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# Diabulimia

## What It Is and How to Recognize It in Critical Care

**Lisa A. Ruth-Sahd, RN, DEd, CEN, CCRN;
Melissa Schneider, RN-BC, MS, ONC; Brigitte Haagen, PhD, PMHCNS, BC**

*Critical care nurses must be able to recognize the signs of symptoms of diabulimia—a potentially life-threatening disorder. Skipping insulin is used as a means of weight control in some persons with diabetes, particularly in young women. This article focuses on the assessment, pathophysiology, critical care nursing interventions, and psychosocial initiatives of interest to critical care nurses in the care of patients with diabulimia.*

*Keywords: Diabetes, Diabulimia, Eating disorder, Insulin*

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### CASE STUDY

A 17-year-old woman began to notice numbness and tingling in her feet as she rushed to get from one college class to another. Next she noticed that she drags her right foot and frequently trips on the sidewalk. In addition, when she sat in her class and tried to read on what her professor was writing on the board, her vision would go in and out of focus. She attributed all of these symptoms to being rushed and stressed out as a new college student. What this young woman did not understand was that these symptoms were due to diabetic peripheral neuropathy and retinopathy as a result of frequently skipping her insulin doses over the last several years as a way to ward off gaining weight.

Another young woman, while preparing for her wedding, began to skip insulin doses as a way to lose weight. She developed an upper respiratory infection and, within a few days, was admitted to the intensive care unit (ICU) in a state of severe diabetic ketoacidosis (DKA). What these 2 women have in common is that they both have diabetes and were insulin-dependant for 10 years and have both been skipping their insulin doses as a way to lose weight.

A third young woman was diagnosed with type 1 diabetes mellitus at the age of 5 years and bulimia at the age of 14 years. This woman, obsessed with food and weight, shortchanged herself on insulin for more than 9 years despite warnings from her parents, physicians, and therapists. When she was 25 years of age, a blood vessel in her eye ruptured, and at 28 years old, she had been told by doctors that she has permanent kidney damage. She currently lives everyday being fearful for the future and that the ramifications of her past will catch up to her as a result of the self-destructive behavior she practiced.

The following excerpt is written by a person with diabulimia in response to a concerned mother of a young daughter with diabetes. This was posted on the American Diabetic Association Web page.

> I have been struggling with insulin manipulation for about three years. Like your daughter, I have neuropathy in my feet (a mild case at this point), which can be extremely unpleasant and painful. I have been hospitalized numerous times for DKA and am dehydrated almost of the time causing my electrolyte balance to be completely off. I have other serious health problems due to my carelessness about dealing with diabetes. But something like "diabulimia" (I don't particularly like the term) holds such a powerful grip that I cannot stop myself and get better. I have put my family and friends through a lot. It's very difficult to know that I'm picking an eating disorder over friends,



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family, and a better life (well, and life itself, really). I don't know what to tell you to do, because I don't know what to do for myself. You can't force your daughter to get better; it's something she needs to realize for herself. On the other hand, you can't simply watch someone destroy themselves. If I could tell people what they can do for me, I would ask that people just listen to me. Even if I get whiny and annoying, just let me get whatever I have to say out of my head.

## BACKGROUND OF DIABULIMIA

Although skipping insulin to lose weight is a well-known method of weight control among the diabetes community, the American Diabetic Association, and endocrinologists who primarily treat type 1 diabetes, it is not well known to primary care physicians, family members, or critical care nurses. A cross-sectional, controlled study with 101 girls, published in 2004, found that insulin omission was commonly found among teens with type 1 diabetes.[1] According to one study, insulin omission was described as one of the most common weight loss strategies in children and adolescents with type I diabetes.[2] The term *diabulimia* is now being used to identify this practice, although currently it is not an approved *Diagnostics and Statistical Manual of Mental Disorders* diagnosis. This study and several others suggest that disturbed eating patterns, including insulin omission, may be underestimated.[2] The purpose of this article is to bring the practice of skipping insulin and the term *diabulimia* into focus in the critical care literature. This article will highlight the required assessment, pathophysiology, critical care nursing interventions, teaching, and psychosocial initiatives that need to be implemented for the acute and long-term care of patients with diabulimia.

In 1985, a group of researchers noted the prevalence of anorexia nervosa and bulimia among young women with diabetes and reported the rate of intentional insulin omission to be 14% among the 80 women they obseved.[3] Similarly, Birk and Spencer[4] in 1987 found the rate to be almost 5% in the 385 women they observed. Bubb and Pontius[5] in 1991 noted weight loss from inappropriate insulin manipulation in adolescents with insulin-dependent diabetes mellitus (IDDM). More recently, other researchers have found that eating disorders and skipping insulin doses are relatively common in female adolescents and young adults with type 1 diabetes.[2,6,7] These recent studies suggest that all young women with type 1 diabetes should be evaluated for eating disorders. Other studies related to eating disorders and insulin manipulation are noted in Table 1. As these data suggest the rates of insulin omission are higher in females than in males. Although the rate of insulin omission varies greatly, it tends to be higher than the rate of diagnosable eating disorders in patients with IDDM. Furthermore, it seems that insulin omission as a weight control strategy is much more common in patients with IDDM than the development of full-blown eating disorders. Within the last year, the number of hospital admissions has increased by 8% for diabetes-related admissions in persons younger than 18 years.[2,6]

*Insulin omission as a weight control strategy is much more common in patients with IDDM.*

## DIABULIMIA IN ADOLESCENCE

Adolescents have special nutritional needs mainly due to their increased growth rate and changes during puberty. National surveys have found that this age group often

**TABLE 1 Research Related to Rate of Intentional Insulin Omission or Manipulation**

| Researchers, y | n | Rate of Insulin Omission, Reduction or Manipulation, % |
|---|---|---|
| Hudson et al[3] | 80 | 14.0 |
| Birk and Spencer[4] | 385 | 4.9 |
| Stacin et al[8] | 59 | 40 |
| Powers et al[9] | 97 | 14.0 Females; 4.0 males |
| Rodin et al[10] | 103 | 12 |
| Fairburn et al[11] | 100 | 37.0 Females; 0 males |
| Striegel-Moore et al[12] | 46 | 6.5 |
| Peveler et al[13] | 76 | 15.0 Females |
| Biggs et al[14] | 42 | 37.5 |
| Polansky et al[15] | 341 | 31.0 |
| Neumark-Sztainer et al[16] | 66 | 18 |
| Colton et al[1] | 101 | Eating disturbances were more common in girls with type I diabetes |
| Mannucci et al[7] | 748 with and 1587 female without diabetes | Type 1 diabetes is associated with a higher prevalence of bulimia nervosa in females |
| Howe et al[2] | 295 | Older females who had a high BMI and elevated HbA1c used significantly more weight control behaviors |

Abbreviations: BMI, body mass index; HbA1c, hemoglobin A1C.



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does not follow dietary recommendations. Eating habits are usually formed in childhood. During adolescence, these good or bad eating habits can further be influenced by peer pressures, busy schedules, less time at home, and the need to feel independent. This can lead to meal skipping, eating on the run, and unhealthy food choices.[17] Even in the general population, for adolescent girls, body dissatisfaction is common, and they practice weight control measures such as dieting, even in their preteen years.[18]

Adolescence is a time of major life transitions. Accelerated developmental changes—biological, psychological, and psychosocial—are the prominent feature of this period of life.[5,19] According to Erikson[20] in 1968, adolescents are in the stage of "identity versus role confusion." The quest for identify leads the young person to discover their "individual uniqueness" based upon values established by family, peers, and the culture.[20] Identification with a peer group becomes increasingly important, and actions toward independence may include selective rejection of family beliefs. Diabetes presents additional challenges for adolescents and their families. Managing a chronic illness requiring a strict daily regimen provides added potential for instability and conflict.[21] The insistence of age-appropriate independence and conformity to peer pressures presents obstacles to diabetes self-management. In a study of adolescents with type 1 diabetes, Hanna and Guthrie[22] in 2000 found that adolescents are prone to dismiss the inherent medical consequences associated with the disease and engage in risky behaviors. Rebellion against parental involvement and also against the restrictive nature of dietary and insulin management occurred with regularity.

Diabetes mellitus is a life-altering disease with a profound impact on many aspects of daily living. A study comparing adolescents with type 1 diabetes with a control group found higher rates of impairments in measures of well-being as evidenced in attitudes, negative life view, and perceptions of relationships with family school and peers.[23] In addition, these teens expressed concerns about health-related issues and a range of physical symptoms. Lower self-esteem and depressive symptoms were also noted.

The nature of family relationships has a significant impact on diabetes management and comorbitiy. Other researchers have found females using unhealthy weight control measures such as insulin omission had lower levels of family cohesion.[16,24] Similarly, in a study of adolescents and parents in 191 families, it was reported that increased weight concern among girls was associated with higher levels of parent-adolescent conflict.[25]

The problem of eating disorders in adolescent girls with type 1 diabetes has also been documented in the literature and can occur when insulin omission is used as a method of weight control.[2,7,11,26] Women are particularly prone to weight gain with insulin, and withholding insulin becomes a form of calorie purging. Teens with type 1 diabetes are known to be twice as likely to have eating disorders and use withholding or skimping on insulin as a way to lose weight.[17] Of course, withholding insulin has serious consequences, which become manifest in the ICUs as heart disease, peripherovascular disease, and stroke seen in very young patients with diabetes.

## PATHOPHYSIOLOGY OF DIABULIMIA

In the case of diabulimia, pathophysiologically, what the critical care nurse will detect are the complications of long-term hyperglycemia presenting in younger patients. Initially, patients may complain of headache, lethargy, poor concentration, and other vague complaints, but over time, poor glycemic control leads to a very rapid progression of macrovascular and microvascular complications (see Tables 2 and 3).

Macrovascular complications include coronary artery disease, peripherovascular disease, and stroke, whereas microvascular complications include retinopathy, nephropathy, neuropathy, and cardiovascular disease.[2] Monnier and colleagues[27] in 2006 cited at least 4 major pathways that lead to vascular damage in the intentionally induced hyperglycemic state: (1) sorbitol and fructose accumulation due to enhanced polyol activity that interferes with cellular metabolism, (2) greater development of advanced glycation end products, (3) inflammation and thus activation of protein kinase C and nuclear factor kB, and (4) increased hexamine pathway flux.

Furthermore, Brownless[28] in 2005 adds that activation of the oxidative stress by hyperglycemia plays a major role in the pathogenesis of diabetic complications. Several authors found that poor metabolic control as evidenced by higher than normal levels of hemoglobin $A_{1c}$ leads to earlier than expected diabetes-related complications.[17,19,26] Although the risk of vascular disease depends largely on the degree of glycemic control, other factors such as duration of diabetes, genetic susceptibility, sex, pubertal status, and lifestyle factors such as smoking, diet, and exercise also play a big part in its development. See Table 2 for early findings of diabetic complications.

A study by Daneman[17] in 2002 found that eating disorders in young women with diabetes put them at increased risk for earlier than expected diabetes-related complications. Battaglia and colleagues[19] in 2005 found the development of diabetic neuropathy to be one of the most striking findings in those with diabulemia. Crow et al[26] in 1998 found that health risks were much more common in young women with IDDM who practiced



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**TABLE 2 Symptoms of Diabulimia Based on Length of Diabetes Diagnosis**

| Duration of Diabulimia | Symptoms of Diabulimia |
|---|---|
| Short term | Polyuria with ketonuria |
| | Polyphagia |
| | Polydipsia |
| | High blood glucose (greater than 250 mmol/L but less than 600 mmol/L) |
| | Weakness |
| | Fatigue |
| | Lack of concentration |
| | Electrolyte imbalances such as high potassium or low sodium |
| Medium term | Moderate to severe dehydration |
| | High blood glucose (greater than 250 mmol/L but less than 600 mmol/L) |
| | Weight loss |
| | Muscle atrophy |
| | Gastroesophageal reflux disease, indigestion |
| | Edema |
| Long term | High blood glucose (greater than 250 mmol/L but less than 600 mmol/L) |
| | Kidney damage |
| | Blindness |
| | Neuropathy |
| | Extreme fatigue |
| | High cholesterol leading to cardiac problems |
| | Osteoporosis |

unhealthy weight control strategies. In their study of disordered eating habits among this same group, Peveler and colleagues[29] and Goebel-Fabbri and colleagues[30] found high mortality rates and poor outcomes from microvascular complications.

The Epidemiology of Diabetes Interventions and Complications study found that maintaining glycemic control diminishes the incidence of cardiovascular complications such as myocardial infarction and stroke. Cardiovascular disease is not specific to diabetes, but it is found more often in patients with diabetes due to hyperglycemia. Cardiovascular disease is 10 times more prevalent in patients with diabetes as compared with the population without diabetes.[6] What young persons with diabetes often do not realize is that playing "Russian roulette" with glucose control can have deadly outcomes and those outcomes come at an earlier age, 45 years versus 58 years.[6]

*Cardiovascular disease is not specific to diabetes, but it is found more often in patients with diabetes due to hyperglycemia.*

## TREATMENT OF THE PATIENT WITH DIABULIMIA

Treatment for the patient with diabulimia is multifaceted. Initial stabilization of the airway is paramount if the patient presents in a comatose and obtunded state. Further medical stabilization includes fluid replacement, electrolyte replacement, and insulin therapy. In addition, patient and family teaching regarding nutrition, exercise, and psychiatric therapy should also be incorporated as part of the treatment regimen.

Medical stabilization of the patient begins with determining the severity of ketoacidosis by assessing blood pH level and degree of ketonuria. The critical care nurse must recognize that the degree of ketoacidosis is determined by monitoring serum bicarbonate, urine ketones, and β-hydroxybutyrate. Vital signs, specifically heart rate and blood pressure, should be assessed to determine

**TABLE 3 Early Assessment Findings**

| Microvascular Disease | Early Assessment Findings |
|---|---|
| Nephropathy | Microalbuminuria (30-300 mg/d) |
| | Normal: 20-200 μm/d |
| | ADA recommends annual screening after 5 y of having diabetes |
| Hypertension | Blood pressure greater than 140/90 |
| | ADA recommends diet and exercise as the treatment initially. ACE inhibitors can protect against the development of nephropathy and should be considered if the systolic and diastolic blood pressure is in the 95th percentile for age, height, and sex. |
| Retinopathy | Dilated retinal venules, microaneurysms, and capillary leakage resulting in loss of visual acuity if these changes are near the macula |
| | ADA recommends annual visual examinations after 5 y of having diabetes |

Abbreviations: ACE, angiotensin-converting enzyme; ADA, American Diabetic Association.



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**TABLE 4 Nursing Care Plan Related to Diabulimia[31]**

| | |
|---|---|
| Imbalanced nutrition: less than body requirements related to increased caloric needs secondary to inability of the body to use nutrients<br>Desired outcome: body weight for height and age will be within normal parameters | 1. Monitor for signs of malnutrition.<br>Rationale: brittle hair and loss of hair, dry and pale skin, muscle wasting are signs of malnutrition.<br>2. Assess serum albumin, serum total protein, prealbumin, transferrin, hemoglobin, hematocrit, electrolytes, and glucose.<br>Rationale: albumin of less than 3.5 g/100 mL is considered an indicator of risk of poor nutritional status. All other noted laboratories will be low.<br>3. Weigh the patient daily at the same time and calculate the body mass index.<br>Rationale: allow weight trends to be readily detected, and maintain a healthy body weight. A body mass index of less than 20 is considered to be a state of malnourishment. Monitoring weight will allow the critical care nurse to determine if the patient is in a positive or negative nitrogen balance.<br>4. Collaborate with dietary. Monitor food intake and assess patient's ability to eat.<br>Rationale: collaborating with dietary allows for a multidisciplinary approach to patient care. Patient may be too fixated on appearance to eat.<br>5. Identify stressors<br>Rationale: such as being in an intensive care unit and being watched when eating may cause anxiety when eating and selecting meal choices.<br>6. Recognize the developmental stage and that a large percentage of girls and teenagers are dieting.<br>Rationale: work with the patient to identify healthy eating habits and a healthy weight range. |
| Activity intolerance related to imbalance between nutrient supply and demand secondary to insulin omission<br>Desired outcome: patient will tolerate periods of activity | 1. Determine the cause of activity intolerance and if the cause is physical or psychological.<br>Rationale: knowing the root of the problem may help to ensure appropriate treatment.<br>2. Assess fatigue and ability to carry out activities of daily living.<br>Rationale: If the patient is too fatigued, allow for periods of rest until the patient regains strength.<br>3. Assess and record the patients ability to carry out activities of daily living. While patient is performing the activities of daily living, evaluate heart rate, blood pressure, respiratory rate, skin color, heart monitor, and pulse oximetry.<br>Rationale: by assessing these parameters, the nurse may identify if the patient is not tolerating the activity and then the activity should be ended and the patient should be allowed to rest. |
| Ineffective protection related to decreased nutritional state<br>Desired outcome: patient will remain free of infection and bleeding | 1. Assess the patient's temperature, heart rate, respiratory rate, and blood pressure as often as every half hour in the acute phase of care.<br>Rationale: changes in vital signs may indicate bleeding or infection.<br>2. Assess the patient's white blood cell (WBC) count.<br>Rationale: elevated WBC counts indicate infection, whereas low WBCs may indicate the need for other protective actions by the nurse.<br>3. Assess level of consciousness and mental status every hour.<br>Rationale: sepsis often presents as a change in mental status.<br>4. Monitor the patients' risk for bleeding by checking clotting studies and platelet counts.<br>Rationale: laboratory studies provide a good indication as to the seriousness of bleeding disorders.<br>5. Determine the amount of stress in the patient's life.<br>Rationale: increased stress depresses the immune system. |
| Other related nursing diagnosis | |
| Adult failure to thrive | |
| Fluid volume deficit related to hyperglycemia induced polyuria | |
| Disturbed thought process related to hyperglycemia leading to the presence of metabolic acid accumulation | |
| Ineffective management of therapeutic regimen related to poor understanding of the need to maintain blood sugar control and denial | |
| Risk for infection secondary to hyperglycemia | |
| Noncompliance with diabetic regimen related to ineffective coping with chronic illness | |
| Knowledge deficit | |



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the degree of dehydration and hypotension. Intravenous 0.9% normal saline should be infused at a rate of 10 mL/kg per hour for mild hypotension or 20 mL/kg per hour for hypovolemic shock. At the same time, it is necessary to correct any potassium, phosphate, magnesium, and bicarbonate imbalances that may be present. Once the potassium is corrected, insulin replacement therapy should be administered intravenously with regular insulin at a rate of 0.15 units per kilogram while at the same time closely monitoring blood sugar levels perhaps as often as every half hour initially. Furthermore, if the initial blood sugar is greater than 600 mg/dL, the critical care nurse must recognize this to be diabetic hyperosmolar syndrome and not DKA.

During medical stabilization, the critical care nurse must be vigilant about monitoring the patient for any complications of treatment. These include hypoglycemia, hypokalemia, recurrent hyperglycemia, overhydration, hyperchloremia, and cerebral edema.

The critical care nurse must anticipate and recognize that controlling insulin levels is much more challenging during adolescence and puberty. During puberty, insulin requirements drastically increase, and glucose insulin sensitivity is decreased by one-third.[2] Therefore, during this time, period frequent blood sugar assessment and supplemental doses of insulin may be required and should be the treatment rather than withholding food, which may then further lead to binge eating. The astute critical care nurse will collaborate with the nutritionist and the educator of persons with diabetes to discuss the treatment plan with both the patient and his/her family.

***The critical care nurse must anticipate and recognize that controlling insulin levels is much more challenging during adolescence and puberty.***

During the initial stabilization of the patient, the holistic critical care nurse will also provide patient and family teaching regarding nutrition, exercise, and psychiatric therapy. Collaborating with a cognitive behavioral therapist may be helpful to reinforce important lifelong healthy habits.[30]

## IMPLICATIONS FOR CRITICAL CARE NURSING

The critical care nurse will care for many patients with diabetes, but the patients who present at a very early age with common complications of diabetes such as hypoglycemia, hyperglycemia, and DKA should raise an index of suspicion. The critical care nurse who quickly recognizes a patient with diabulimia will improve the patient's prognosis by implementing a plan of care that addresses the physiological and the psychosocial aspects of the illness.

First, the critical care nurse must stabilize the patient hemodynamically and focus on tight glucose control. Second, the critical care nurse will recognize that, like the young women in the three scenarios, many patients do not believe that skipping insulin to lose weight can have serious consequences, so consequently teaching and psychological interventions are paramount to the long-term success and treatment of these patients. Third, the critical care nurse must be aware of certain "red flags" in the patient story. These include lack of finger stick marks, lack of prescription refills for insulin, weight loss, spikes in hemoglobin A1C levels that do not match the patient records, low self-esteem, and poor body image.

Another red flag should be a patient who presents with a flat affect and seems depressed. Depression is very common in the first year after the initial diagnosis of diabetes in adolescent girls.[12] The critical care nurse who is aware of this fact should begin to identify why the adolescent is intentionally skipping his/her insulin and consult psychiatry in the care of this patient to identify if depression is a factor. See the care plan in Table 4 for further nursing-related implications.[31] Web sites that may provide helpful information concerning this disorder are listed in Table 5.

**TABLE 5 Helpful Web Sites for Diabulimia**

| Organization | Web Site Address |
|---|---|
| American Diabetes Association | http://www.diabetes.org/home.jsp |
| National Eating Disorders Association | http://www.edap.org |
| National Institute of Mental Health Eating Disorder Publication | www.nimh.nih,gov/publicat/eatingdisorders.csf |
| American Psychiatric Nurses Association | http://www.apna.org |
| Site on Eating Disorders | www.something-fishy.org |
| Juvenile Diabetes Research Foundation | www.jdrf.org |

## SUMMARY

In summary, providing holistic care to a patient with diabetes who presents to the critical care nurse after intentionally skipping or manipulating insulin as a way to control his/her weight is a challenge for the critical care nurse. The nurse must not only stabilize the patient medically but also meet the patient's psychosocial needs.



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At the same time, the critical care nurse must address the issues and concerns that the patient's family and support system will need addressed. By providing holistic care and patient and support system teaching in collaboration with nutritionists and educators of persons with diabetes, the critical care nurse will prevent recurrent hospitalizations and the development of early diabetes-related complications.

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### ABOUT THE AUTHORS


**Lisa A. Ruth-Sahd, RN, DEd, CEN, CCRN,** is a consultant with *Dimensions of Critical Care Nursing* and associate professor of nursing at York College of Pennsylvania, York, Pennsylvania. She is also an employee at Lancaster General Hospital.

**Melissa Schneider, RN-BC, MS, ONC,** is a professor of nursing at York College of Pennsylvania and a part time nurse educator at York Hospital, York, Pennsylvania.

**Brigitte Haagen, PhD, PMHCNS, BC,** is a BS associate professor of Nursing York College, Pennsylvania.

Address correspondence and reprint requests to: Lisa A. Ruth-Sahd, RN, DEd, CEN, CCRN, York College of Pennsylvania, York, PA 17405-7199 (LSahd961@embarqmail.edu; LSahd@ycp.edu).


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