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DIABULIMIA IN TYPE 1 DIABETES: PSYCHOLOGICAL, METABOLIC, AND CLINICAL CONSEQUENCES - A NARRATIVE REVIEW

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ABSTRACT

Background: Type 1 diabetes mellitus (T1D) is associated with increased psychological burden and higher risk of disordered eating behaviors. Intentional insulin restriction or omission for weight control, commonly referred to as diabulimia, may lead to severe metabolic and psychological complications.

Aim: This narrative review summarizes current evidence regarding the prevalence, psychological mechanisms, biological consequences, diagnostic challenges, quality of life impairment, and treatment approaches associated with intentional insulin restriction in patients with T1D.

Methods: This narrative review included studies indexed in PubMed and Google Scholar, with primary focus on publications from the last 10 years. Narrative reviews, systematic reviews, meta-analyses, consensus statements, and selected original studies related to diabulimia, insulin omission, diabetes distress, and eating disorders in T1D were analyzed.

Results: Adolescents and young women with T1D appear to be at increased risk of developing disordered eating behaviors compared to the general population. Intentional insulin omission may result in hyperglycemia, glycosuria, dehydration, lipolysis, diabetic ketoacidosis, accelerated microvascular complications, and increased mortality risk. Diabetes distress, body dissatisfaction, chronic disease burden, and sociocultural pressure related to body image appear to play important roles in the development of diabulimia. Early diagnosis remains difficult because symptoms may resemble poor treatment adherence.

Conclusions: Diabulimia represents a serious and underrecognized complication of T1D requiring multidisciplinary management. Early identification, psychological support, and integration of psychodiabetological care into routine diabetes management may improve both metabolic and psychological outcomes. Further research is needed to establish standardized diagnostic criteria and evidence-based treatment strategies.

KEYWORDS

Type 1 Diabetes, Diabulimia, Insulin Omission, Eating Disorders, Diabetes Distress

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1. Introduction

Type 1 diabetes mellitus (T1D) is a chronic autoimmune disease characterized by destruction of pancreatic β -cells, resulting in absolute insulin deficiency and lifelong dependence on exogenous insulin. The disease most commonly develops during childhood and adolescence, with nearly 85% of cases diagnosed before the age of 20 years (Chiang et al., 2018). Management of T1D requires continuous glucose monitoring, insulin administration, dietary control, and daily therapeutic decision-making, which can be emotionally demanding for both patients and their families (Young-Hyman et al., 2016).

In addition to its metabolic consequences, T1D is associated with increased vulnerability to mental health disorders, including anxiety, depression, diabetes distress, and disordered eating behaviors (Young et al., 2013). Particular concern has been directed toward intentional insulin restriction or omission for the purpose of weight control, commonly referred to as “diabulimia.” Although the term is not formally recognized in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), it is widely used to describe the coexistence of T1D and disturbed eating behaviors involving deliberate insulin manipulation (Yahya et al., 2023).

Unlike other eating disorders, diabulimia represents a unique interaction between chronic disease management, body image concerns, and metabolic control. By reducing or omitting insulin doses, patients may induce rapid weight loss through glycosuria, dehydration, lipolysis, and severe catabolic dysregulation (Umpierrez et al., 2024; Goebel-Fabbri et al., 2008). Despite potentially life-threatening consequences, including recurrent diabetic ketoacidosis, accelerated microvascular complications, and increased mortality risk, insulin omission may become psychologically reinforced by perceived control over body weight and appearance (Goebel-Fabbri et al., 2008).

Adolescents and young adults are particularly vulnerable due to developmental factors, sociocultural pressure related to appearance, and the intensive focus on food intake and body weight inherent to diabetes self-management (Young et al., 2013; Jones et al., 2000; Bombaci et al., 2024). Additionally, diabetes-related emotional distress has increasingly been recognized as a clinically significant component of diabetes management burden and may negatively affect self-management behaviors and psychological well-being (Fisher et al., 2012; Poos et al., 2023). Nevertheless, diabulimia remains underrecognized, inconsistently defined, and frequently difficult to identify in routine clinical practice.

The aim of this narrative review is to summarize current evidence regarding the prevalence, psychological mechanisms, biological consequences, diagnostic challenges, impact on quality of life, and treatment approaches associated with intentional insulin restriction and disordered eating behaviors in patients with T1D (Markowitz et al., 2010; Hanlan et al., 2013; Pinhas-Hamiel et al., 2015).

2. Methodology

A literature search was conducted using the PubMed and Google Scholar databases. The search strategy used combinations of the following keywords and Medical Subject Headings (MeSH) terms: “type 1 diabetes”, “T1D”, “diabulimia”, “insulin omission”, “insulin restriction”, “disordered eating”, and “eating disorders”. Boolean operators (AND/OR) were applied to identify relevant publications.

The literature search primarily focused on studies published within the last decade in order to summarize the most recent evidence regarding psychological, metabolic, and clinical aspects of intentional insulin restriction in individuals with T1D. However, several older landmark publications were additionally included because of the relatively limited number of available studies specifically addressing diabulimia and because these earlier studies provide important clinical, and pathophysiological foundations for understanding insulin omission behaviors and their consequences.

Narrative reviews, systematic reviews, meta-analyses, consensus reports, and selected original studies addressing psychological, metabolic, clinical, and therapeutic aspects of intentional insulin restriction in T1D were included. Articles unrelated to T1D, studies focused exclusively on type 2 diabetes mellitus, conference abstracts without full-text availability, and duplicate publications were excluded.

Publications were selected based on their relevance to the topic and their contribution to understanding the psychological and metabolic consequences of insulin omission in patients with T1D. The relatively small number of retrieved publications identified using several search combinations additionally reflects the still limited and heterogeneous body of literature specifically dedicated to diabulimia and intentional insulin restriction in T1D. Table 1 presents selected PubMed search strategies and the number of retrieved records.

Table 1. PubMed search strategies and number of retrieved records

SEARCH STRATEGY	NUMBER OF RESULTS
("type 1 diabetes" OR T1DM) AND (diabulimia OR "intentional insulin omission" OR "insulin restriction")	9
("type 1 diabetes" OR T1DM) AND ("disordered eating" OR "insulin omission" OR diabulimia)	26
("type 1 diabetes") AND ("eating disorders" OR "disordered eating") AND insulin	24
("type 1 diabetes") AND ("insulin omission") AND (ketoacidosis OR HbA1c OR complications)	4
("type 1 diabetes") AND (diabulimia OR "disordered eating") AND prevalence	13
("type 1 diabetes") AND (diabulimia OR "insulin omission") AND (treatment OR therapy OR multidisciplinary)	6

3. Prevalence of Disordered Eating Behaviors in Type 1 Diabetes

Individuals with T1D, particularly adolescent girls and young women, appear to be at increased risk of developing disordered eating behaviors compared to the general population. However, reported prevalence rates vary considerably across studies due to differences in diagnostic criteria, assessment tools, study populations, and terminology used in the literature. The lack of standardized diagnostic criteria for diabulimia further complicates accurate epidemiological assessment (Young et al., 2013; Jones et al., 2000; Markowitz et al., 2010; Hanlan et al., 2013). Variability in study design and differences between self-reported questionnaires and structured clinical interviews may additionally influence reported prevalence rates. Some studies evaluate only clinically significant eating disorders, whereas others include broader categories of disturbed eating behaviors and insulin manipulation practices, contributing to substantial heterogeneity across the literature.

One of the earliest and most frequently cited studies investigating disturbed eating behaviors in T1D was conducted by Colton et al., who evaluated 101 girls aged 9-13 years with T1D and compared them with 303 age-matched controls. The study demonstrated substantially higher rates of disturbed eating behaviors among girls with T1D, suggesting that vulnerability to eating pathology may already emerge during early adolescence (Colton et al., 2004). These findings emphasize that psychological difficulties related to body image and weight concerns may develop relatively early in the course of diabetes management. Increased awareness of body weight associated with routine monitoring of food intake and insulin dosing may contribute to heightened vulnerability during critical developmental periods.

Similarly, Young et al. (2013) performed a systematic review and meta-analysis examining eating problems in adolescents with T1D and reported higher levels of disordered eating behaviors, body dissatisfaction, and weight-related concerns among adolescents with diabetes compared to healthy peers. The authors additionally emphasized that adolescent females appear particularly vulnerable to eating pathology associated with diabetes management and body image distress (Young et al., 2013; Jones et al., 2000). Puberty-related weight changes, sociocultural pressure regarding thinness, and fear of insulin-associated weight gain may further intensify psychological vulnerability in this population. Some studies additionally suggest that repeated emphasis on nutrition, carbohydrate counting, and glycemic outcomes may unintentionally increase focus on food and body weight among susceptible individuals.

Intentional insulin omission for weight control represents one of the most concerning manifestations of disordered eating in T1D. In a longitudinal study conducted by Goebel-Fabbri et al. (2008), approximately 30% of women with T1D admitted to intentional insulin restriction for weight loss purposes. Importantly, insulin omission was associated with poorer glycemic control, increased risk of diabetic complications, and elevated mortality during long-term follow-up (Goebel-Fabbri et al., 2008; Nielsen et al., 2002; Peveler et al., 2005). Recurrent insulin restriction behaviors may also contribute to worsening diabetes distress, psychological exhaustion, and progressive deterioration in quality of life.

Reported prevalence rates of insulin omission vary across studies, ranging from approximately 10% to over 40% depending on patient age, sex, and assessment methodology. Disordered eating symptoms are observed more frequently among adolescent females and young adult women than among males with T1D, although recent evidence suggests that eating disturbances in males may remain underrecognized and underreported (Young et al., 2013; Yahya et al., 2023; Hanlan et al., 2013; Pinhas-Hamiel et al., 2015). Some authors additionally emphasize that males may present with different body image concerns, including excessive focus on muscularity and body composition rather than thinness alone, potentially contributing to underdiagnosis.

The true prevalence of diabulimia is likely underestimated due to underreporting, shame, concealment of symptoms, fear of stigmatization, and difficulties distinguishing pathological behaviors from intensive diabetes self-management practices. Furthermore, inconsistent use of terms such as “diabulimia,” “insulin omission,” “insulin restriction,” and “disordered eating behaviors” complicates interpretation and comparison of epidemiological findings across studies (Yahya et al., 2023; Markowitz et al., 2010; Hanlan et al., 2013). Limited awareness among healthcare professionals regarding the psychological aspects of T1D may additionally contribute to delayed recognition and underdiagnosis of eating-related disturbances in clinical practice.

4. Psychological Burden of Type 1 Diabetes and Its Association With Disordered Eating Behaviors

The diagnosis of T1D is frequently associated with substantial emotional stress for both patients and their families. Shortly after diagnosis, children and adolescents are required to rapidly acquire complex self-management skills, including blood glucose monitoring, insulin dose adjustment, carbohydrate counting, hypoglycemia management, and interpretation of glycemic trends (Young-Hyman et al., 2016; Bombaci et al., 2024; Delamater et al., 2018). This intensive educational process may become overwhelming, particularly for young individuals simultaneously adapting to the psychological burden of a chronic lifelong disease.

Importantly, initiation of insulin therapy is frequently associated with weight restoration or weight gain following diagnosis, which may be psychologically distressing for some adolescents, particularly females exposed to sociocultural ideals emphasizing thinness. In vulnerable individuals, intentional insulin omission may become perceived as a rapid and controllable method of weight reduction despite severe metabolic consequences (Goebel-Fabbri et al., 2008; Jones et al., 2000; Rydall et al., 1997).

Diabetes self-management requires continuous attention to food intake, body weight, physical activity, and metabolic control. Daily therapeutic decision-making often leads to chronic stress, anxiety, and fear of treatment-related mistakes.

Despite intensive self-management efforts, many patients continue to experience glycemic variability and difficulties achieving recommended HbA1c targets, which may further increase frustration, guilt, and feelings of failure (Bombaci et al., 2024; Fisher et al., 2012; Hagger et al., 2016; Hood et al., 2014).

In psychologically vulnerable individuals, this persistent focus on food, body weight, and metabolic outcomes may contribute to the development of disordered eating behaviors (Young-Hyman et al., 2016). Additionally, fear of future diabetic complications, repeated medical evaluations, and perceived pressure to maintain optimal glycemic control may intensify anxiety and emotional distress associated with eating and insulin administration (Young-Hyman et al., 2016; Poos et al., 2023; Hagger et al., 2016; Buchberger et al., 2016).

In many patients treated with multiple daily injections, nutritional education initially focuses primarily on carbohydrate counting. However, transition to insulin pump therapy often introduces additional calculations related to fat and protein intake, requiring more detailed analysis of overall meal composition (Young-Hyman et al., 2016; Bombaci et al., 2024; Smart et al., 2013). This increased emphasis on precise nutritional control often intensifies preoccupation with food and body weight in psychologically vulnerable individuals (Young-Hyman et al., 2016; Bombaci et al., 2024; Hanlan et al., 2013).

Adolescence and young adulthood are developmental periods strongly associated with increased body image sensitivity and sociocultural pressure related to appearance and body weight. In individuals with T1D, these challenges may become even more pronounced due to the visible and intrusive nature of diabetes management. Many patients are required to administer insulin injections in public settings, wear insulin pumps or continuous glucose monitoring devices, and continuously monitor food intake during social interactions (Young-Hyman et al., 2016; Bombaci et al., 2024; Pinhas-Hamiel et al., 2015; Colton et al., 2004).

Some patients with T1D report feelings of embarrassment, social stigma, or fear of being perceived as “different” because of visible medical devices and diabetes-related behaviors (Bombaci et al., 2024; Pinhas-Hamiel et al., 2015). Additionally, eating in public settings may become associated with anxiety related to carbohydrate counting, insulin administration, or fear of glycemic excursions (Young-Hyman et al., 2016; Bombaci et al., 2024; Buchberger et al., 2016). Over time, this persistent focus on food, body weight, and metabolic control may contribute to body dissatisfaction, disordered eating patterns, and maladaptive compensatory behaviors.

5. Biological Mechanisms of Weight Loss Associated With Insulin

Restriction

Insulin is a key anabolic hormone responsible for glucose utilization, glycogen synthesis, lipid storage, and inhibition of protein and fat catabolism. In patients with T1D, absolute insulin deficiency results in impaired cellular glucose uptake and profound metabolic dysregulation. When insulin administration is intentionally reduced or omitted, the body enters a catabolic state characterized by hyperglycemia, increased hepatic glucose production, lipolysis, proteolysis, and dehydration (Umpierrez et al., 2024; Basu & Jensen, 2005). In addition to its metabolic role, insulin normally suppresses hepatic glucose output and promotes energy storage within adipose tissue and skeletal muscle. Consequently, insulin deficiency disrupts multiple pathways responsible for maintaining normal energy balance and body composition.

In the absence of sufficient insulin, glucose cannot be effectively transported into insulin-dependent tissues such as skeletal muscle and adipose tissue. Despite elevated blood glucose concentrations, cells remain in a state of relative energy deprivation, leading to activation of counterregulatory hormones including glucagon, cortisol, catecholamines, and growth hormone. These hormonal changes stimulate hepatic gluconeogenesis and glycogenolysis, further exacerbating hyperglycemia. Increased hepatic glucose production combined with reduced peripheral glucose utilization creates a severe metabolic imbalance characterized by persistent elevation of circulating glucose concentrations. Severe insulin deficiency leads to marked hyperglycemia that exceeds the renal tubular capacity for glucose reabsorption, resulting in glycosuria and osmotic diuresis. Urinary glucose excretion contributes to negative energy balance, as substantial amounts of glucose are eliminated rather than utilized for cellular energy production. Simultaneously, osmotic diuresis causes significant fluid and electrolyte depletion, further contributing to rapid body weight reduction (Umpierrez et al., 2024; Basu & Jensen, 2005). Polyuria, polydipsia, dehydration, and fatigue frequently accompany this process and may become clinically significant during prolonged insulin omission.

Additionally, insulin deficiency promotes breakdown of adipose tissue triglycerides into free fatty acids and accelerates skeletal muscle protein catabolism in order to provide alternative energy substrates. Persistent lipolysis and proteolysis further intensify the catabolic state and contribute to progressive weight loss despite severe metabolic imbalance (Basu & Jensen, 2005). Loss of skeletal muscle mass may additionally contribute to weakness, impaired physical functioning, and chronic fatigue. Prolonged catabolism may also negatively affect nutritional status and overall physical health.

Chronic insulin restriction is also associated with increased ketogenesis resulting from excessive hepatic conversion of free fatty acids into ketone bodies. Progressive accumulation of ketones may lead to diabetic ketoacidosis (DKA), a potentially life-threatening acute complication characterized by metabolic acidosis, dehydration, electrolyte disturbances, and impaired consciousness (Umpierrez et al., 2024; Basu & Jensen, 2005). Clinical manifestations of DKA commonly include nausea, vomiting, abdominal pain, tachycardia, weakness, and altered mental status. Recurrent episodes of ketoacidosis may require emergency hospitalization and are associated with considerable morbidity and increased risk of long-term complications.

Importantly, the rapid weight reduction associated with insulin omission may reinforce maladaptive eating behaviors and contribute to repeated intentional insulin restriction in psychologically vulnerable individuals. Over time, metabolic deterioration may become psychologically linked to perceived control over body weight and appearance (Goebel-Fabbri et al., 2008; Poos et al., 2023; Hanlan et al., 2013). Fear of weight gain following appropriate insulin administration may further strengthen anxiety surrounding insulin therapy and contribute to recurrent insulin manipulation behaviors. This mechanism may create a self-perpetuating cycle in which temporary weight loss reinforces continued insulin restriction despite awareness of severe metabolic and psychological consequences.

6. Clinical Consequences of Insulin Restriction

Intentional insulin restriction in patients with T1D is associated with numerous severe short-term and long-term medical complications. Persistent insulin deficiency leads to chronic hyperglycemia, metabolic instability, and recurrent episodes of diabetic ketoacidosis (DKA), one of the most common acute complications observed in individuals engaging in insulin omission behaviors. Recurrent DKA episodes frequently require emergency department visits and hospitalizations and are associated with substantial morbidity and healthcare burden (Umpierrez et al., 2024; Goebel-Fabbri et al., 2008; Nielsen et al., 2002). Acute metabolic decompensation may additionally result in dehydration, electrolyte disturbances, nausea, vomiting, abdominal pain, impaired consciousness, and, in severe cases, cerebral edema or death. Repeated hospital admissions related to DKA may further negatively affect educational functioning, occupational stability, and psychosocial well-being, particularly among adolescents and young adults with longstanding disease burden.

Poor glycemic control associated with chronic insulin restriction significantly increases the risk of developing microvascular complications. Several studies have demonstrated associations between disordered eating behaviors and accelerated progression of diabetic retinopathy, nephropathy, and neuropathy. Chronic hyperglycemia contributes to endothelial dysfunction, oxidative stress, inflammatory activation, and vascular damage, leading to progressive impairment of retinal, renal, and peripheral nervous system function (Goebel-Fabbri et al., 2008; Peveler et al., 2005; Rydall et al., 1997). Sustained exposure to elevated glucose concentrations may also impair wound healing and increase susceptibility to infections, additionally contributing to long-term deterioration in health status.

Diabetic retinopathy is particularly common among patients with prolonged insulin omission and persistently elevated HbA1c levels. Similarly, diabetic nephropathy may develop earlier and progress more rapidly in individuals with recurrent metabolic decompensation. Progressive renal impairment may ultimately lead to chronic kidney disease and increased cardiovascular risk. Peripheral neuropathy, chronic fatigue, impaired concentration, dizziness, and reduced physical functioning may additionally contribute to deterioration in overall quality of life and daily functioning (Peveler et al., 2005; Rydall et al., 1997). Some patients may also experience menstrual irregularities, reduced bone mineral density, nutritional deficiencies, and gastrointestinal symptoms related to prolonged catabolic state and poor metabolic control.

Importantly, insulin restriction has also been associated with increased mortality risk. Long-term studies suggest that patients engaging in intentional insulin omission experience significantly higher rates of diabetes-related complications and premature death compared to individuals maintaining regular insulin therapy. Recurrent ketoacidosis, chronic hyperglycemia, severe metabolic disturbances, and psychological comorbidity are associated with worse long-term outcomes (Umpierrez et al., 2024; Goebel-Fabbri et al., 2008; Nielsen et al., 2002). Coexisting depression, anxiety, and diabetes distress may additionally worsen self-management behaviors and further increase the risk of severe complications. The cumulative interaction between metabolic instability and psychological burden highlights the potentially life-threatening nature of diabulimia and emphasizes the importance of early recognition and comprehensive multidisciplinary intervention.

7. Impact on Quality of Life

Diabulimia and disordered eating behaviors substantially impair quality of life in individuals with T1D. Persistent preoccupation with food intake, body weight, glucose levels, and insulin administration may contribute to chronic emotional exhaustion, anxiety, and diabetes burnout. Many patients experience feelings of shame, guilt, loss of control, and reduced self-esteem, particularly when recurrent episodes of hyperglycemia occur despite intensive self-management efforts (Chiang et al., 2018; Young-Hyman et al., 2016; Fisher et al., 2012; Anderson et al., 2005). Continuous pressure to maintain optimal glycemic control while simultaneously coping with body image concerns may create a persistent cycle of psychological stress and frustration. Over time, emotional burden associated with intensive diabetes management may contribute to depressive symptoms, hopelessness, and reduced motivation for self-care behaviors.

The psychological burden associated with insulin restriction may negatively affect social functioning and interpersonal relationships. Eating in public settings, administering insulin injections, or wearing visible medical devices such as insulin pumps and continuous glucose monitoring systems may become sources of embarrassment and social anxiety for some individuals (Young et al., 2013; Bombaci et al., 2024; Pinhas-Hamiel et al., 2015). Consequently, patients may avoid social situations involving food, withdraw from peer

interactions, or experience increased feelings of isolation. Fear of negative evaluation by others may additionally contribute to secrecy surrounding diabetes management and disordered eating behaviors. Difficulties in interpersonal relationships may also arise from misunderstandings regarding the seriousness of T1D, frustration associated with chronic disease management, or conflicts involving parental supervision and treatment adherence, particularly among adolescents and young adults.

Recurrent episodes of hyperglycemia and diabetic ketoacidosis may additionally interfere with education, occupational functioning, concentration, physical well-being, and everyday activities. Frequent hospitalizations and progressive diabetic complications may further worsen overall well-being and life satisfaction (Umpierrez et al., 2024; Goebel-Fabbri et al., 2008; Rydall et al., 1997). Chronic fatigue, impaired concentration, sleep disturbances, and reduced physical functioning may negatively affect academic performance, work productivity, and participation in social activities. In severe cases, progressive metabolic instability may substantially reduce independence and impair the ability to maintain regular educational, professional, and interpersonal functioning.

Fear of stigmatization and perceived judgment from healthcare professionals or family members may discourage some patients from seeking psychological support or openly discussing insulin omission behaviors. As a result, emotional distress and maladaptive coping mechanisms may remain unrecognized for prolonged periods, further contributing to deterioration in both psychological and metabolic health (Young-Hyman et al., 2016; Poos et al., 2023; Hanlan et al., 2013; Banting & Randle-Phillips, 2018). Some individuals may additionally avoid routine diabetes appointments, minimize symptoms during medical consultations, or conceal difficulties related to insulin administration and eating behaviors in an attempt to avoid criticism or loss of autonomy. Delayed recognition of psychological difficulties may contribute to worsening diabetes distress, poorer metabolic outcomes, and progression of long-term diabetic complications.

Importantly, reduced quality of life associated with diabulimia extends beyond physical health consequences alone and frequently affects emotional well-being, self-perception, family functioning, and social participation. The cumulative interaction between chronic disease burden, psychological distress, and metabolic instability highlights the importance of integrating psychosocial assessment and psychological support into routine diabetes care. Early recognition of emotional difficulties and implementation of multidisciplinary interventions may improve both quality of life and long-term treatment outcomes in individuals with T1D and disordered eating behaviors.

8. Challenges in Identification and Diagnosis of Diabulimia

Early identification of patients engaging in intentional insulin omission remains particularly challenging in clinical practice. Many individuals with T1D may deliberately conceal disordered eating behaviors due to shame, fear of judgment, or concerns about losing autonomy over diabetes management. Furthermore, manifestations of insulin restriction, including elevated HbA1c levels, glycemic variability, recurrent diabetic ketoacidosis, and avoidance of medical appointments, may be misinterpreted as poor treatment adherence rather than symptoms of an underlying eating disorder (Yahya et al., 2023; Markowitz et al., 2010; Hanlan et al., 2013). In some cases, patients may present with apparently adequate diabetes knowledge and technical skills while simultaneously engaging in maladaptive insulin manipulation behaviors, which may further delay recognition by healthcare professionals.

Diagnosis of diabulimia is further complicated by the absence of formal diagnostic criteria in the DSM-5 and inconsistent terminology used throughout the literature. Healthcare professionals may focus predominantly on metabolic parameters and insulin dosing while underestimating the psychological aspects of diabetes self-management (Young-Hyman et al., 2016; Yahya et al., 2023; Hanlan et al., 2013; Pinhas-Hamiel et al., 2015). Consequently, many patients remain undiagnosed for prolonged periods despite severe psychological distress and progressive metabolic deterioration. The lack of standardized screening recommendations additionally contributes to variability in clinical practice and may reduce opportunities for early intervention. Several studies emphasize that disordered eating behaviors in T1D frequently remain unrecognized until severe metabolic complications or recurrent hospitalizations occur.

Adolescents and young adults may be particularly difficult to identify due to developmental factors, increasing desire for independence, and attempts to avoid parental or medical supervision. Additionally, behaviors such as strict dietary control, meticulous carbohydrate counting, or insulin manipulation may initially resemble appropriate intensive diabetes self-management, further complicating recognition of pathological patterns (Young et al., 2013; Bombaci et al., 2024; Markowitz et al., 2010; Pinhas-Hamiel et al.,

2015). Sociocultural pressure regarding body image, fear of weight gain associated with insulin therapy, and perfectionistic tendencies may further increase vulnerability to insulin omission behaviors in this population. Emotional symptoms including anxiety, depressive mood, irritability, and social withdrawal may additionally overlap with common psychological difficulties observed during adolescence, making differentiation even more challenging.

Some authors additionally highlight the potential usefulness of screening tools specifically developed for individuals with T1D, including the Diabetes Eating Problem Survey-Revised (DEPS-R), which may facilitate earlier identification of patients at increased risk of disordered eating behaviors. Increasing awareness among healthcare professionals regarding the psychological burden associated with intensive diabetes management may improve recognition of warning signs and reduce diagnostic delay.

9. Treatment Approaches

Currently, there are no universally established evidence-based guidelines specifically dedicated to the treatment of diabulimia or intentional insulin restriction in patients with T1D. Due to the complex interaction between metabolic instability, disordered eating behaviors, and psychological distress, most authors emphasize the importance of a multidisciplinary treatment approach involving endocrinologists, psychiatrists, psychologists, diabetes educators, dietitians, and family support systems (Yahya et al., 2023; Hanlan et al., 2013; Pinhas-Hamiel et al., 2015; Banting & Randle-Phillips, 2018).

Management of diabulimia should extend beyond improvement of glycemic control alone and address the underlying psychological mechanisms contributing to insulin omission behaviors. Cognitive behavioral therapy (CBT) is among the most commonly recommended interventions, as it addresses maladaptive eating behaviors, body image concerns, perfectionistic traits, emotional dysregulation, and diabetes-related cognitive distortions. Psychological treatment may additionally help patients develop healthier coping strategies and reduce maladaptive associations between body weight control and insulin manipulation (Young-Hyman et al., 2016; Hanlan et al., 2013; Banting & Randle-Phillips, 2018).

Recent literature increasingly identifies diabetes distress as a central therapeutic target. The ongoing demands of intensive diabetes self-management, constant glucose monitoring, dietary control, fear of complications, and pressure to achieve optimal metabolic outcomes may significantly contribute to insulin restriction behaviors (Young-Hyman et al., 2016; Fisher et al., 2012; Poos et al., 2023; Hagger et al., 2016). Consequently, effective treatment should incorporate psychosocial support and interventions aimed at reducing emotional exhaustion, anxiety, shame, and diabetes-related burnout.

Establishing a supportive and nonjudgmental therapeutic relationship is particularly important, as many patients experience fear of stigmatization, guilt, and reluctance to disclose disordered eating behaviors or intentional insulin omission to healthcare professionals. Early recognition of warning signs and sensitive communication may improve treatment engagement and reduce diagnostic delay (Poos et al., 2023; Hanlan et al., 2013; Banting & Randle-Phillips, 2018).

Family involvement and psychoeducation may be especially beneficial in adolescents and young adults, in whom family dynamics, parental supervision, and emotional support substantially influence diabetes self-management behaviors (Young-Hyman et al., 2016; Bombaci et al., 2024; Delamater et al., 2018; Banting & Randle-Phillips, 2018). Increasing awareness among healthcare professionals regarding the psychological aspects of T1D and disordered eating may further improve early identification and facilitate implementation of integrated treatment strategies.

An additional challenge involves limited access to specialized psychological and psychodiabetological support in many healthcare systems. Although psychological burden and diabetes distress are increasingly recognized as important components of T1D management, access to multidisciplinary care remains inconsistent, particularly among adults transitioning from pediatric diabetes services. Insufficient availability of healthcare professionals experienced in both diabetes management and eating disorders may contribute to delayed diagnosis and limited treatment implementation in patients with diabulimia.

10. Limitations

This narrative review has several limitations. Available literature regarding diabulimia and intentional insulin restriction in patients with T1D remains relatively limited and heterogeneous. Differences in terminology, diagnostic criteria, study populations, and assessment methods complicate direct comparison of epidemiological findings across studies. Additionally, some older landmark studies were included due to the limited number of recent publications specifically addressing this topic. Further high-quality longitudinal studies and standardized diagnostic approaches are needed to improve understanding of the prevalence, mechanisms, and treatment of diabulimia.

11. Discussion

The available literature suggests that intentional insulin restriction in individuals with T1D represents a complex clinical problem involving the interaction of metabolic, psychological, and behavioral factors. Unlike classical eating disorders, diabulimia is uniquely associated with the ability to manipulate body weight through insulin omission, which directly affects both glucose metabolism and caloric loss through glycosuria. This combination of chronic disease burden and disturbed eating behaviors creates substantial diagnostic and therapeutic challenges.

Adolescents and young adults appear particularly vulnerable to the development of insulin omission behaviors due to developmental instability, increasing independence in diabetes self-management, and heightened sensitivity to sociocultural pressure regarding body image and body weight. Intensive diabetes treatment itself may additionally contribute to psychological distress because patients are required to maintain constant focus on food intake, carbohydrate counting, glucose monitoring, insulin administration, and fear of long-term complications. Over time, these factors may contribute to emotional exhaustion, diabetes distress, and maladaptive coping behaviors.

Current evidence indicates that insulin restriction may lead to severe short-term and long-term consequences, including recurrent diabetic ketoacidosis, chronic hyperglycemia, accelerated microvascular complications, and increased mortality risk. Importantly, many patients intentionally omit insulin despite awareness of potential medical consequences, suggesting that psychological mechanisms frequently outweigh rational health-related decision-making. Fear of weight gain, low self-esteem, perfectionistic tendencies, anxiety, depressive symptoms, and distorted body image may all contribute to the persistence of maladaptive behaviors.

Another important issue involves the considerable diagnostic difficulty associated with intentional insulin restriction in individuals with T1D. Symptoms are frequently interpreted as poor treatment adherence rather than manifestations of an underlying eating disorder, particularly because many patients demonstrate adequate diabetes-related knowledge and technical self-management skills. Furthermore, the absence of universally accepted diagnostic criteria and inconsistent terminology used throughout the literature complicate both clinical recognition and epidemiological assessment. Delayed diagnosis may contribute to prolonged psychological distress and progressive metabolic deterioration before appropriate intervention is implemented.

The literature increasingly emphasizes the importance of diabetes distress as a clinically significant factor contributing to psychological burden and impaired treatment adherence in T1D. Emotional exhaustion associated with continuous self-management demands may negatively influence both metabolic control and mental health outcomes. Persistent fear of hyperglycemia, hypoglycemia, long-term complications, and weight gain may additionally intensify anxiety surrounding insulin therapy and eating behaviors. These findings highlight the importance of integrating routine psychological assessment into diabetes care, particularly among adolescents and young adults presenting with recurrent ketoacidosis, unexplained deterioration of glycemic control, or significant body image concerns.

The findings of this review additionally underline the importance of multidisciplinary treatment approaches integrating endocrinological, psychological, psychiatric, and nutritional care. Effective management should extend beyond metabolic stabilization alone and address the underlying emotional and behavioral mechanisms associated with insulin omission. Cognitive behavioral therapy, psychoeducation, family involvement, and psychosocial support appear to play important roles in improving both psychological well-being and diabetes self-management behaviors. Establishing a supportive and nonjudgmental therapeutic relationship may further improve treatment adherence and facilitate earlier disclosure of disordered eating behaviors.

An additional challenge involves limited access to specialized psychodiabetological and multidisciplinary care in many healthcare systems. Despite increasing recognition of the psychological burden associated with T1D, access to healthcare professionals experienced in both diabetes management and eating disorders remains inconsistent, particularly among adults transitioning from pediatric diabetes services. Insufficient availability of specialized psychological support may contribute to delayed diagnosis, reduced treatment engagement, and poorer long-term outcomes.

Future research should focus on establishing standardized diagnostic criteria and improving screening strategies for intentional insulin restriction in individuals with T1D. Additional longitudinal studies are needed to better understand epidemiology, risk factors, psychological mechanisms, and long-term outcomes associated with diabulimia. Further evaluation of multidisciplinary treatment models and psychological interventions may additionally help improve evidence-based management strategies for this high-risk patient population.

12. Conclusions

Intentional insulin restriction and disordered eating behaviors in patients with T1D represent a serious and potentially life-threatening clinical problem that remains insufficiently recognized in routine practice. Diabulimia results from a complex interaction between chronic disease burden, psychological vulnerability, body image concerns, and intensive diabetes self-management.

Current evidence indicates that insulin omission may lead to severe metabolic and psychological consequences, including recurrent diabetic ketoacidosis, poor glycemic control, accelerated microvascular complications, impaired quality of life, and increased mortality risk. Early diagnosis remains challenging because symptoms are frequently mistaken for poor treatment adherence.

Effective management requires a multidisciplinary approach integrating diabetological, psychological, psychiatric, and nutritional care. Increasing awareness of diabetes distress and improving access to psychodiabetological support may contribute to earlier identification and better long-term outcomes in individuals with T1D and disordered eating behaviors.

Further high-quality studies are needed to establish standardized diagnostic criteria and evidence-based therapeutic strategies.

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