DIABULIMIA: MEDICAL REPERCUSSIONS OF INSULIN MANIPULATION

Abstract

While eating disorders cause alarm because of the health risks they pose, the combination of disordered eating with insulin dependent diabetes causes greater concern. “Diabulimia” is the term used to describe diabetic patients who also exhibit disordered eating. A significant amount of female diabetic patients manipulate their insulin injections to prevent weight gain. This review of articles found primarily from PubMed analyzes the medical repercussions that result when patients with diabetes mellitus exhibit disordered eating especially related to insulin injection manipulation. Those who manipulate their insulin for weight management begin experiencing the healthy complications that would exist if the patient was not taking insulin injections as all. Identification, prevention, and treatment of diabetic patients with disordered eating will also be analyzed.
INTRODUCTION

Adolescent patients diagnosed with insulin dependent diabetes mellitus who manipulate their insulin injections and exhibit disordered eating suffer from the health complications associated with diabetes. Insulin dependent diabetes mellitus and disordered eating largely affect the same population—adolescents. During adolescence the struggle teens already face with body satisfaction is complicated by the increased awareness of weight fluctuations due to diabetes control. The lack of metabolic control in diabetic patients results in ketoacidosis and fluctuations in weight. The resulting frustration of difficulties associated with weight management in patients with diabetes increases the likelihood of disordered eating.

Eating disorders are assigned to three different categories: 1) anorexia nervosa, 2) bulimia nervosa, and 3) eating disorder not otherwise specified. Anorexia nervosa is associated with consistent under consumption of calories, bulimia nervosa is characterized by over consumption of calories accompanied by purging or taking laxatives, and the third category includes any disordered eating that doesn’t meet the criteria for the other two categories. All categories of disordered eating can be seen in connection to type 1 diabetes, however insulin manipulation is a unique method for patients with type 1 diabetes. Since these patients depend on self-injected insulin for the uptake of glucose into their cells, they can adjust the amount of insulin they inject. Limiting the amount of insulin they inject prevents the uptake of calories, therefore resulting in less weight gain. This combination of disordered eating and insulin manipulation for patients with type 1 diabetes is nicknamed “diabulimia.”

Diabulimia is more often associated with bulimia nervosa rather than binge eating disorder. Diabetic patients overeat but skip insulin shots to prevent the glucose uptake from their excess calories in their blood. Providing the insulin to shift only some of the blood glucose into the cells results in sustained hyperglycemia. When insulin is not present to move the glucose from the blood into the cells, the microvascular complications, dehydration, and fatigue result. If the hyperglycemia persists, macrovascular complications (namely, atherosclerosis) arise and the patient has an increased risk of death.

The microvascular and macrovascular complications associated with diabetes can be prevented by proper blood glucose control, and disordered eating can be controlled with the help of counseling. This review addresses the previous research that identifies the risks associated with skipping insulin injections and the advice to health care professionals on how to identify and treat this disordered eating.

METHODS

Journal articles were found primarily from PubMed. The key words used to search were “diabulimia,” “diabulimia and adolescents,” “eating disorders and insulin dependent diabetes and adolescents.” Because “diabulimia” is a relatively new term to describe this condition the search resulted in 9-15 articles all from the last 20 years. The latter search brought up 179 results. The articles that identified the prevalence of eating disorders among patients diagnosed with diabetes and how disordered eating affects patients with insulin dependent diabetes mellitus were considered relevant and were included in this review. Articles that analyzed the health risks associated with eating disorders in connection to diabetes are also analyzed. The studies that suggested prevention and useful information for treatment are included to determine the next best step for this ever-growing problem.
The prevalence of eating disorders among insulin dependent diabetic patients will be discussed. The insulin manipulation that results from eating disorders will be analyzed to reveal the health complications that arise for those who exhibit disordered eating and are diagnosed with type 1 diabetes. Suggestions for identifying and treating or preventing disordered eating behavior will be submitted to inform healthcare professionals who can influence the prevalence of this eating disorder.

RESULTS/DISCUSSION

Adolescents diagnosed with insulin dependent diabetes mellitus are at risk for physiological and psychological problems due to disordered eating.\textsuperscript{2} Disordered eating is more prevalent among adolescents than among adults because of the stage of psychological development at this age.\textsuperscript{1} Among adolescents, eating disorders occur more often with individuals who are diagnosed with type 1 diabetes. These individuals exhibit disordered eating as well as manipulate their insulin injections. Restricting their insulin results in adverse health effects.

Increased awareness in patients with insulin dependent diabetes mellitus leads to insulin manipulation. The need for patients with type 1 diabetes to monitor their carbohydrate intake, glucose levels, exercise, and weight gain increases their awareness of weight changes and often leads to the desire to maintain weight.\textsuperscript{1} Insulin stimulates the body to store fat, and patients restrict their injections to prevent the fat storage. Disordered eating results in which the individual binge eats but only takes the amount of insulin for the amount of glucose he/she wants to be utilized and stored. Binge eating combined with insulin restriction is the most common form of weight loss among adolescent type 1 diabetics.\textsuperscript{1} This manipulation interferes with adherence to self-management and increases the risks of health complications.

Eating disorders, while already harmful, can cause severe problems for those with type 1 diabetes. Since insulin levels are low, the symptoms of hyperglycemia appear. Minor issues, such as dehydration, fatigue, and breakdown of tissue can result. More seriously, the lack of insulin can cause vascular disease, kidney failure, blindness, and even death. A serious complication of hyperglycemia is diabetic ketoacidosis. This is a life-threatening complication in which the body preserves glucose stores in the cells by depleting fat stores. A by-product of fat-metabolism is ketone bodies. The buildup of ketones in the body result in polyuria, polydipsia, hyperventilation, dehydration, and fatigue. If this state of ketoacidosis is maintained the patient is at risk for coma and death. Blood glucose control is essential to prevent diabetic ketoacidosis. Although this condition is associated with very high amounts of blood glucose, even mild adjustments in insulin injections made by the patients who exhibited mild disordered eating behavior resulted in microvascular and macrovascular complications.\textsuperscript{4} Over time, patients who exhibit disordered eating have higher BMI and worse metabolic control.\textsuperscript{5} They also exhibit microvascular complications, especially retinopathy.\textsuperscript{2}

The attention patients with type 1 diabetes must pay to their weight and diet put them at risk for developing disordered eating behaviors.\textsuperscript{2} As a result of the physical and mental stress caused by their difficulty in managing weight, many patients resort to restricting their insulin therapy. Patients admitted that they manipulated their insulin intake to prevent weight gain. This disordered eating behavior is more prevalent among females.\textsuperscript{6} Even those who didn’t exhibit signs of disordered eating manipulated their treatment of insulin to manage their weight.

Bryden, et al conducted a study that analyzed the eating behavior and body perception of 76 adolescents over an eight-year time period.\textsuperscript{4} Many of the females exhibited disordered eating behavior, but their behavior was not serious enough to be diagnosed as anorexia nervosa, bulimia
nervosa, or other disordered eating. Regardless of the fact that their behavior was sub-threshold for diagnosis of an eating disorder, 30% of the women still manipulated their insulin to prevent weight gain.

Eating disorders are more prevalent among individuals diagnosed with diabetes, and among this demographic, women are more likely to exhibit disordered eating. Insulin manipulation is not limited to individuals who have disordered eating behavior that qualifies them for diagnosis. Even individuals whose disordered eating was below the level used to diagnose an eating disorder reported to manipulate their insulin injections to prevent weight gain. Although women are more likely to exhibit disordered eating behavior, men also reported to manipulate insulin injections for weight management.

Insulin dependent diabetic patients who struggle with disordered eating need the combined efforts of healthcare professionals to control physiological and psychological problems. They need diabetes specialists to regulate the diabetes, nutrition specialists to bring about slow weight gain while not disturbing the diabetes, and psychiatric specialists to stabilize the mental health of the patient so they have positive body satisfaction. Prevention often depends on the ability of health care professionals to notice and act appropriately. They can help by encouraging patients who are diagnosed with type 1 diabetes to be involved in groups that help support their view of body image and help them adjust to diabetes treatment.

Hasken, et al made suggestions to various healthcare professionals in schools for identifying those diabetic patients who struggle with disordered eating in order to help them and preventing others from falling into this behavior. They advise health educators to integrate education on diabulimia into their current curriculum. As this eating disorder becomes more prevalent they should have open discussions on body image, diet, and exercise. They are advised not to focus on obtaining an ideal body weight but demonstrate how to integrate healthy foods and exercise into a daily routine.

School health services personnel are encouraged to be aware of warning signs so they can identify diabetic patients who may be manipulating their insulin or exhibiting other disordered eating behavior. Often, those with disordered eating and diabetes are unwilling to share their struggle with physicians but will leave clues and secretly hope the physicians will see the warning signs. To help school nurses monitor diabetic adolescents some schools are initiating a policy that encourages all insulin dependent students to have a witness as they take their injections. School counselors should also be aware of issues and warning signs associated with eating disorders among diabetic patients and ready to help, but they also must be aware that more serious mental help may be needed and how to receive such help. Since patients often see a physician for side-effects associated with diabulimia, physicians must be aware of health indications associated with hyperglycemia. They are also encouraged to be empathetic and to exhibit trust in the patients to promote self-confidence.

Increased awareness of weight fluctuations in patients with insulin dependent diabetes mellitus influences them to manipulate their manual insulin injections. Restricting insulin injections results in microvascular and macrovascular complications due to sustained hyperglycemia. The psychological issues associated with diabulimia require the assistance of professional counselors combined with the efforts of family and school counselors. Healthcare professionals must work together to recognize the early signs of diabulimia and to treat it.
REFERENCES

Response to Reviewer

Make sure you cite all of your articles in your paper (in the introduction)! (I cited articles and made sure they were in the correct order)

• Line 9: “effect of eating disorders on diabetes mellitus” this makes it sound like the eating disorders is what is causing diabetes- you may want to clarify this sentence (I removed the word “effect” and changed the sentence)
• You should include a transition in between the last two sentences of your abstract. It doesn’t flow very well. (I added a sentence)
• Line 16: I suggest that you say “During adolescence, when most adolescents already struggle with body satisfaction, is when the complications of both diabetes and disordered eating tend to appear.” (I used this sentence)
• Line 19: This last sentence is weak compared to the rest of the paragraph. (I changed)
• Line 21: eating disorders should be plural
• Line 24: add “includes any disordered eating” (I changed)
• Line 25: add “categories of disordered eating can be seen in connection to type 1 diabetes, however, insulin manipulation is a unique form of disordered eating that arises among diabetic patient.” (I used this sentence instead of my own)
• Line 26: add “Since these patients depend on manual insulin injection for the…” (I changed to this wording)
• Line 27: add clarification as to what the effect of adjusting the amount of insulin they inject will do on their weight status (I added one more sentence to explain how insulin manipulation prevents weight gain)
• Line 30: change “glucose uptake of their excess” to “glucose uptake from their excess” (I changed)
• Line 31: explain what insulin’s usual function is besides just saying “its usual function” (I reworded the sentence to specify what insulin’s function is)
• Line 34: add “review analyzes previous research which identifies the risks…” (I changed)
• Line 34: add comma after shots, and (I don’t think I need a comma, because the second clause could not be a separate sentence)
• Lines 37-39: random paragraph here-might want to move it to discussion portion (I broke up the paragraph and integrated it into the paper)
• Line 48: add “relevant and included in this review.” (I changed)
• Line 49-51: this sentence did not flow very well- rewrite and add punctuation (I reworded the sentence)
• Line 60: weak sentence to begin your discussion with
• Line 62: add “diabetes mellitus experience, put” (I changed)

Abstract: I clarified and simplified

Introduction: I deleted the last paragraph to make it flow better and clarified points that were unclear to the reviewer

Methods: I reworded some sentences to clarify the point

Discussion: I added more to the discussion section, expanding on different concepts and clarifying the research.