post-operatively. Malabsorption of vitamin K was not seen in JI patients because the vitamin can be absorbed from the colon and is found in dietary sources and produced by intestinal bacteria. The significance of vitamin E deficiency was not certain. Despite multivitamin supplementation and consumption of twice the Recommended Daily Allowance (RDA) for vitamin A, subnormal values for vitamins A, D, and E were found (Rogers, Douglass, Russel, Bushman, Hubbard, & Iber, 1980).

An intolerance of carbohydrate has been noted in 55% of JI patients under the care of Stunkard and Blumenthal (1972). Malabsorption of lactose in JI patients caused abdominal distention and gas (MacLean, 1976). Malabsorption of carbohydrate has been reported with a D-xylose loading test. Husemann (1977) notes that impairment of carbohydrate utilization ceases in one year after JI bypass surgery at which time the fasting glucose level is normally below 80 mg per deciliter. Normal blood sugars were found in 12 of 13 diabetics at 9 - 44 months post- JI

bypass (Baddely, 1979). Normal insulin responses with a decrease in glucose intolerance and a return of normal glucose and insulin levels was found in twenty-four post- JI bypass diabetics by Ahmad, Danowski, Nolan, Stephan, Sunder, and Bahl (1978).

Protein metabolism is not affected to the extent most individuals assume according to Husemann (1977). While hypoproteinemia may occur in patients whose intestine is 18 inches or less (Husemann, 1977), protein levels are within the normal range in patients when 20 cm of both jejunum and terminal ileum are retained (Husemann, 1977). A decline in albumin may result from the increased excretion of fecal nitrogen which would reduce concentrations of amino acids in the serum (Husemann, 1977). Alopecia is noted in 4% - 33% of patients post-JI bypass (Phillips, 1978). Although alopecia may accompany any form of rapid weight loss, protein deficiency may be the underlying etiology for surgical bypass patients (Phillips, 1978). Degree of hair loss is variable and the regrowth (usually six to twelve months post-JI bypass) is possibly a sign of improvement in amino acid absorption.

Vitamin deficiency has been discussed in regard to fat-soluble vitamins. A decrease in serum vitamin levels has also been found in the water-soluble vitamins B12 and folate, which results from a decreased absorptive surface, bacterial overgrowth, and poor quality of dietary intake (Baddely, 1976). Bray et al. (1977) report normal B12 levels when 36 cm of ileum are retained. The ileal reflux common to the Payne procedure may prevent B12 deficiency since absorption of B12 is a function of the terminal ileum (Phillips, 1978). Surgeons suggest an injection of B12 once each month after JI bypass surgery. Anemia is common among JI patients; however, the mechanism of iron deficiency is obscure since iron is primarily absorbed in the duodenum (Phillips, 1978). Anemia may be caused by

deficiency of folic acid, vitamin B12, copper, or iron according to Phillips (1978).

According to Bray et al. (1977), oxalic acid absorption is increased after JI bypass. Dietary oxalate is normally bound with calcium to form insoluble calcium oxalate which is excreted in the feces of pre-operative JI patients. After JI bypass, more fatty acids are available to complex with calcium, leaving less calcium to complex with oxalic acid. The result is a greater absorption of oxalate and the formation of oxalate renal stones. Reducing the dietary fat and oxalate intake will reduce formation of oxalate stones (Bray et al., 1977).

Liver Disease

From 60% - 98% of obese patients have fatty infiltration of the liver prior to bypass (Phillips, 1978). A temporary increase in fatty infiltration of the liver occurs after weight reduction as fat deposits are rapidly broken down (Husemann, 1977); however, as weight reduction plateaus, fatty infiltration decreases (Phillips, 1978). Etiology for the occurrence of liver disease in JI patients has not been determined. A number of hypotheses are given to explain the liver disease occurring in JI patients. These include protein deficiency, choline deficiency, inadequate absorption of essential fatty acids, formation and absorption of excess quantities of lithocholic acid, endogenous formation of ethanol, deficiency of vitamin E, and formation of toxic bacterial products (Bray et al., 1977). Liver failure is presaged by anorexia, nausea, and vomiting. Levels of albumin and potassium are low, which results in fluid retention, edema, ascites, and finally jaundice and hypoprothrombinemia. Coma and death may occur if liver disease is not corrected (Phillips, 1978). Treatment of liver failure consists of hyper-alimentation with low calorie amino acid solutions. Liver dysfunction after JI

bypass improves with time (Halverson, Wise, Wazna, & Ballinger, 1978).

Adaption of the Small Bowel

An adaption to malabsorption occurs twelve to eighteen months post-JI bypass (Husemann, 1977). The shortened bowel will undergo longitudinal growth with a two-to-three fold increase in depth of the crypts and in height of the villi. The absorptive surface is enlarged six-to-eight times the original area post-operatively (Husemann, 1977). The adaption of the small bowel is responsible for cessation of weight loss and stabilization of weight which occurs twelve to twenty-four months post-JI bypass (Scott, Dean, Shull, Gluck, Abram, Webb, Brill, & Price, 1976). Gothlin, Andersson, and Dencker (1978) found an increased thickness of the mucosal folds of the small bowel one year post-JI bypass. This may suggest that bowel function may begin to normalize, but that bowel transit time shorter than normal.

The adaptation to malabsorption is evidenced by a return to normal serum values of electrolytes in the late post-operative period (Halverson et al., 1978). However, serum vitamin levels are not as likely to return to normal as electrolytes (Scott et al., 1976). A decrease in fatty liver is seen as the intestine accommodates with time and nitrogen balance is maintained (Scott et al., 1976).

Nutritional Complications of GS

Nutritional complications of GS may be classified as gastrointestinal and metabolic complications. The most common chronic GI problem is nausea with associated vomiting (Hermreck, Jewell, & Hardin, 1976). Vomiting is due to over-eating and is controllable by reducing the volume of food per sitting. Nausea and vomiting occur frequently in 15% of patients, occasionally in 45%, rarely in 30%

and never in less than 10% of patients (Mason, Printen, Blommers & Scott, 1978).

While diarrhea is common among all JI patients, few GS patients develop diarrhea. Constipation is more likely to occur (Knecht, 1978, Mason et al., 1978; Wills, 1980). Hermreck et al. (1976) cited two patients who developed chronic diarrhea for unknown reasons. A stable gastrointestinal function occurred in patients followed by Kark and Burke (1979) who had normal stool frequency and consistency. GS limits the amount of food ingested, but not as drastic of a limitation is put on liquid consumption. Patients who drink large quantities of tea or coffee may complain of diarrhea (Mason et al., 1978). Mild dumping is occasionally seen but normally does not persist because of the delay in emptying of foods from the upper to the lower gastric pouch (Alden, 1977; Soper et al., 1975).

Stomal ulceration has been observed at a 1.8% incidence among a large series of GS patients studied by Hermreck et al. (1976). The best way to prevent stomal ulceration is by creating a small proximal pouch. If there is not enough distal parietal cell mass to bathe the antrum with acid, a form of antral exclusion exists and marginal ulceration occurs (Knecht, 1978).

Metabolic Complications

Vitamin and electrolyte deficiencies are rare among GS patients; however, a few cases have been reported. Knecht (1978) reported the case of a woman who could not control a desire for water and would drink and vomit until she became hypokalemic. A mild iron deficiency anemia has been seen in some gastric bypass patients and is most likely due to a lack of exposure of ingested food to the duodenal mucosa (Halverson et al., 1978). The iron deficiency anemia which may occur in gastric bypass patients is eliminated by gastropasty (Mason et al., 1978). Peltier,

Hermreck, Moffat, Hardin, and Jewell (1979) noted thiamin deficiency among chronic vomiters. Hermreck et al., (1976) encountered two patients with vitamin deficiencies resulting from failure to take prescribed vitamins. These patients had also been found in a starvation state. Administration of vitamin B complex and an adequate diet resolved the deficiency. Hair loss is common two-to-three months post-operatively and stops six months post-operatively (Goette & Odom, 1976). Reported cases of alopecia are probably due to inadequate protein intake as was found in JI bypass patients.

Inadequate weight loss may be considered a nutritional complication which results from either too large a proximal pouch, eating quantities of food sufficient to prevent weight loss, or staple disruption resulting from overloading the proximal pouch during the first eight week post-operative period (Pace et al., 1979).

Nutritional complications of GS are all potentially correctable, reasonably preventable, and are not as major as the chronic complications observed in JI patients. A patient who fails at weight reduction through JI bypass develops severe complications, while a GS patient who fails at weight reduction will not develop malnutrition.

Post-operative Diet Prescriptions

JI diet. The rationale of the diet prescribed for JI patients is to reduce diarrhea and provide adequate protein. Diets vary from one physician to another as there is disagreement on which diet is most appropriate for the post-JI patient.

Swenson and Oberst (1975) and Baddeley (1979) recommend a high protein, low fat, low calorie diet. Six small meals with potassium rich foods are to be included in the diet (Swenson & Oberst, 1975). Limited spicy foods and green vegetables

along with a low fat diet regimen is recommended by Robinson, Folstein, and McHugh (1979). A diet with small quantities of liquid is recommended by Buckwalter (1977). In contrast to the recommendations of most physicians for use of a low fat diet, Buchwald et al. (1973) advise cottage and cheddar cheese, skim milk, and bananas for diarrhea. A multivitamin supplement is usually prescribed with inclusion of exercise to decrease diarrhea (Swenson & Oberst, 1975). Alcohol is restricted in all patients to reduce the incidence of liver disease.

GS diet. The rationale of the diet prescribed for GS patients is to prevent staple disrupture and stretching of the gastric pouch to ensure weight loss. Mason et al. (1980) emphasize the need for immediate supervision and education of patients regarding new eating habits. Knowledge of portion control and the caloric value of food is important to prevent overeating and stretching of the gastric pouch. Stretching of the pouch results in decreased weight loss because more food is required to fill the pouch and feel satisfied. Emesis may occur from overloading the pouch. Food must be consumed at a controlled rate to prevent staple disrupture which may occur up to the eighth post-operative week.

The University of Iowa hospital and clinic prescribe a liquid blenderized diet for the first eight weeks post-operatively. A slow progression to solid foods is then advised. Patients are counseled to re-introduce foods which are not tolerated well, such as meat, spicy food, and high carbohydrate food, at a later time. Foods which cause discomfort or lead to vomiting are often voluntarily eliminated from the diet (Saltzstein & Gutmann, 1980). The diet should be based on the four food groups with an emphasis on inclusion of a variety of foods divided into small frequent meals. A multivitamin and mineral supplement should be included daily (Pace et al., 1979).

The greatest challenge for a GS patient, as for any person who must reduce weight, is learning to alter a life-long behavior of constant nibbling and gorging (Knecht, 1978). Most patients adapt to the GS diet, but some patients eat to capacity, leave for the bathroom to induce vomiting, and return for more food (Hermreck et al., 1976; Knecht, 1978). Psychiatrists state that the more mature an adjustment the obese individual makes as a result of surgery, the better his food habits will be (Knecht, 1978).

Hypothesis

This study was designed to investigate the following statements:

1. There is a significant difference in the food selection patterns and attitudes pre-operatively between JI and GS patients.
2. There is a significant difference in the food selection patterns and attitudes post-operatively between JI and GS patients.
3. There is a significant difference in the food selection patterns and attitudes for pre and post-operative JI patients.
4. There is a significant difference in the food selection patterns and attitudes for pre and post-operative GS patients.

The significance of difference will be tested at the .05% probability level.

METHODS

Previous research on food selections and attitudes of JI patients had been completed by Rau and Tseng (1979). Permission was given by Rau and Tseng to use the questionnaire from the study done in 1979 so comparisons could be made between JI and GS populations. See Appendix for the questionnaire used in this study. To minimize variability in surgical technique and post-operative care, Peter Fisher, M.D., was contacted for permission to study former JI and GS patients. Fisher has performed both JI bypass and GS at Methodist Hospital in Houston, Texas. The medical files of Fisher were used for the random selection of fifty JI and GS patients. Patients selected were those who had the surgery six months or more prior to the study.

Each patient was contacted by telephone about participating in the study. A closed-type questionnaire was mailed to the subjects with a self-addressed return envelope for convenience. The questionnaire had been tested in a previous study by Rau and Tseng (1979).

Thirty-six questionnaires were received by the investigator; seventeen were from JI patients and nineteen from GS patients. Patients had been informed not to write their names on the questionnaire so that patients would remain anonymous.

The Statistical Package for the Social Sciences (SPSS) was used to analyze the data. Frequencies were obtained for each variable so that the distribution of responses to each item could be analyzed. Cross tabulations and analysis of variance were used to examine the relationships of the variables in the questionnaire

for JI and GS patients. Differences were analyzed at the $P < .05$ level of significance. Because of a limited number of patients in the study, differences at the $P < .10$ level will also be discussed.

RESULTS AND DISCUSSION

In this study, seventeen (34%) JI and nineteen (38%) GS patients returned usable questionnaires to the investigator. Results obtained from analyses of these questionnaires are described in this chapter. Predisposition to obesity, pre and post-operative weights, and attitudes towards dieting are discussed. Changes in food selection and food habits are evaluated. Problems resulting from surgery and satisfaction with results of surgery conclude this chapter.

Predisposition to Obesity

Prior to surgery for obesity, both JI and GS patients reported obesity since adolescence. This agrees with research by Mann (1974) and Mayer (1968). Cross tabulations and analysis of variance were used to compare weight loss methods used by JI and GS patients. Various dieting methods had been used by both groups prior to surgery. Limited success resulted from efforts to lose weight by the diet methods listed in the questionnaire. GS patients were more likely to use weight loss methods such as hypnosis, fad diets, and over-the-counter drugs ($P < .05$). No significant difference was found between the groups for the use of such methods as diet groups, prescription drugs, or psychotherapy. See Table 2 for the demographic data of JI and GS patients.

TABLE 2

	<u>Surgical Type</u>	
	<u>JI</u>	<u>GS</u>
Male / female	3 / 14	2 / 17
Years overweight	23 \pm 11	22 \pm 21
Range of years overweight	12 \pm 34	1 \pm 43
Mean age at time of surgery	34	30
Range of ages at time of surgery	21 \pm 48	17 \pm 48
Years post-operative	6	1

Pre and Post-operative Weight

The mean pre-operative weight for JI patients was 328 lbs as compared to 286 lbs for GS patients. JI patients lost 107 lbs (31% of pre-operative weight). This difference in post-operative weight was significant at the $P < .05$ level. Therefore, JI patients weighed more pre-operatively and lost more weight than GS patients. JI patients in this study were six years post-operative as compared to GS patients who were one year post-operative. Mills and Stunkard (1976) and O'Leary, Weeks, and Woodward (1978) found that heavier patients lost more weight. Thus, the greater weight loss for JI patients may be due to the greater initial weight. No significant difference was found in the mean current weight of JI and GS patients. See Table 3 for the comparison of JI and GS patient weights to results found in JI patients of Rauen and Tseng (1979).

TABLE 3

WEIGHT COMPARISON OF JI AND GS PATIENTS TO JI PATIENTS
OF RAUEN AND TSENG

	<u>Surgical Type</u>		
	<u>GS</u>	<u>JI</u>	<u>JI</u>
			Rauen & Tseng
Mean pre-op wt (lbs)	286 \pm 44	328 \pm 64	325
Range pre-op wt (lbs)	272 \pm 330	264 \pm 392	
Mean current wt (lbs)	226 \pm 49	221 \pm 52	202
Range current wt (lbs)	177 \pm 275	169 \pm 273	
Mean post-op wt loss (lbs)	60	107	127
% of original wt lost	21% \pm .09%	31% \pm .14%	37%
Range of % original wt lost	12% \pm 30%	17% \pm 45%	

Pre-operative Attitude towards Obesity and Dieting

Patients were questioned regarding the cause of obesity. JI and GS patients continually dieted prior to surgery. Pre-operatively, no significant difference was found between groups on the number of times patients had tried dieting. This is in agreement with results on JI patients of Rauen and Tseng (1979). Both JI and GS patients felt overeating was the cause of obesity.

Patients were questioned as to pre-operative eating patterns. GS patients were found to eat large amounts of food from late afternoon until bedtime ($P < .10$). This eating pattern of GS patients may be associated with the night eating syndrome described above by Stunkard (1978). JI patients of Rauen

and Tseng (1979) were found to demonstrate night eating syndrome pre-operatively. See Table 4 for the pre-operative eating pattern of the GS patient.

SAMPLE POPULATION'S RESPONSES TO QUESTION ON EATING PATTERNS

		<u>Surgical Type</u>	
		<u>JI</u>	<u>GS</u>
"Did you eat large amounts of food from late afternoon until bedtime pre-operatively?"	Yes	4	10
	No	13	9

Kendall's Tau b= .29, .03 significance

Post-operative Food Selections

Sixty-one food items were listed on the questionnaire to establish foods normally consumed by patients post-operatively. An analysis of the food selections indicated that there were significant differences in food selections between JI and GS patients.

JI patients consumed more sugar than GS patients ($P < .05$). Also, highly concentrated carbohydrates such as chocolate candy and jam were also more likely to be consumed by JI patients ($P < .10$). In contrast, GS patients consumed significantly more artificial sweeteners ($P < .05$). Both JI and GS patients demonstrated a preference for sweets post-operatively. This is in agreement with research by Hamburger (1974). Contrary to results found in this study, a decrease in the intake of sweets was found among GS patients by Schaff (1979).

TABLE 5
SAMPLE POPULATION'S RESPONSES TO QUESTION
ON THE DESIRE FOR SWEETS POST-OPERATIVELY

		<u>Surgical</u>	<u>Type</u>
		<u>JI</u>	<u>GS</u>
"Did you desire sweets post-operatively?"	Yes	12	10
	No	5	9

Kendall's Tau b = .22, .07 significance

As compared to GS patients, JI patients consumed significantly more tea, white bread, pork, ham, and cheese ($P < .05$). Both JI and GS patients continued to consume snack foods post-operatively. This agrees with research by Hamburger (1974). No difference was found between groups for the consumption of cereals, fats, fruits, vegetables, desserts, or snack foods. An increase in the intake of fruits and vegetables was previously noted in JI patients by Buckwalter (1979), Castelnovo-Tedesco and Schiebel (1976), and Rauen and Tseng (1979). No difference in the intake of fruits and vegetables was found in post-operative GS patients of the Ohio State pilot study (Schaff, 1979).

Patients were asked to evaluate statements which best described present food preferences. JI patients reported that they consumed three meals per day while GS patients tended to consume small, frequent meals throughout the day. The difference in meal frequency was significant at the $P < .05$ level. This is in agreement with results of Bray, Dahms, Atkinson, Mena, and Schwartz (1976), Kulda, Barnard, Kreutziger, and Rand (1979), Mills and Stunkard (1976), and Rauen and Tseng (1979). JI patients also reported more of an increase in thirst

post-operatively than the GS patients ($P < .05$). An increase in thirst of JI patients was also found by Mills and Stunkard (1976) and Rauen and Tseng (1979). Both JI and GS patients desired sweets and salty foods post-operatively. While Rauen and Tseng (1979) previously had reported that JI patients had an increased desire for sweets post-operatively, a decrease in the preference for sweets had been found in JI patients by Buckwalter (1979) and Castelnovo-Tedesco and Schiebel (1976).

Breakfast was consumed more often post-operatively by JI and GS patients. This was also found in JI patients of Bray et al. (1976) and Kulda et al. (1979). A decrease in the intake of beer, wine, and other alcoholic beverages was found among JI and GS patients. Post-operatively, no alcohol was consumed by 37% of JI and 52% of GS patients. This decrease in alcohol consumption had also been found in JI patients by Bray et al. (1976) and Rauen and Tseng (1979).

Post-operative Changes in Eating Habits and Appetite

Post-operative changes in the eating habits of JI and GS patients were also analyzed. GS patients were found to consume smaller, more frequent meals. This was significant at the $P < .05$ level. As noted previously, JI patients were more likely to consume three meals per day post-operatively ($P < .05$). Neither group of patients ate low bulk foods post-operatively ($P < .05$). Although JI patients reported a greater increase in thirst post-operatively ($P < .10$), no increase in the consumption of liquid was reported by JI or GS patients. Neither JI or GS patients stopped snacking after surgery, although JI patients tended to snack less than the GS patients ($P < .10$). This is in contrast to research which found a decrease in snacking of JI patients (Buckwalter, 1979; Castelnovo-Tedesco & Schiebel, 1976; Bray

et al., 1977; Rauen & Tseng, 1979). JI patients were more inclined to feel that there were no changes in eating habits post-operatively ($P < .10$). See Table 6 for post-operative changes in meal frequency of JI and GS patients.

TABLE 6
SAMPLE POPULATION'S RESPONSES TO QUESTION ON
POST-OPERATIVE CHANGES IN MEAL FREQUENCY

		<u>Surgical Type</u>		<u>Significance</u>
		<u>JI</u>	<u>GS</u>	
"Do you eat small meals post-operatively?"	Yes	6	14	
	No	11	5	$P < .01$
"Do you eat frequent meals post-operatively?"	Yes	2	10	
	No	15	9	$P < .00$
"Do you eat three meals per day?"	Yes	11	8	
	No	6	11	$P < .03$

Changes in the appetite of JI and GS patients were analyzed. No change in appetite was reported by JI patients ($P < .05$). This is in agreement with the findings of Dewind and Payne (1976). A decrease in appetite of JI patients was reported by Baddely (1979), Bray et al. (1976), Bray et al. (1974), Mills and Stunkard (1976), Patterson (1978), Rauen and Tseng (1979) and Robinson et al. (1979). A significant decrease in appetite was found in GS patients ($P < .05$). GS patients reported that they were not hungry all the time as compared to pre-operative eating behavior ($P < .10$). A trend existed which suggested that GS patients were satisfied with less food than they had been pre-operatively ($P < .10$).

Attitudes of Eating Behaviors

Patient attitudes toward themselves and their post-operative eating behavior were assessed using a Likert scale. JI patients reported that they felt that weight loss did not rely on willpower. JI patients also felt that weight loss was rapid and reliable. These attitudes were significantly different than those of the GS patients ($P < .05$). JI and GS patients both reported that they felt food could be consumed at any time. JI patients were the only group which believed that a stable weight would result after eating any amount of food desired. This was significantly different from GS patient's belief at the $P < .05$ level. JI patients tended to feel more in control of their eating post-operatively than the GS patients ($P < .10$). JI patients were less likely to feel guilty about eating post-operatively than the GS patients ($P < .10$). This may be a result of the feeling that a stable weight would result from consuming any amount of food. Also, the increased tendency to eat sweets may have been a result of the JI patients not feeling guilty about eating.

TABLE 7

SAMPLE POPULATION'S RESPONSE TO QUESTION STATING
WEIGHT LOSS IS RAPID AND RELIABLE

		<u>Surgical Type</u>	
		<u>JI</u>	<u>GS</u>
"Do you feel weight loss is rapid and reliable and does not rely on willpower?"	Yes	12	7
	No	5	12

Kendalls' Tau b = .36, .00 significance

TABLE 8
SAMPLE POPULATION'S RESPONSES TO QUESTION ON
CONTROL OVER EATING BEHAVIOR

		<u>Surgical Behavior</u>	
		<u>JI</u>	<u>GS</u>
"Do you feel you are in control of your post-operative eating behavior?"	Yes	11	6
	No	6	13

Kendall's Tau b = .33, .02 significance

GS patients reported that they felt that their post-operative eating behaviors were similar to those of the non-obese, whereas the JI patients did not ($P < .05$). Consumption of smaller, frequent meals ($P < .05$) may account for GS patient's feeling that their eating behaviors were similar to those of the non-obese. As noted previously, GS patients were satisfied with less food and were not hungry all the time. GS patients may have developed an awareness to internal cues of hunger. Mason et al. (1980) found self-control was established in GS patients with the development of internal cues. GS patients may be more aware of food consumption post-operatively. This awareness of food may account for the increased use of artificial sweeteners and decrease in consumption of sweets as compared to JI patients. Creation of a small gastric pouch allows for early satiety and may account for the development of internal cues and awareness of foods consumed. Both JI and GS patients felt that some people never gain control over appetite.

Occurrence of Diarrhea and Food-Related Problems

The problem causing concern among post-operative JI patients was diarrhea. The occurrence of diarrhea in GS patients was not common. JI patients found that the following foods increased the likelihood of diarrhea: spicy foods, large meals, greasy foods, and green vegetables. Similar results were found in JI patients by Rauen and Tseng (1979). JI patients stated that food intake was limited to reduce diarrhea ($P < .05$). Although JI patients limited food intake to reduce diarrhea, the reported post-operative food selections still included fried foods and sweets. Consumption of fried foods and sweets may also increase the incidence of dumping syndrome (Krause & Mahan, 1979). When asked whether patients continue to have diarrhea now, 82.4% of JI patients as compared to 18.8% of GS patients stated that diarrhea was still present ($P < .05$).

Patients were asked whether physical discomfort occurred while eating at any time after surgery. Twenty-two% of JI and 14% of GS patients had discomfort while eating post-operatively. Both JI and GS patients disagreed with the statement that eating was not as enjoyable post-operatively because of diarrhea and discomfort. Diarrhea, gas, and cramps were the most annoying problems of JI patients in the study by Rauen and Tseng (1979).

Common bypass problems resulting from surgery such as arthritis, stomach pain, and gallbladder problems were listed in the questionnaire. Specific problems aside from diarrhea were tabulated as frequencies. Cross tabulations and analysis of variance found that JI patients reported more problems post-operatively, JI patients had more problems currently, and the worst problems resulting from surgery occurred in JI patients. These results were significantly different at the $P < .05$ level. Because JI patients had more problems than GS patients, JI patients were found to

visit the doctor more often than GS patients ($P < .10$).

Satisfaction with Surgery

Patients were questioned on satisfaction with the results of surgery. Both JI and GS patients were satisfied with the results of surgery although JI patients tended to be more satisfied with the results of surgery. This difference was not statistically significant. Personal statements concerning patient attitudes toward themselves were analyzed. Both JI and GS patients felt : (1) weight loss increased self-esteem and self-confidence, (2) work and studies had improved since surgery, (3) a better outlook on life was present and, (4) an increased sense of physical well-being. Overall, life was better as a result of weight loss. The above statements are in agreement with research by Mason et al. (1980), Phillips (1978), Rauen and Tseng (1979) and Saltzstein and Gutmann (1980).

TABLE 9

SAMPLE POPULATION'S RESPONSES TO QUESTION STATING
LIFE IS BETTER SINCE SURGERY

		<u>Surgical Type</u>	
		<u>JI</u>	<u>GS</u>
"Do you feel life is better since surgery?"	Yes	14	16
	No	3	2

Kendall's Tau b = .01, .46 significance

Patients were questioned on satisfaction with weight loss. Both groups were satisfied with weight loss. Although not statistically different, JI patients tended to be more satisfied with weight loss than GS patients. JI patients may tend to be more satisfied with weight loss and surgery because JI patients reported that they felt that any quantity of food could be consumed post-operatively. In contrast, GS patients may not have been as satisfied with weight loss or surgery because the amount of food which could be consumed at one time was restricted severely when compared to pre-operative food habits. GS patients also had more difficulty maintaining the lowest post-operative weight. JI patients may be more satisfied than GS patients because JI patients were more inclined to feel a sense of control over eating habits as compared to GS patients.

TABLE 10
SAMPLE POPULATION'S RESPONSES TO QUESTION ON
SATISFACTION WITH WEIGHT LOSS

		<u>Surgical Type</u>	
		<u>JI</u>	<u>GS</u>
"Are you satisfied with your weight loss resulting from surgery?"	Yes	10	7
	No	7	11

Kendall's Tau b = .12, .19 significance

CONCLUSIONS

Questionnaires were mailed to JI and GS patients to determine pre and post-operative changes in food selection patterns and attitudes following surgery for morbid obesity. Patients returning usable questionnaires consisted of seventeen JI bypass and nineteen GS patients. Surgery had been performed more than six months prior to the study.

JI and GS patients had been overweight since adolescence and had continually dieted to lose weight. After failure at sustained weight loss through various diet methods, patients underwent surgery to lose weight.

The questionnaire addressed various statements to determine if a significant difference could be found in the pre-operative food selection patterns and attitudes between JI and GS patients. A significant difference was found in food selection patterns of JI and GS patients. GS patients consumed large amounts of food from late afternoon until bedtime.

No significant difference was found in the pre-operative attitudes of JI and GS patients. Both groups of patients believed overeating was the cause of their obesity. Neither JI or GS patients felt they had control over pre-operative eating behavior. JI and GS patients were self-conscious and had low self-esteem pre-operatively.

Significant differences in post-operative food selections were found between JI and GS patients. Both JI and GS patients demonstrated a preference for sweets post-operatively. JI patients consumed more sugar and concentrated forms

of carbohydrate as compared to GS patients. GS patients consumed more artificial sweeteners.

The following foods were consumed more by JI patients: tea, white bread, pork, ham, and cheese. Although non-significant, JI patients consumed more dairy products and fried foods post-operatively. JI patients were found to have an increased thirst as compared to GS patients. No difference was found between groups for the consumption of cereals, fats, fruits, vegetables, desserts, or snack foods. Both JI and GS patients consumed snack foods post-operatively. A decrease in the consumption of alcohol, beer, and wine was found among both JI and GS patients.

Diarrhea was the most common food-related problem among JI patients. GS patients were more likely to be constipated due to a limited food intake. JI patients found the following foods to increase the occurrence of diarrhea: spicy food, greasy food, large meals, and green vegetables. Food intake was limited by JI patients to reduce diarrhea; however, JI patients stated that diarrhea was still present.

Patients were asked to describe eating habits which had changed since surgery. GS patients were found to consume smaller, frequent meals. JI patients continued to consume three meals per day. JI patients were more inclined to feel that there were no changes in eating habits. Neither JI or GS patients stopped snacking and neither group consumed low bulk foods post-operatively. Changes in appetite were analyzed among JI and GS patients. JI patients had no decrease in appetite. A significant decrease in appetite was found in GS patients.

A significant difference in the post-operative attitudes of JI and GS patients was found. JI patients believed that a stable weight would result after consuming any amount of food. JI patients may not have realized that a reduction

in food intake would be necessary to lose weight. JI patients believed that weight loss was rapid and reliable and did not rely on willpower. As noted previously, JI patients felt they were in control of their eating post-operatively. A trend existed that JI patients no longer felt guilty about eating.

GS patients were forced to alter food habits because the upper gastric pouch limited food capacity. GS patients felt they ate more like the non-obese since surgery. GS patients tended to feel they were not hungry all the time and were satisfied with less food ($P < .10$). JI and GS patients felt that they gained control over appetite and hunger post-operatively. In contrast, both groups believed that some people never gain control over their appetite. Both groups of patients also believed that eating was still enjoyable post-operatively regardless of diarrhea or discomfort. Although not statistically significant, JI and GS patients did not encounter any physical discomfort while eating after surgery.

An increase in the psycho-social areas of JI and GS patient's lives were observed. A trend existed that patients felt that life was better, self-confidence had increased, capacity for work improved, enjoyment of physical exercise increased, and the outlook on life was better as a result of weight loss.

Results of weight loss indicated that JI patients lost more weight than GS patients. JI patients may have lost more weight because they weighed more pre-operatively. The current weight of JI and GS patients was not significantly different. Both JI and GS patients had difficulty maintaining the lowest weight achieved since surgery. Regardless of difficulty maintaining post-operative weight, both groups of patients were satisfied with the results of surgery and weight loss.

The importance of knowledge in nutrition for JI and GS patients cannot be overemphasized. Dietary counseling is crucial in order to avoid emesis due to

overloading the gastric pouch and to ensure that proper nutrient intake is provided in the diet of GS patients. Portion control is essential for GS patients to avoid stretching the gastric pouch. Knowledge of the physiological changes which result from surgery may encourage patients to change food habits. JI and GS patients must realize that food intake needs to be reduced to achieve and maintain weight loss. Knowledge of specific food intolerances will help patients anticipate food-related problems. Foods which may not be tolerated after surgery should be re-introduced into the diet at a later time.

In conclusion, changes in food selections were found between pre and post-operative JI and GS patients. Attitude changes were found among post-operative JI and GS patients. Patients were satisfied with results of surgery and weight loss regardless of food-related problems. One of the greatest improvements was observed in the psycho-social areas of the patient's lives. Further research is indicated in the area of food behaviors of the obese. More information is needed on specific intolerances of the GS patient. Research on the psychological effect of diet on JI and GS patients has not been attempted. Studies based on increased requirements for vitamins or minerals for GS patients may be needed.

APPENDIX

SURVEY OF GASTRIC STAPLE PATIENTS

Please circle the appropriate response number or fill in the blank. Please be as honest as possible. Everything is STRICTLY CONFIDENTIAL!

How many years, previous to the operation, had you been overweight? Circle all ages that apply to your overweight:

birth 0, baby 1, years 1-5 2, years 6-12 3,
years 13-19 4, years 20-29 5, years 30-39 6,
years 40-49 7, years 50+ 8

Before the operation, how many times had you tried dieting to reduce your weight?

Over and over again 1, always on a diet 2,
on and off a diet 3, once in awhile 4, never 5

Comments _____

What dieting methods had you tried?

Diet group (Weight Watchers) 1, hypnosis 2,
prescription drugs 3, psychotherapy 4, fad diets 5,
over-the-counter drugs 6, others 7

Comments _____

Had any of these methods been successful? Yes 1 No 0

If yes, which methods? _____

How much weight did you lose? _____

How long did the weight stay off? _____

Why do you think you were overweight?

You ate too much 1, heredity 2,
a disturbing family situation 3, personal problems 4,
all of the above 5, none of the above 6

What is your current weight? _____ Is this the lowest weight
you have achieved since the operation? Yes 1 No 0

If no, what was the lowest weight? _____ pounds

Have you had any difficulties maintaining your lower weight?

Yes 1 No 0

If yes, what difficulties have you encountered? _____

Are you satisfied with your weight loss? Yes 1 No 0

Are you satisfied with the results of the gastric staple operation?

Very satisfied 1 Satisfied 2 Not satisfied 3

What was the best result of the gastric staple surgery? _____

How did you learn about gastric stapling?

books 1 T.V. 2 Other: 7 Please specify: _____

magazine 3 friend 4 _____

physician 5 family 6 _____

When the doctor explained how serious and experimental the operation was did you: (Circle all answers that apply)

Worry that the complications might threaten your life? 1

Worry about any part of the operation and the problems you might have? 2

Decide that any risk was worth losing the weight? 3

Do you think you understood the operation and its problems before the surgery? Yes 1 No 0

Do you think you received enough information about the operation? Yes 1 No 0

One way of helping gastric staple patients would be to have a booklet that describes the operation, its complications, diet instructions, etc. Do you feel this information would be:

1 helpful in deciding whether or not to have the operation?

2 useful for preparing patients to care for themselves at home after the operation?

3 of no help to patients

Have you returned to your doctor for regular physical examinations and laboratory tests since the operation? Yes 1 No 2

How often have you returned? _____ (in months)

Do you continue to return regularly? Yes 1 No 0

Here are some questions concerning side effects and/or problems you may have had since the operation. Please circle all answers that apply to you:

A = Arthritis F = Fatigue G = Gallbladder problems
 H = Hernia K = Kidney stones L = Liver problems
 S = Stomach pain, gas, cramps L.E. = Low Electrolytes (Potassium, Calcium, etc.)
 N = No Problems

	0	1	2	3	4	5	6	7	8
	N	A	F	G	H	K	L	S	L.E.
I have had problems in these areas since the operation:	N	A	F	G	H	K	L	S	L.E.
Which was the most objectionable problem?	N	A	F	G	H	K	L	S	L.E.
Which problem(s) do you now have?	N	A	F	G	H	K	L	S	L.E.
For which problem did you consult the doctor?	N	A	F	G	H	K	L	S	L.E.
For which problem did a change in food or eating bring relief?	N	A	F	G	H	K	L	S	L.E.

Explain _____

THE FOLLOWING QUESTIONS CONCERN DIARRHEA AND RELATED PROBLEMS:

Prior to the operation how many bowel movements per day were normal for you?

More than one 0, one 1, one every few days 2

Six months after the operation approximately how many bowel movements were you having per day?

One 1, two 2, three 3, four 4, five 5,
 more than five 6

If more than five, please list the number _____

Do you continue to have diarrhea? Yes 1 No 0
 If yes, do you take medicine to control the diarrhea?

Yes 2 No 3

Does exercise affect your diarrhea?

More diarrhea 1, Less diarrhea 2, No affect 0

Do certain foods increase your diarrhea? Yes 1 No 0

Do any of the following foods increase the likelihood of diarrhea?
 Please circle all applicable answers.

Orange juice <u>1</u>	large meals <u>4</u>	fatty foods <u>7</u>
Tomatoes <u>2</u>	milk <u>5</u>	greasy foods <u>8</u>
Spicy Foods <u>3</u>	butter <u>6</u>	green vegetables <u>0</u>

Others, please specify _____

Have you restricted your food intake or feel that you have become intolerant of certain foods because of diarrhea?

Yes 1 No 0

If yes, please list the foods that you:

Cannot tolerate

Restrict

Does the diarrhea have an uncommonly bad odor? Yes 1 No 0

Do certain foods affect the odor (make it better or worse)?

Yes 1 No 0 If yes, specify what foods and how they affect the odor _____

Did you encounter physical discomfort while eating any time after the operation? Yes 1 No 0 The first three months 2

The first six months 3 The first year 4

Continue to have discomfort 5 Explain: _____

Were you given any dietary restrictions by your doctor in terms of how much you could eat or what foods to eat?

Yes 1 No 0

If yes, was the diet instruction helpful? Yes 1 No 0

If yes, was the diet instruction given by a dietitian?

Yes 1 No 0

Would it be helpful to discuss diet, food, or eating with a professionally trained person?

Yes 1 No 0

If you had any questions on food or diet to whom would you go?

Dietitian or Nutritionist 1 Doctor or Physician 2

Health food expert 3 Nurse 4

Other 5, specify: _____

Were there many foods that you disliked or would not eat before the operation?

Yes 1 No 0

If yes, have you noticed any changes in the types of kinds of foods that you dislike since the operation? Please list changes:

Yes 1 No 0 Changes _____

Circle the foods or types of foods you normally eat:

Beverages: 1 2 3 4 5 6
 coffee tea carbonated 10 fat, or whole cocoa
 beverages skimmed milk milk

Breads: 1 2 3 4
 whole grained bread white bread crackers rolls

Cereals: 1 2 3
 dry unsweetened dry sweetened hot cereal
 cereal cereal

Eggs: 1 2 3 4
 fried scrambled boiled poached

Fats: 1 2 3 4 5
 butter margarine oil mayonnaise salad dressing

Meat 1 2 3 4 5
 beef pork and ham lamb chicken fish

Protein: 1 2 3 4
 hard cheese and bacon hot dogs peanut butter
 cottage cheese

Juices: 1 2 3 4
 orange juice fresh fruit canned fruit other citrus
 juice juice fruit juice

Sugar 1 2 3 4 5
 and sugar hard chocolate jams and honey
 candy candy jellies

Sweeteners: 6
 artificial sweeteners

Vegetables: 1 2 3 4
 tomatoes green vegetables yellow raw
 vegetables vegetables

Fruits: 1 2 3 4
 banana apple citrus fruit canned fruit

Dessert: 1 2 3 4 5 6
 ice cream sherbet pie cake pudding cookies

Miscellaneous 1 2 3 4 5
 and olives nuts gravy cream sauce alcoholic
 beverages

Snack Food: 6 7
 potato chips popcorn

Would you eliminate any of these foods if you wanted to be sure you did not have much diarrhea on a particular day?

Yes 1 No 0 Please specify: _____

Do you think your appetite has changed since the operation?

Yes 1 No 0

If yes, larger appetite 2 smaller appetite 3

Did you ever feel that you were not in control of your eating?

Yes 1 No 0

Do you feel that you are in control of your eating now?

Yes 1 No 0

If yes, explain: _____

What statements best describe the way you NOW eat compared to the way you ate before the operation. Please circle answer.

	Much More than Before 1	More than Before 2	Same as Before 3	Less than Before 4	Much Less than Before 5	Do Not Use 6
I desire sweets candy & desserts	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I crave salty foods	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I drink beer & wine	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I eat breakfast	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I eat 3 meals a day	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I drink milk & dairy products	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I eat gravy & sauces on meat and potatoes	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I eat snack foods (Pot. chip, popcorn, etc.)	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I am thirsty	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I drink alcoholic beverages	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
I eat fried food	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>

Here are some personal statements that you may agree or disagree with. Each statement concerns how you feel about things after the gastric staple operation. Circle the statement that best describes how you feel

SA = Strongly Agree
MD = Mildly Disagree

A = Agree
D = Disagree

MA = Mildly Agree
SD = Strongly Disagree

	1	2	3	4	5	6
Patients gain control over their appetite and hunger after the operation.	SA	A	MA	MD	D	SD
Some people can never control their appetite.	SA	A	MA	MD	D	SD
Weight loss is rapid and reliable after the operation and does not rely on willpower.	SA	A	MA	MD	D	SD
I am not hungry all the time and am satisfied with less food.	SA	A	MA	MD	D	SD
Because of my diarrhea I limit my food intake.	SA	A	MA	MD	D	SD

Have your eating habits changed since the operation?
Circle all answers that apply:

- | | |
|-----------------------------|----------------------------------|
| <u>1</u> eat smaller meals | <u>2</u> eat more frequent meals |
| <u>3</u> eat low bulk foods | <u>4</u> drink more liquid |
| <u>5</u> stopped snacking | <u>6</u> drink less liquid |
| <u>7</u> none | <u>8</u> other, please specify: |
-

Since the operation are you able to eat just about what you want whenever you want it?

Yes 1 No 0

If not, why not (cramps, gas, etc.). List: _____

Does your weight remain stable no matter what you eat?

Yes 1 No 0

Comment _____

Do any of these statements describe your eating pattern before the operation:

Ate all the time <u>1</u>	Ate large amounts from late <u>2</u> afternoon until bedtime
Ate large amounts <u>3</u> only occasionally	None of the above <u>4</u>

How often did you eat breakfast BEFORE the operation? Never 0,

Rarely 1, Sometimes 2, Frequently 3, Always 4

Eating is not as enjoyable as it once was because of diarrhea and discomfort.

SA A MA MD D SD

I no longer feel guilty about what I eat.

SA A MA MD D SD

Now I am busier and do more interesting things so I eat less.

SA A MA MD D SD

I find I eat more like other people since the operation.

SA A MA MD D SD

I had low self-esteem and was very self-conscious before the operation.

SA A MA MD D SD

My life is better since the operation.

SA A MA MD D SD

My self-confidence has increased since the surgery.

SA A MA MD D SD

My work and/or studies have improved since surgery.

SA A MA MD D SD

My enjoyment of physical exercise has increased.

SA A MA MD D SD

I have an increased sense of physical well-being.

SA A MA MD D SD

My outlook on life is much better.

SA A MA MD D SD

My capacity for work has increased.

SA A MA MD D SD

The following questions will help us learn more about the different types of people who have the gastric staple operation. You will remain anonymous, and the information is STRICTLY CONFIDENTIAL. We will appreciate your answering these questions.

What was your age at the time of the operation? _____ years old.

What is your present age? _____ years old.

In what year was the surgery performed? _____

What was your weight at the time of the operation? _____ pounds.

What is your height? _____

Sex: Male 0 Female 1

Ethnic Origin: Black 1 White 2 Chicano 3 Oriental 4

Native American 5

Religious preference: Protestant 1 Catholic 2 Jewish 3 Other 4

None 5

Were other members of your family overweight? Yes 1 No 0
Please circle all answers that apply:

Grandmother overweight 2 ; Grandfather overweight 3

Mother overweight 4 , Father overweight 5

Sister(s) overweight 6 , Brothers overweight 7

What was the last year of school completed? _____ grade.

Were you employed before the operation? Yes 1 No 0

Are you now employed? Yes 1 No 0

Has your occupation changed since the operation? Yes 1 No 0

Which category best describes your income before the operation?

1 \$0-5,000 3 \$10,000-15,000 5 above \$20,000

2 \$5,000-10,000 4 \$15,000-20,000

Has your income changed since the operation? Yes 1 No 0

If yes, is it higher 2 or lower 3 ? Specify if desired:

What was your marital status before the operation:

Married 1 Divorced 2

Separated 3 Single 4

Has your marital status changed since the operation? Yes 1 No 0

Explain, if desired _____

Do you think that the operation had any influence on your personal life, your occupation, or your educational desires?

Yes 1 No 0

If yes, explain: _____

WOULD YOU HAVE THE OPERATION AGAIN? Yes 1 No 0

If you have any additional comments, please use the reverse side of this sheet.

Thank you very much for your help.

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