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- Employ a collaborative approach in the treatment of patients with bulimia nervosa and type 1 diabetes

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Early Diagnosis and Management of Bulimia Nervosa in Type 1 Diabetes

Ahmed Saeed Yahya, MBBS, MRCPsych[a,*];
Shakil Khawaja, MBBS, MRCPsych[a];
Jude Chukwuma, MBBS, MRCPsych, DPM, MD[b];
and Chisolum Chukwuma MBBS, MRCGP[c]

ABSTRACT

Treatment outcomes for bulimia nervosa in type 1 diabetes are worse than those for conventional bulimia nervosa. These outcomes may be a consequence of late detection and subsequent management. The combination of these disorders has been referred to as *diabulimia*; however, this is not an official diagnosis and is a colloquial term used by patients and the media to describe the associated maladaptive pattern of compensatory behaviors. Early intervention is required to prevent short- and longer-term complications, with intensive treatment approaches having the best current evidence. Collaboration is required between specialist services for patients to receive optimal care. This narrative review summarizes the latest published evidence in the formulation, detection, and subsequent management of bulimia nervosa in type 1 diabetes, while highlighting the need for higher-quality research in the assessment and treatment of these comorbidities.

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[a]Waltham Forest Older Adults Mental Health Team, North East London NHS Foundation Trust, Red Oak Lodge, London, United Kingdom

[b]Barnet, Enfield and Haringey Mental Health Trust, London, United Kingdom

[c]Babylon Health Office, London, United Kingdom

**Corresponding author:* Ahmed Saeed Yahya, MBBS, MRCPsych, Waltham Forest Older Adults Mental Health Team, North East London NHS Foundation Trust, Red Oak Lodge, London, E11 4HU, United Kingdom (a.yahya@nhs.net).

Estimates indicate that 3.7 million people are living with diabetes in the United Kingdom, and approximately 10% have a diagnosis of type 1 diabetes (T1D).[1] Eating disorders are more frequent in T1D and are associated with significant risk.[2–6] The mortality and morbidity rates are increased in those with both diagnoses.[7–12] Eating disorders tend to be more common in females with T1D, and studies[13–17] indicate they are twice as likely to develop an eating disorder compared to those without T1D. A meta-analysis[7] reported a 3-fold increase of bulimia nervosa (BN) in patients with T1D compared to controls.

Eating disorders can manifest with intentional insulin restriction and omission, which can cause life-threatening complications including diabetic ketoacidosis and hypoglycemia.[10–14] Glycemic control is poor in this patient group (as reflected by raised glycated hemoglobin [HbA_{1c}]), and hospitalization is frequent, which is distressing for both patients and their families. Rapid correction of glucose control can itself increase the risk of microvascular disease.[13]

Diabulimia is a term used by patients and the media to describe BN in T1D and is not an official diagnosis.[1,3,4] Up to 20% of women with T1D may have this disorder.[1] Diabulimia is intentional insulin

Clinical Points

- Early recognition and treatment of bulimia nervosa in type 1 diabetes results in better outcomes.
- Efficacy of recognized treatments for bulimia nervosa in type 1 diabetes is equivocal.
- A collaborative effort between diabetes and eating disorder services appears to be the best approach in the treatment of patients with bulimia nervosa and type 1 diabetes.

omission or manipulation to achieve weight loss or prevent weight gain manifest in the form of purging, whereby hyperglycemia is induced with the aim to lose glucose calories through urine.[6–9] There are associated binging episodes wherein patients normally report temporary loss of control over their eating. Those who omit insulin have been found to be 3 times more likely at risk of premature death than those who cooperate with their prescribed treatment. Cases of T1D and BN are difficult to manage and understandably provoke anxiety in health care professionals.[6,7,10,11] These disorders are especially challenging given the difficulties in detection and diagnosis, which could be related to lack of awareness but are also linked to the clinical invisibility of BN in T1D.

BN in T1D can take over the patient's life with primacy and central importance attached to stringently monitoring dietary intake and enforcing extreme measures to control weight. Additional measures aside from insulin manipulation can include dietary restriction, overexercising, and misusing laxatives. The importance of good communication and collaboration between family, primary care, diabetes, and specialist psychiatric services is essential. This collaboration would ensure prompt recognition, which has been associated with better outcomes and the use of a robust, proactive interdisciplinary approach in managing these potentially devastating comorbidities.[2,8,18]

This review summarizes the latest published evidence in the formulation, detection, and subsequent management of BN in T1D. We recommend regular screening for disordered eating to be incorporated into consultations, particularly for those considered to be at higher risk, which would assist in the earlier identification of BN in T1D. We highlight possible benefits of using a biopsychosocial model of care, with focus on psychoeducation, motivational interviewing, and use of an adapted form of cognitive-behavioral therapy (CBT) in the treatment of this challenging condition.

METHODS

We conducted a comprehensive search for the relevant literature published in the last 10 years and base our recommendations on these findings. Our search was restricted to articles published in the English language. We searched various databases including MEDLINE, PubMed, Cochrane Library, Trip Database, NICE Healthcare Database Advanced Search, DynamedPlus, North East London NHS Foundation Trust (NELFT) Discovery, and the NELFT library catalog. Our search terms included *bulimia nervosa*, *type 1 diabetes mellitus*, *feeding disorders*, *eating disorders*, *insulin*, *drug misuse*, and *prescription drug misuse*. We screened the bibliography of all relevant articles as part of the evidence search.

The search identified 47 articles,[1–47] 2 national guidelines,[48,49] and 1 book chapter[50] relevant for the review. The results included 1 recent systematic review and meta-analysis,[2] which reported on the efficacy of interventions for people with T1D and general disordered eating. Another systematic review[5] provided a brief overview of the literature pertaining to insulin restriction as a disordered eating behavior in T1D. The authors[5] proposed a novel maintenance model that adapted and integrated concepts from well-known accepted theories by Treasure and colleagues[12] and Cooper and Fairburn.[21] These models may already guide current structured CBT for BN in T1D. These models comprise the 3 disordered eating behaviors specific to T1D and BN, which include dietary restriction and binging and purging behaviors.

On the basis of the evidence gathered and our clinical experience, we provide practical recommendations for the assessment, diagnosis, formulation, and management of BN in T1D.

RESULTS

Formulation of BN in T1D

There are 2 established models for the etiology of BN in T1D: the transdiagnostic model for eating disorders and the dual pathway model. Both models address the psychopathology of dysfunctional ideation about the control of weight and shape through eating, poor coping mechanisms, and the impact of dysregulated emotional states. We have integrated concepts from both models to provide a concise and more readable synopsis.[5,9,12,19–21]

A diagnosis of T1D is life changing and requires considerable adjustment, leading to the negative cognitions of denial, anger, and frustration. In 90% of cases, the onset of T1D is before the eating disorder.[12] Multiple interacting factors may lead to the development of BN including predisposing personality traits (ie, emotional instability, interpersonal conflicts, and individual genetic vulnerabilities). There is significant focus on diet, in particular carbohydrate counting, and exercise in T1D. The advised lifestyle management may instill a preoccupation with weight in vulnerable patients and promote dysfunctional compensatory measures.[5,9,12,19,21]

The close monitoring of blood sugar levels and scrutiny associated with the timing, quantity, and nutritional content of meals may further reinforce existing perfectionist, obsessional traits and the adoption of rigid dietary rules.[5,9,12,19,21] Patients with T1D may experience difficulty recognizing hunger and satiety cues because of underlying hormonal dysregulation, which may evoke physiologic and

Table 1. Possible Warning Signs of Bulimia Nervosa in Type 1 Diabetes[6,18,19,23]

- Deterioration in metabolic and glycemic control
- Complications of diabetes including episodes of hypoglycemia, symptomatic hyperglycemia, or a hospital admission for diabetic ketoacidosis
- Fluctuation of weight
- Poor engagement with services
- Poor glucose monitoring
- Lack of insight regarding severity of diabetes diagnosis
- Irregular and infrequent meals.
- Decline in socio-occupational functioning
- Preoccupation with weight and shape concerns
- Substance misuse
- Known psychiatric history
- Family history of psychiatric illness or eating disorder

psychological deprivation states predisposing to an episodic and addictive pattern of binge eating. There also may be episodes of disinhibited eating in response to misperceived or actual episodes of hypoglycemia because of overexercising, inappropriate insulin use, and regulation of blood sugar levels.[5,9,12,19,21]

Additionally, those with T1D are prone to weight gain and obesity, with females being at higher risk. Insulin encourages fat storage, and patients gradually become more aware of this effect. Prior to the initial diagnosis of T1D, individuals may have experienced weight loss as a consequence of endogenous insulin cessation from damage to pancreatic β cells.[5,9,12,19,21] Diabetic patients find it more challenging to maintain an optimal weight, with a tendency to be more self-conscious. They may misinterpret comments from professionals, and the public/media perception of an "ideal body weight" can be triggering and also a perpetuating factor. Body image concerns may exacerbate low self-esteem, leading to negative emotionality and subsequent dietary restraint.[5,9,12,19,21,22] Both dietary restraint and negative affect are thought to be predictive of binge eating in BN. When the patient expectably breaks these extreme dietary rules, an episode of binge eating may result. The difficulties associated with BN may be a manifestation of or precipitate depressive and anxiety disorders in some individuals.[8]

Assessment of BN in T1D

In consultations, there should be emphasis on good communication and establishing a rapport to elicit pertinent details (Table 1 summarizes potential warning signs). A relevant clinical history and examination allow the exclusion of other potential causal factors. There may be objective clinical signs including calluses on the hand (also called Russell's sign), parotid and submandibular lymph gland enlargement, poor dentition, gastrointestinal symptoms, and hematologic/biochemical abnormalities in blood tests.[1,6,18,19,23]

Deterioration in metabolic and glycemic control confirmed by a raised HbA_{1c} level is a red flag. Levels of HbA_{1c} provide an indication of diabetic control. Those who have had complications of diabetes including episodes of hypoglycemia, symptomatic hyperglycemia, or an admission for diabetic ketoacidosis necessitate further investigation. The fluctuation of weight in some patients may be a sign of illness. Poor engagement with services including missed appointments, inadequate glucose monitoring, and minimization of the degree of illness should raise concern.[24–28]

The consumption of irregular and infrequent meals may be a sign of dysfunction, although this is fairly common in adolescents with T1D. A study[15] found that 28% of female and 7% of male adolescents with T1D were skipping some meals. The study[15] also reported that 22% of healthy school children were missing breakfast. The omission and restriction of caloric intake may be associated with poor academic and occupational performance, which is an indication for further investigation. Patients with BN may express unusual dissatisfaction/sensitivity about their weight/shape in consultations, refuse to be weighed, have excessive preoccupation with their diet, or adopt unusual dietary practices. Individuals who misuse illicit substances, are socially withdrawn, present with affective/anxiety symptoms, or have a psychiatric history or positive family history for specific eating disorders/mental disorder may be at greater risk of developing BN.[29–34]

The Diabetes Eating Problem Survey-Revised (DEPS-R)[51] and the modified SCOFF (mSCOFF)[52] eating disorder questionnaire are available as an adjunct in detecting eating disorders in T1D. The DEPS-R is a standardized, reliable, specific, and concise 16-item self-report diabetes screening measure.[6,35,36] It is a modification of the longer DEPS[53] and is used to identify at-risk individuals who warrant further evaluation.[35,36] The mSCOFF is a 5-item questionnaire, altered from the original validated SCOFF[54] questionnaire, to assess the possible presence of an eating disorder in diabetes.[6,19]

Management of BN in T1D

An eclectic and holistic model of care is required in the treatment of BN in T1D and consists of several modalities. A concurrent treatment approach is recommended, with several areas that need to be addressed at one time.

Motivational Interviewing

The implementation of simple techniques such as motivational interviewing cannot be underestimated. Motivational interviewing has been found to be a useful intervention in BN and T1D. The utilization of a person-centered approach, demonstrating curiosity and interest may help to alleviate initial resistance, while promoting acceptance and change.[37–40] A fundamental concept of motivational interviewing is demonstrating appropriate empathy and reinforcing autonomy and self-efficacy. It facilitates self-reflection and ultimately creates discrepancy in deep-seated values and current behaviors.[37–39,48] Motivational interviewing works synchronously with the transtheoretical model of change, which breaks down the concept of readiness to change into distinct stages.[37] It is important to avoid confrontation and solving problems on behalf of the patient. Control forms a significant element

Table 2. Summary of Adapted CBT Model for Bulimia Nervosa in Type 1 Diabetes[9,21]

- Creation of joint formulation
- Food diaries
- Psychoeducation
- Review maintaining factors for eating disorders
- Teach skills including problem solving and mood regulation
- Agree on a relapse prevention plan

Abbreviation: CBT = cognitive-behavioral therapy.

of the psychopathology of BN, and it is therefore crucial to foster empowerment and guide self-discovery.[48]

Psychoeducation and Family Support

Psychoeducation by professionals from the multidisciplinary team is advised. This also forms a component of the structured CBT model, which is a recognized treatment for BN.[48] Information should be conveyed about the harmful effects of insulin manipulation. The patient should be informed that improved adherence with insulin treatment can cause insulin-related edema and thus transient weight gain. The improvement in glycemic control may cause short-term bloating and abdominal discomfort as a result of water retention.[6,18,19]

NICE guidelines[48] recommend that family therapy should be offered to a young person with BN. It is important to educate family members about the psychopathology of BN and encourage them to avoid high expressed emotion during interactions, while providing adequate behavioral and emotional support through listening and validation. Their presence at key moments can prevent purging and binging behaviors, ie, offering to stand outside the bathroom, as these are usually private acts performed in secrecy.[40–42,48,49] A study[41] found that insulin restriction is less prevalent in the morning and additional support may be required during late afternoon.

Psychoeducation may improve restrictive eating practices, body dissatisfaction, and preoccupation with food. However, evidence suggests this does not appear to improve metabolic control, treatment adherence, or insulin manipulation in those with BN in T1D.[6,18,19]

Adapted CBT Model

The CBT model used to treat BN in T1D is an adapted, specialized treatment. It employs a variety of strategies to encourage adherence and thereby achieve positive outcomes. It can be administered as either group or individual therapy (Table 2 provides a summary of CBT).[19,21] A study[43] reported that group CBT led to improvement in glycemic control and eating habits of 6 female patients with T1D and comorbid BN. CBT comprises 2 forms: 1 form focuses primarily on the eating disorder psychopathology, while the other focuses on addressing external barriers to change including clinical perfectionism, core low self-esteem, and interpersonal problems. The therapist is vigilant for mental health comorbidity during the course of therapy.[10,12,18,21,43]

Treatment consists of 4 stages and is time limited (usually 20 sessions). Components include jointly creating a formulation; monitoring of eating and linking this to underlying thoughts, emotions, and behaviors (diaries are encouraged to monitor and record thoughts and feelings during binge-eating episodes, times of insulin misuse, when monitoring blood sugar levels, and before other compensatory behaviors); and psychoeducation directed toward weight regulation, consistent and regular eating, a balanced diet with a variety of foods, the effects of misusing insulin, and the physical complications and adverse effects associated with current disturbed behaviors.[19,21]

The therapist explores the maintaining factors of BN with emphasis on addressing maladaptive thoughts, feelings, and behaviors, including overevaluation of body shape/weight and understanding the mechanism of dietary restraint and the events that trigger disruptive behaviors. Patients are taught skills that include problem solving and methods to regulate mood patterns. As the therapy comes to an end, both the patient and therapist would concentrate on devising an appropriate relapse prevention plan.[19,21]

Nutritional Management

The aim should be to normalize and stabilize the diet by introducing regular meals (having 3 meals and 3 snacks daily), introducing a variety of foods, and encouraging a balanced diet. The frequency of snacking should correlate with the timing of the insulin injections. There should be some flexibility with the diet and initial emphasis on ensuring patient safety.[6,17–19]

Insulin Treatment

Patient safety and stabilization is paramount. A flexible and realistic insulin treatment and blood glucose monitoring regimen, suited to the individual's lifestyle, is recommended. Continuous blood glucose monitoring and the use of an insulin pump may be considered. These interventions may reduce binge-eating episodes, as they would allow the individual to distinguish and control episodes of hypoglycemia, which may be an antecedent. They may promote dietary change and support adherence to a lower glycemic diet.[2,6,12,18,19,44,49]

Pharmacologic Treatments

Antidepressants have proven efficacy in treating symptoms of BN. The selective serotonin reuptake inhibitor fluoxetine at a dose of 60 mg daily is an option, although NICE guidelines[48] recommend drug treatment should not be the only intervention.[45,47] Antidepressants are particularly beneficial when there are comorbid depressive or anxiety disorders. In a study[45] of 387 subjects treated with fluoxetine, there were notable improvements in both binge-eating and purging behaviors. There is reasonable evidence that the anticonvulsant topiramate decreases binge-eating and purging behaviors. Topiramate is associated with weight loss, and this potential effect should be carefully considered when prescribing this medication.[45,50] Systematic reviews have suggested benefit for lisdexamfetamine, which is approved in the United States for the treatment of binge-eating

disorder. The starting dose of lisdexamfetamine is usually 30 mg daily and the maintenance dose between 50 and 70 mg daily.[50]

DISCUSSION

The evidence for the efficacy of recognized treatments for BN in T1D is equivocal. The treatment outcomes are poorer than for conventional eating disorders. A systematic review[2] including 6 studies concluded there were insignificant effects in glycemic control with current regimens. However, in some studies there was some improvement noted in eating disorder symptoms and insulin misuse.[2] Inpatient therapy appeared to be the superior treatment, which may be due to a multifaceted and intensive holistic model of care employed in these facilities. The authors[2] add that the quality of the data retrieved from these studies is variable and open to question, and their review suggests that an intensive and integrated treatment is required. Treatment ideally should comprise tailored diabetes management, nutritional management, and psychological/pharmacologic treatment for BN.

Further research is indicated in the development of more effective treatments while obtaining more valid data on outcomes with current approaches. Even for BN without T1D, a Cochrane review[46] summarized that there is only a small body of evidence for the effectiveness of psychological therapies.

Early recognition and management of BN results in better outcomes.[2,18,19] However, the secrecy enshrined with BN and the lack of willingness or ability of the person to disclose their weight/shape concerns and subsequent disruptive behaviors is a complicating factor. Families can be oblivious to the disordered eating and the compensatory behaviors employed by the patient. In rarer cases, they may be accommodating or enabling these behaviors. It is imperative to detect this disorder in time before these maladaptive beliefs and disruptive behaviors become entrenched and resistant to treatment. A joint effort from both diabetic and eating disorder services appears to be the way forward to ensure early detection and implementation of a timely comprehensive personalized management plan.

CONCLUSIONS

There is generally a lack of high-quality published research in the etiology and management of comorbid BN and T1D. There are already efforts to direct more attention toward the recognition and management of this disorder. Given the complexity of BN in T1D and the nature of the risks with these disorders, further research is required with regard to detection and also in the development of efficacious treatments.

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POSTTEST

To obtain credit, go to http://www.cmeinstitute.com/activities/Pages/PCC.aspx to complete the Posttest and Evaluation. A $10 processing fee is required.

1. **You are evaluating MayLynn, a patient with type 1 diabetes. You suspect she may have bulimia nervosa because of which of the following clinical signs?**
   a. Calluses on the hand/knuckles
   b. Parotid and submandibular lymph gland enlargement
   c. Poor dentition
   d. All of the above

2. **In what circumstance would you have concern that your patient with type 1 diabetes has developed an eating disorder?**
   a. Deterioration in metabolic and glycemic control
   b. Emergent generalized anxiety disorder, with no prior psychiatric history
   c. Regular engagement with your office
   d. Avoidance of alcohol and other substances

3. **La Shara has type 1 diabetes and also has a confirmed diagnosis of bulimia nervosa. She is interested in cognitive-behavioral therapy for the eating disorder. As you describe the core elements of this therapy, which of the following components would *not* be included?**
   a. Formulation of the problem by the therapist
   b. Food diaries that record thoughts and feelings during binge-eating episodes
   c. Skills for problem solving and mood regulation
   d. Agreement on a relapse prevention plan