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EATING DISORDERS IN TYPE 1 DIABETES MELLITUS: A NARRATIVE REVIEW OF EPIDEMIOLOGY, UNDERLYING MECHANISMS, DIAGNOSIS, AND MULTIDISCIPLINARY MANAGEMENT

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ABSTRACT

Introduction: The coexistence of eating disorders (EDs) and type 1 diabetes mellitus (T1DM) represents a complex clinical challenge associated with increased morbidity and mortality. Individuals with T1DM have unique risk factors for developing eating disorders, including the psychological burden of intensive diabetes management, insulin-associated weight changes, and persistent focus on food intake and body weight. Intentional insulin restriction or omission for weight control, commonly referred to as “diabulimia,” represents a particularly concerning diabetes-specific behavior.

Methods: This narrative review synthesizes current evidence regarding eating disorders and disordered eating behaviors in individuals with T1DM. A literature search was conducted using PubMed, Google Scholar, and Scopus, including peer-reviewed studies, systematic reviews, meta-analyses, and clinical guidelines, with a primary focus on publications from January 2020 to June 2026.

Results: Individuals with T1DM demonstrate higher rates of eating disorders and disordered eating behaviors compared with the general population, particularly during adolescence and young adulthood. Risk development reflects interactions between biological, psychological, and social factors, including insulin-associated weight gain, body dissatisfaction, perfectionism, diabetes distress, and the demands of diabetes self-management. Insulin restriction is associated with poor glycemic control, recurrent diabetic ketoacidosis, diabetes complications, and increased mortality. Diabetes-specific screening tools, particularly the Diabetes Eating Problem Survey–Revised (DEPS-R), improve detection of clinically significant behaviors. Current evidence supports multidisciplinary management integrating diabetes care, mental health support, and nutritional expertise.

Conclusion: Eating disorders in T1DM require early recognition and integrated multidisciplinary care. Routine psychological screening and diabetes-specific assessment may improve outcomes. Further research is needed to establish standardized diagnostic approaches and optimize prevention and treatment strategies.

KEYWORDS

Type 1 Diabetes Mellitus, Eating Disorders, Insulin Omission, Diabulimia, Diabetes Distress, Glycemic Control, Diabetes Eating Problem Survey–Revised (DEPS-R), Multidisciplinary Management

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1. Introduction

Type 1 diabetes mellitus (T1DM) is a chronic autoimmune condition characterized by an absolute insulin deficiency, requiring lifelong dependence on exogenous insulin therapy. Effective management requires continuous attention to carbohydrate intake, insulin dosing, physical activity, blood glucose monitoring, and increasingly, interpretation of continuous glucose monitoring (CGM) data. While these practices have substantially improved glycemic outcomes and reduced diabetes-related complications, they also necessitate an unusually intense focus on food and body weight that may inadvertently contribute to the development of disturbed eating behaviors in susceptible individuals [1,2].

Eating disorders (EDs) represent a spectrum of psychiatric conditions characterized by persistent disturbances in eating behavior and body image that impair physical and psychosocial functioning. According to the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*, the principal eating disorders include anorexia nervosa (AN), bulimia nervosa (BN), binge-eating disorder (BED), avoidant/restrictive food intake disorder (ARFID), and other specified feeding or eating disorders (OSFED) [3]. In individuals with T1DM, however, the clinical presentation often differs from that observed in the general population. Alongside conventional ED psychopathology, many patients exhibit diabetes-specific disordered eating behaviors, including intentional insulin restriction or omission to induce glycosuria and weight loss, compulsive carbohydrate restriction, excessive exercise to influence glucose levels, or recurrent binge eating followed by insulin manipulation rather than self-induced vomiting or laxative misuse. These

diabetes-specific behaviors complicate diagnosis because they do not fit neatly within existing psychiatric classifications [4].

The convergence of eating disorders and type 1 diabetes creates a bidirectional relationship where each condition exacerbates the other. Poor glycemic control resulting from disordered eating behaviors accelerates diabetes complications, while the psychological distress associated with diabetes management intensifies eating disorder symptoms [5]. Recognition of the relationship between T1DM and eating disorders has increased considerably during the past decade [1,6]. Earlier investigations primarily focused on adolescent females with insulin omission, whereas more recent research demonstrates that disordered eating affects individuals across the lifespan, including males and adults, and encompasses a broad range of maladaptive eating behaviors extending beyond insulin restriction. Recent systematic reviews indicate that people with T1DM experience significantly greater rates of eating disorders and disordered eating behaviors than individuals without diabetes, although reported prevalence varies substantially because of differences in study populations, diagnostic criteria, and assessment instruments. Importantly, diabetes-specific screening tools such as the Diabetes Eating Problem Survey–Revised (DEPS-R) have improved detection of clinically relevant pathology that may not be identified using conventional eating disorder questionnaires [7, 8].

The mechanisms underlying this increased vulnerability are complex and multifactorial. Biological changes following insulin initiation often lead to rapid restoration of body weight after diagnosis, a phenomenon that can provoke body dissatisfaction, particularly among adolescents. At the same time, the daily demands of diabetes management require continual monitoring of food intake and caloric content, behaviors that resemble cognitive patterns observed in restrictive eating disorders. Psychological factors—including perfectionism, anxiety, depression, diabetes distress, fear of hypoglycemia, and reduced quality of life—interact with sociocultural pressures regarding body image to create a unique risk profile. These influences are further amplified during adolescence, a developmental period marked by increasing autonomy, identity formation, and heightened sensitivity to appearance-related concerns. [1, 9]

The coexistence of T1DM and eating disorders presents substantial challenges for healthcare professionals. Poor glycemic control may be mistakenly attributed to inadequate diabetes self-management rather than intentional insulin manipulation, delaying recognition of an underlying psychiatric disorder [8]. Conversely, eating disorder services may have limited expertise in intensive diabetes management, resulting in fragmented care and inconsistent treatment recommendations. Recent reports have highlighted the need for integrated multidisciplinary services that combine endocrinology, psychiatry, psychology, specialist nursing, and dietetics to address both metabolic and psychological aspects of these conditions simultaneously [1,2,10,11].

The growing body of literature published over the past five years provides new insights into epidemiology, mechanisms, screening strategies, and therapeutic interventions. However, evidence remains heterogeneous, particularly regarding prevention and long-term treatment outcomes. Recent systematic reviews have emphasized that although awareness has increased, robust intervention studies remain scarce and multidisciplinary models of care have not yet been consistently implemented across healthcare systems [6, 12].

This narrative review aims to synthesize contemporary evidence regarding eating disorders in individuals with T1DM. Specifically, we examine current epidemiology, explore biological and psychological mechanisms linking diabetes and disordered eating, summarize clinical consequences, evaluate available screening and diagnostic approaches, review current treatment strategies, and identify priorities for future research. Understanding this complex interplay is essential for clinicians, researchers, and healthcare systems to develop effective prevention and intervention strategies for this population.

2. Methodology

This study was conducted as a comprehensive narrative review of the literature eating disorders in individuals with type 1 diabetes mellitus. A narrative approach was selected to provide a broader synthesis of the literature, allowing for integration of diverse study designs, theoretical perspectives, and clinical insights to provide a comprehensive overview of a complex topic.

Search strategy

A comprehensive literature search was conducted using three major databases: PubMed (MEDLINE), Google Scholar, and Scopus. The search strategy employed a combination of Medical Subject Headings (MeSH) terms and keywords related to eating disorders and type 1 diabetes. Primary search terms included:

“eating disorders,” “anorexia nervosa,” “bulimia nervosa,” “binge eating disorder,” “diabulimia,” “insulin omission,” “insulin restriction,” “type 1 diabetes,” “type 1 diabetes mellitus,” “T1DM,” “insulin-dependent diabetes,” and “juvenile diabetes.”

Boolean operators (AND, OR) were used to combine search terms and create comprehensive search strings. For example: (“eating disorder*” OR “anorexia nervosa” OR “bulimia nervosa” OR “diabulimia” OR “insulin omission”) AND (“type 1 diabetes” OR “T1DM” OR “insulin-dependent diabetes”). Additional searches were conducted using terms related to specific aspects of the topic, including “screening,” “assessment,” “prevalence,” “epidemiology,” “pathophysiology,” “mechanisms,” “treatment,” “management,” “outcomes,” and “prognosis.”

The search focused primarily on literature published between January 2020 and June 2026, reflecting recent advances in diabetes technology, updated psychiatric classifications, and emerging evidence regarding multidisciplinary management. Earlier landmark studies published before 2020 were included selectively where necessary to provide historical context or describe foundational concepts, including insulin omission as a diabetes-specific purging behavior.

Eligibility Criteria

Studies were included if they met the following criteria: (1) focused on eating disorders, disordered eating behaviors, or insulin omission/restriction in individuals with type 1 diabetes; (2) published in English; (3) included original research (observational studies, clinical trials, case series), systematic reviews, meta-analyses, clinical guidelines, or expert consensus statements; (4) provided relevant information on prevalence, mechanisms, clinical presentation, screening, assessment, management, or outcomes; and (5) published in peer-reviewed journals.

Studies focusing exclusively on type 2 diabetes, gestational diabetes, obesity without T1DM, or non-peer-reviewed literature (e.g., conference abstracts, editorials, opinion articles) were excluded unless they provided essential contextual information.

Data Synthesis

Given the heterogeneity of the available literature—including differences in participant age, diabetes duration, diagnostic criteria, outcome measures, and assessment instruments—a formal meta-analysis was beyond the scope of this review. Instead, relevant data were extracted from studies and organized thematically according to the major topics addressed in this review.

Where multiple systematic reviews addressed the same topic, greater weight was given to the most recent, methodologically rigorous reviews and meta-analyses. Individual observational studies were incorporated primarily to illustrate emerging evidence or clarify inconsistencies identified in previous reviews.

3. Results

3.1 Prevalence and Epidemiology

The prevalence of eating disorders in individuals with type 1 diabetes mellitus (T1DM) is substantially higher than in the general population, although reported rates vary considerably depending on the study population, diagnostic criteria, and assessment methods. Multiple systematic reviews and meta-analyses have consistently demonstrated that adolescents and young adults with T1DM are at significantly increased risk of developing eating disorders [1,12,13].

A recent systematic review and meta-analysis by Dean et al. (2024), which synthesized data from more than 20 observational studies, reported significantly increased odds of eating disorders among individuals with T1DM compared with healthy controls. The association was strongest among adolescent girls and young women, although elevated risk was also observed in adults. The review identified eating disorders as a major comorbidity in T1DM and recommended routine psychological screening as an integral component of diabetes care [1].

Similarly, Niemelä et al. (2024) conducted a systematic review and meta-analysis of insulin-dependent diabetes and found that the pooled prevalence of eating disorder symptoms substantially exceeded estimates reported for the general population. Notably, prevalence varied according to the assessment instrument used, with diabetes-specific questionnaires consistently identifying more cases than generic eating disorder measures.

These findings suggest that conventional psychiatric screening tools may underestimate the true burden of eating pathology in individuals with T1DM [7].

Although prevalence estimates differ across studies, clinically diagnosed eating disorders are generally reported in approximately 7–15% of females with T1DM, while subclinical disordered eating behaviors affect an estimated 20–40% of adolescents and young adults. Intentional insulin restriction or omission for weight control has been reported in approximately 15–40% of females with T1DM, depending on age and assessment methodology. Although prevalence appears lower among males, it is likely underestimated because of limited research and under-recognition [1,13,14].

While DSM-5 diagnoses such as anorexia nervosa, bulimia nervosa, and binge-eating disorder occur more frequently in individuals with T1DM than in the general population, many patients exhibit diabetes-specific disordered eating behaviors that do not meet formal diagnostic criteria. These behaviors include intentional insulin restriction or omission, excessive dietary restraint, rigid carbohydrate restriction, binge eating, compulsive exercise, and maladaptive manipulation of insulin dosing to influence body weight or glycemic control [4].

Among these behaviors, intentional insulin omission has received the greatest clinical attention. By reducing or omitting insulin, individuals with T1DM can induce weight loss through glycosuria and urinary calorie loss. Although this practice has become popularly known as *diabulimia*, it is not recognized as an independent psychiatric diagnosis. Nevertheless, insulin omission is widely regarded as a diabetes-specific compensatory behavior analogous to purging in bulimia nervosa because it serves a similar weight-control function while producing severe metabolic consequences [4,15].

Recent qualitative research suggests that insulin restriction often develops gradually rather than occurring as an isolated behavior. Many individuals initially omit insulin intermittently following episodes of overeating or perceived dietary "failure" before progressing to more frequent omission associated with increasing body dissatisfaction, diabetes distress, and worsening glycemic control. These findings emphasize that insulin omission should be viewed as part of a broader spectrum of eating disorder psychopathology rather than simply as poor treatment adherence [16].

The risk of developing eating disorders is particularly elevated during adolescence and young adulthood, coinciding with developmental periods characterized by heightened body image concerns, peer influence, and increasing independence in diabetes self-management. Some studies further suggest that diabetes onset during preadolescence or adolescence may increase the subsequent risk of eating disorders, possibly reflecting the psychological challenges associated with adapting to intensive diabetes management during critical stages of development [18,19].

Factors Contributing to Variability in Prevalence Estimates

A defining feature of the epidemiological literature is the substantial heterogeneity in reported prevalence estimates. This variability reflects differences in study design, participant characteristics, and assessment methodology rather than true population differences alone.

First, studies differ in the diagnostic criteria used. Some rely on structured psychiatric interviews based on DSM criteria, whereas others employ self-report questionnaires that assess eating disorder symptoms without establishing formal diagnoses. Consequently, prevalence estimates derived from symptom screening are generally higher than those based on clinical interviews [20].

Second, the choice of screening instrument has a major influence on reported prevalence. Generic measures such as the Eating Disorder Examination Questionnaire (EDE-Q) and Eating Attitudes Test (EAT-26) do not adequately capture diabetes-specific behaviors such as insulin omission. In contrast, the Diabetes Eating Problem Survey–Revised (DEPS-R), developed specifically for individuals with T1DM, has demonstrated superior sensitivity for identifying diabetes-related eating pathology [20,21]. Recent reviews therefore recommend incorporating diabetes-specific screening tools into routine clinical practice to improve early detection [7].

Participant characteristics also contribute substantially to variability. Studies involving predominantly adolescent females consistently report higher prevalence than those including adults or mixed-sex populations. Likewise, diabetes duration, body mass index (BMI), insulin delivery modality, and cultural factors may influence both the occurrence and expression of disordered eating behaviors. Cross-national comparisons remain challenging because of differences in healthcare systems, diabetes education, and sociocultural attitudes toward body image and weight [1].

Finally, advances in diabetes technology may influence eating behaviors in complex ways. Continuous glucose monitoring (CGM) and automated insulin delivery systems have improved glycemic control and reduced treatment burden for many individuals. However, emerging evidence suggests that continuous exposure to glucose data may increase anxiety, perfectionism, and preoccupation with food among vulnerable patients. Although current evidence remains limited, further research is needed to determine whether modern diabetes technologies ultimately reduce or exacerbate the risk of disordered eating behaviors [6].

3.2 Underlying Mechanisms and Pathophysiology

The increased prevalence of eating disorders in individuals with type 1 diabetes mellitus (T1DM) reflects a complex interplay of biological, psychological, and social factors that create unique vulnerabilities. Rather than being explained by a single mechanism, current evidence supports a biopsychosocial model in which diabetes-specific treatment demands interact with individual predisposition to increase the risk of disordered eating.

Biological Factors

Initiation of insulin therapy represents one of the earliest biological factors implicated in the development of disordered eating. Before diagnosis, individuals with untreated T1DM experience insulin deficiency, resulting in hyperglycemia, glycosuria, dehydration, and substantial weight loss despite increased appetite. Insulin replacement restores anabolic metabolism, promotes glucose uptake, suppresses lipolysis, and facilitates weight regain. Although metabolically beneficial, this rapid weight restoration may be distressing, particularly for adolescents and young adults who are sensitive to changes in body image [15,22]. In individuals with pre-existing body dissatisfaction or perfectionistic personality traits, perceived insulin-associated weight gain may encourage unhealthy weight-control behaviors. Consistent evidence identifies concern about weight gain following insulin initiation as one of the strongest predictors of intentional insulin restriction among adolescents and young women with T1DM [1,22].

Intentional insulin restriction reinforces disordered eating through its physiological effects. Reduced insulin availability limits cellular glucose uptake, resulting in persistent hyperglycemia and glycosuria, with subsequent urinary calorie loss and rapid weight reduction despite continued food intake. This immediate weight loss may reinforce insulin omission in a manner analogous to compensatory behaviors observed in bulimia nervosa [4]. However, repeated insulin restriction has profound metabolic consequences, including diabetic ketoacidosis (DKA), dehydration, electrolyte disturbances, and accelerated development of microvascular complications such as retinopathy, nephropathy, and neuropathy. Longitudinal studies have demonstrated that persistent insulin restriction is associated with increased mortality compared with adherence to prescribed insulin regimens, underscoring the severe medical consequences of this behavior [15].

Beyond insulin-associated weight changes, glycemic instability may also contribute to disordered eating. Episodes of hypoglycemia often require rapid carbohydrate consumption, which some individuals perceive as a loss of dietary control or as binge eating. Subsequent guilt may promote compensatory insulin restriction or excessive dietary restraint. Conversely, chronic hyperglycemia can impair satiety signaling, increase fatigue, and contribute to irregular eating patterns, further reinforcing maladaptive eating behaviors [22].

Although alterations in leptin, ghrelin, insulin signaling, and hypothalamic regulation have been proposed as potential contributors, evidence supporting these neuroendocrine mechanisms remains preliminary. No single physiological pathway adequately explains the increased prevalence of eating disorders in T1DM, further supporting a multifactorial biopsychosocial model [2].

Psychological Mechanisms

Body dissatisfaction is among the most consistently identified psychological risk factors for disordered eating in T1DM. Concerns regarding insulin-associated weight gain and changes in physical appearance frequently contribute to negative body image, particularly during adolescence when developmental changes coincide with increasing awareness of societal ideals of body shape and appearance [13]. Body dissatisfaction has been consistently associated with dietary restraint, binge eating, and insulin omission, even after adjustment for body mass index (BMI), suggesting that subjective body perception is a more important determinant of eating disorder risk than objective weight [22].

Optimal diabetes management requires continuous attention to carbohydrate counting, insulin dosing, glucose monitoring, and meal planning. Although these behaviors are essential for maintaining glycemic control, they may reinforce perfectionistic thinking in susceptible individuals. Many patients describe pressure to achieve "perfect" glucose values, while deviations from glycemic targets often generate feelings of failure,

guilt, and self-criticism. These cognitive patterns resemble those observed in restrictive eating disorders, where rigid behavioral rules and dichotomous ("all-or-nothing") thinking contribute to the maintenance of psychopathology [4].

Qualitative studies further suggest that restrictive eating may develop not only from concerns about body weight but also from fear of postprandial hyperglycemia. Over time, diabetes self-management may become increasingly intertwined with maladaptive eating behaviors, making it difficult to distinguish appropriate disease management from pathological dietary restriction [16].

Psychological comorbidity further increases vulnerability to eating disorders. Depression and anxiety are consistently associated with greater eating disorder symptom severity, poorer glycemic control, and increased diabetes-related complications [14]. In addition, growing attention has focused on diabetes distress, the emotional burden associated with living with and managing diabetes. Unlike clinical depression, diabetes distress reflects frustration, burnout, fear of complications, and concerns related specifically to daily diabetes management. Recent systematic reviews identify diabetes distress as one of the strongest psychological correlates of disordered eating, with affected individuals demonstrating greater body dissatisfaction, more frequent insulin omission, poorer treatment adherence, and reduced quality of life [11]. These findings suggest that diabetes-specific emotional burden represents an important therapeutic target independent of traditional psychiatric diagnoses.

Behavioral Mechanisms

Individuals with T1DM must make frequent decisions regarding carbohydrate intake, insulin dosing, meal timing, and physical activity, making eating a highly monitored and medically regulated behavior. Although carbohydrate counting is fundamental to effective diabetes management, constant attention to food intake may inadvertently increase cognitive preoccupation with eating. Several authors have suggested that this sustained focus on food resembles cognitive patterns observed in restrictive eating disorders, particularly among adolescents with perfectionistic or anxiety-related traits [20].

Fear of hypoglycemia represents another important behavioral mechanism. Some individuals intentionally maintain elevated blood glucose concentrations to reduce the risk of hypoglycemic episodes, whereas others restrict food intake to minimize insulin requirements. Over time, these strategies may reinforce avoidance behaviors, increase meal-related anxiety, and contribute to increasingly rigid eating practices. Recurrent hypoglycemia requiring emergency carbohydrate intake may also be perceived as binge eating, further reinforcing guilt and compensatory insulin manipulation [22].

The widespread adoption of continuous glucose monitoring (CGM), insulin pumps, and automated insulin delivery systems has transformed diabetes management. Although these technologies generally improve glycemic control and reduce treatment burden, their psychological effects remain incompletely understood. Continuous access to glucose data may increase health anxiety, perfectionism, and excessive focus on numerical targets in vulnerable individuals, potentially reinforcing restrictive eating or compulsive insulin adjustment. Conversely, improved glucose stability and reduced diabetes-related burden may alleviate diabetes distress and improve quality of life. Current evidence remains inconclusive, and further longitudinal studies are required to determine whether modern diabetes technologies ultimately reduce or increase the risk of disordered eating behaviors [6].

3.3 Clinical Presentation and Complications

The coexistence of eating disorders (EDs), disordered eating behaviors (DEBs), and type 1 diabetes mellitus (T1DM) is associated with substantial medical and psychological morbidity. Unlike eating disorders in individuals without diabetes, where complications arise primarily from nutritional restriction, binge-purge behaviors, or weight fluctuations, eating pathology in T1DM additionally disrupts insulin therapy and glycemic management. Intentional insulin restriction or omission is particularly concerning because it compromises metabolic stability and accelerates the development of diabetes-related complications. Consequently, the clinical consequences extend beyond impaired glycemic control to include acute metabolic emergencies, chronic vascular complications, reduced quality of life, increased healthcare utilization, and premature mortality [4,15].

Impact on Glycemic Control

Deterioration in glycemic control is one of the most consistent clinical manifestations of disordered eating in T1DM. Individuals who intentionally restrict insulin typically exhibit persistently elevated glycated hemoglobin (HbA1c) concentrations compared with those without disordered eating behaviors [15].

Several studies have demonstrated a strong association between higher Diabetes Eating Problem Survey–Revised (DEPS-R) scores and elevated HbA1c levels, with poorer glycemic outcomes accompanying increasing severity of disordered eating behaviors [14,21]. Elevated HbA1c in this context should not be interpreted solely as inadequate diabetes education or treatment non-adherence but may instead represent a behavioral manifestation of underlying eating disorder psychopathology.

The relationship between disordered eating and glycemic control is bidirectional. Poor metabolic control may exacerbate diabetes distress, reinforce feelings of failure and guilt, and promote maladaptive coping strategies. In turn, insulin restriction and irregular eating patterns further destabilize glucose levels, perpetuating a cycle of psychological distress and metabolic deterioration [22].

Diabetic Ketoacidosis and Acute Metabolic Complications

Intentional insulin omission is strongly associated with an increased risk of diabetic ketoacidosis (DKA), one of the most serious acute complications of T1DM. Individuals with T1DM and eating disorders experience substantially higher rates of recurrent DKA than those without disordered eating behaviors. Repeated hospital admissions for DKA, particularly in the absence of identifiable precipitating factors such as infection, insulin pump failure, or limited access to insulin, should therefore prompt consideration of underlying eating disorder psychopathology [1,15].

Because insulin omission often resembles poor treatment adherence, it may remain unrecognized in routine clinical practice. Patients may intentionally conceal insulin restriction because of shame, fear of criticism, concerns about losing independence, or anxiety regarding healthcare professionals' responses. Consequently, recurrent DKA should prompt sensitive assessment of eating behaviors, body image concerns, and psychological distress rather than focusing exclusively on reinforcement of diabetes education or insulin administration techniques [16].

Development and Progression of Diabetes-Related Complications

Persistent hyperglycemia resulting from chronic insulin restriction accelerates the development of microvascular complications, including diabetic retinopathy, nephropathy, and neuropathy. Individuals with T1DM and eating disorders consistently demonstrate earlier onset and greater severity of these complications than those without eating pathology.

A landmark longitudinal study by Goebel-Fabbri et al. (2011) demonstrated that women with T1DM who reported insulin restriction experienced substantially higher rates of diabetic complications and mortality during follow-up than women who adhered to prescribed insulin therapy. Insulin restriction was associated with increased risks of nephropathy, retinopathy, and premature death, highlighting the profound long-term consequences of this behavior [15].

Diabetic nephropathy is of particular concern because prolonged periods of hyperglycemia may remain undetected before insulin restriction is recognized and appropriately addressed. Progressive renal impairment further complicates diabetes management by altering insulin clearance and glucose regulation. Similarly, diabetic retinopathy occurs more frequently among individuals who intentionally omit insulin. Although chronic hyperglycemia is the principal driver of retinal damage, marked glycemic variability associated with repeated cycles of insulin restriction and correction may further accelerate disease progression [15].

Psychological Consequences and Quality of Life

Beyond its physical complications, the coexistence of T1DM and eating disorders is associated with substantial psychological burden. Individuals commonly report greater anxiety, depressive symptoms, diabetes distress, shame, and reduced quality of life than those with diabetes alone [4].

Managing two chronic conditions with overlapping concerns regarding food, body weight, and glucose control places considerable emotional demands on affected individuals. This overlap may intensify cognitive distress and complicate recovery by making adaptive diabetes self-management difficult to distinguish from pathological eating behaviors.

Many individuals report guilt following episodes of hyperglycemia, anxiety surrounding meals, distress related to weight fluctuations, and concerns about judgement from healthcare professionals. These experiences may contribute to avoidance of diabetes appointments, reduced disclosure of symptoms, and delayed access to appropriate multidisciplinary care [16].

Disordered eating may also impair social functioning. Anxiety surrounding carbohydrate intake, insulin administration, or perceived judgement during meals can lead individuals to avoid eating with others, contributing to social isolation and further deterioration in psychological well-being.

3.4 Screening and Assessment Tools

Early detection of eating disorders in individuals with type 1 diabetes is essential for preventing serious complications and improving outcomes. However, standard eating disorder screening tools may not adequately capture diabetes-specific disordered eating behaviors, necessitating the use of specialized instruments.

Screening Instruments

The Diabetes Eating Problem Survey–Revised (DEPS-R) is currently the most widely used diabetes-specific screening instrument for identifying disordered eating behaviors in individuals with T1DM. Developed by Markowitz et al. (2010), the DEPS-R is a 16-item self-report questionnaire designed to assess eating disorder symptoms that are particularly relevant to diabetes management. Unlike general eating disorder measures, it evaluates behaviors such as intentional insulin restriction, manipulation of insulin doses following overeating, concerns regarding insulin-associated weight gain, difficulties balancing food intake with glucose management, and emotional distress related to diabetes and body weight.

The DEPS-R has demonstrated good reliability and validity across both pediatric and adult populations with T1DM. Higher DEPS-R scores have been associated with elevated HbA1c levels, increased diabetes distress, poorer treatment adherence, and greater psychological morbidity [20,21]. An important advantage of the DEPS-R is its ability to identify individuals with clinically meaningful diabetes-related eating behaviors who may not meet formal psychiatric diagnostic criteria. This is particularly relevant because subclinical disordered eating may represent an early stage of disease progression and an opportunity for preventive intervention.

General eating disorder questionnaires, including the Eating Disorder Examination Questionnaire (EDE-Q) and Eating Attitudes Test (EAT-26), remain widely used in research and clinical settings. The EDE-Q assesses domains including dietary restraint, eating concerns, shape concerns, and weight concerns, while the EAT-26 evaluates restrictive eating attitudes and behaviors. Although these instruments have strong psychometric properties in general eating disorder populations, they do not assess diabetes-specific behaviors such as insulin omission or manipulation of insulin dosing. Consequently, reliance on general screening tools alone may underestimate the prevalence and severity of eating pathology in individuals with T1DM [20].

The original Diabetes Eating Problem Survey (DEPS), developed before the revised version, established the foundation for diabetes-specific screening. However, the DEPS-R has largely replaced the original instrument because of improved psychometric performance and broader clinical applicability [21]. Current evidence therefore supports incorporating diabetes-specific screening measures, particularly the DEPS-R, into routine diabetes care while maintaining comprehensive clinical assessment.

Screening in Clinical Practice

Given the increased prevalence and significant consequences of eating disorders in T1DM, routine psychological screening has become an increasingly important component of comprehensive diabetes care. Screening is particularly relevant during periods of increased vulnerability, including adolescence, emerging adulthood, transition from pediatric to adult diabetes services, and episodes of unexplained deterioration in glycemic control.

Current diabetes care guidelines recommend that psychological assessment be integrated into routine diabetes management rather than reserved for situations of clinical crisis. The International Society for Pediatric and Adolescent Diabetes (ISPAD) recommends regular evaluation of psychological health in young people with diabetes, including assessment of eating behaviors, diabetes distress, and broader mental health concerns [23].

Despite growing recognition of the importance of screening, implementation remains limited by several practical barriers. Many diabetes clinicians receive insufficient training in identifying and managing eating disorders, while eating disorder specialists may have limited experience with complex insulin management. This knowledge gap can contribute to delayed diagnosis, fragmented care, and uncertainty regarding appropriate treatment pathways [10].

Additional barriers include limited time during routine diabetes appointments, where clinical priorities often focus on glucose monitoring, insulin adjustment, and complication prevention. Some clinicians may also hesitate to discuss weight, food, or insulin omission because of concerns about increasing patient distress or inadvertently introducing harmful ideas. However, available evidence suggests that sensitive and appropriately conducted screening does not increase eating disorder risk and may strengthen therapeutic relationships by encouraging open discussion of psychological difficulties [20].

4. Discussion

This narrative review demonstrates that eating disorders (EDs) and disordered eating behaviors (DEBs) represent clinically significant and increasingly recognized complications among individuals with type 1 diabetes mellitus (T1DM). The available evidence consistently indicates that individuals with T1DM experience higher rates of eating disorder symptoms and behaviors compared with the general population, particularly during adolescence and young adulthood [1,7,18]. However, the clinical relevance of this association extends beyond prevalence alone. The coexistence of T1DM and eating pathology creates a unique clinical challenge because behaviors that resemble eating disorder psychopathology may directly interfere with essential diabetes management. In particular, intentional insulin restriction or omission represents a diabetes-specific compensatory behavior that can result in severe metabolic consequences while remaining inadequately captured within traditional eating disorder classifications [4,8].

The findings of this review support the concept that the relationship between T1DM and eating disorders is bidirectional and multifactorial. Diabetes management requires continuous attention to food intake, carbohydrate composition, insulin dosing, weight, and glucose levels, creating an environment in which individuals may become increasingly focused on eating-related behaviors and body weight [2,5]. At the same time, eating disorder symptoms can negatively affect diabetes management through insulin manipulation, restrictive eating, and impaired engagement with healthcare, leading to worsening glycemic control and increased risk of complications [1,5]. This reciprocal relationship suggests that eating disorders in T1DM should not be viewed as isolated psychiatric conditions but rather as complex disorders occurring at the intersection of metabolic disease, psychological vulnerability, and environmental stressors.

The epidemiological findings indicate that prevalence estimates vary substantially across studies, reflecting differences in diagnostic criteria, participant characteristics, and assessment methods [1,7]. Although clinically diagnosed eating disorders appear relatively uncommon, subclinical disordered eating behaviors are considerably more prevalent and may represent an early stage of clinically significant pathology [7,8]. This distinction is particularly important because individuals with T1DM may experience substantial medical risk without meeting formal diagnostic criteria for anorexia nervosa, bulimia nervosa, or other DSM-defined eating disorders [3,4]. The use of diabetes-specific screening tools, particularly the Diabetes Eating Problem Survey–Revised (DEPS-R), has improved recognition of these behaviors by assessing insulin manipulation and diabetes-related concerns that are often missed by conventional eating disorder instruments [20,21].

A key finding emerging from the literature is that insulin omission represents a defining feature distinguishing eating disorders in T1DM from those occurring in individuals without diabetes. Unlike traditional compensatory behaviors such as vomiting or laxative misuse, insulin restriction produces weight loss through glycosuria and caloric loss while simultaneously inducing prolonged hyperglycemia [4,15]. Qualitative research suggests that insulin omission often develops gradually, beginning as an attempt to manage weight or regain control before becoming an entrenched behavioral pattern associated with shame, distress, and deteriorating diabetes outcomes [16]. These findings highlight the importance of recognizing insulin omission as a clinically meaningful eating disorder behavior rather than simply interpreting it as poor adherence to treatment.

The mechanisms underlying increased vulnerability to eating disorders in T1DM appear to involve interactions between biological, psychological, and social factors. Weight gain following initiation of insulin therapy represents a significant psychological adjustment, particularly for adolescents and young adults who may already experience heightened concerns regarding body image and appearance [15,18]. The necessity of carbohydrate counting, dietary planning, and frequent glucose monitoring may further reinforce restrictive thinking patterns in individuals with underlying perfectionism, anxiety, or body dissatisfaction [4,22]. Importantly, diabetes self-management behaviors are not inherently pathological; rather, risk emerges when medically appropriate behaviors become excessive, rigid, or primarily motivated by weight control or fear.

Diabetes distress represents another important factor linking T1DM management with eating disorder risk. The continuous burden of diabetes care, including glucose fluctuations, fear of complications, and the need for constant decision-making, may contribute to emotional distress and maladaptive coping strategies [5,11]. Psychological difficulties may manifest as restrictive eating, avoidance of diabetes management tasks, excessive monitoring, or insulin manipulation. Therefore, assessment of psychological well-being should be integrated into routine diabetes care rather than reserved for individuals presenting with severe psychiatric symptoms. Current guidelines emphasize the importance of evaluating emotional health, diabetes distress, and eating behaviors as part of comprehensive diabetes management, particularly among young people with diabetes [23].

The clinical consequences of eating disorders in T1DM are considerable. Evidence consistently demonstrates associations between disordered eating behaviors and poorer glycemic outcomes, including elevated HbA1c levels, recurrent diabetic ketoacidosis (DKA), and increased risk of diabetes-related complications [1,4,15]. Importantly, poor glycemic control should not automatically be interpreted as inadequate education or lack of motivation. Instead, persistent hyperglycemia may represent a manifestation of underlying psychological distress or intentional insulin manipulation [8,16]. This distinction has important clinical implications because approaches focused exclusively on improving adherence may fail to address the underlying drivers of disordered eating behaviors and may contribute to stigma or reduced disclosure.

The findings also highlight the ongoing challenges associated with screening and diagnosis. Healthcare professionals must differentiate between appropriate diabetes self-management and behaviors that reflect eating disorder psychopathology. For example, carbohydrate monitoring, weight assessment, and attention to glucose trends may represent essential diabetes care but may also become excessive or distress-driven in vulnerable individuals [20]. Screening tools such as the DEPS-R provide an opportunity for earlier identification, but they should be considered part of a broader clinical assessment rather than a replacement for diagnostic evaluation [20,21]. Effective screening also requires healthcare environments in which patients feel safe discussing insulin omission, body image concerns, and eating difficulties without fear of judgement.

Management of eating disorders in individuals with T1DM requires coordinated multidisciplinary care involving endocrinology, mental health professionals, specialist diabetes nurses, and dietetic support [10,11]. Traditional eating disorder treatments often require adaptation because nutritional rehabilitation and behavioral interventions must occur alongside safe insulin management. Emerging evidence from integrated care models suggests that combining diabetes and psychological interventions may improve engagement and clinical outcomes; however, larger controlled studies are required to determine optimal treatment approaches [10]. At present, access to specialized multidisciplinary services remains limited, representing an important barrier to effective care delivery [6,11].

Despite increasing recognition of eating disorders in T1DM, important evidence gaps remain. Much of the existing research has focused on adolescent and young adult females, while comparatively less is known about males, older adults, and individuals from diverse cultural backgrounds [7,18]. Furthermore, the majority of available studies are observational, limiting conclusions regarding causality and long-term outcomes [6]. Additional longitudinal studies are needed to identify individuals at greatest risk, determine effective prevention strategies, and evaluate whether early intervention can reduce the development of severe eating disorder pathology.

The impact of diabetes technologies represents another emerging area requiring further investigation. Continuous glucose monitoring (CGM), insulin pumps, and automated insulin delivery systems have transformed diabetes care, improving glycemic outcomes and reducing treatment burden for many individuals. However, increased exposure to glucose data and performance metrics may contribute to anxiety, perfectionism, or excessive focus on achieving ideal glycemic targets in vulnerable individuals [6]. Future research should explore how diabetes technologies can be implemented in ways that support both metabolic outcomes and psychological well-being.

Several limitations within the current evidence base should be acknowledged. Considerable heterogeneity exists regarding diagnostic criteria, screening instruments, study populations, and outcome measures, limiting direct comparison between studies [1,7,20]. Many investigations rely on self-report questionnaires rather than structured psychiatric assessments, and intervention research remains limited [6,12]. Additionally, as this review employed a narrative approach, quantitative synthesis was not performed. Nevertheless, the consistency of findings across systematic reviews, meta-analyses, and clinical studies supports the conclusion that eating disorders and DEBs represent important comorbidities requiring targeted clinical attention.

Overall, the evidence indicates that eating disorders in T1DM represent a distinct and complex clinical challenge requiring integrated metabolic and psychological care. Early recognition through routine screening, improved clinician education, and development of specialized multidisciplinary services are essential to reducing morbidity and improving outcomes. Future research should prioritize standardized diagnostic approaches, prevention strategies, and evidence-based interventions specifically designed for individuals experiencing the combined challenges of T1DM and eating disorder pathology.

5. Conclusions

Eating disorders and disordered eating behaviours represent important yet frequently underrecognized comorbidities in individuals with type 1 diabetes mellitus (T1DM). The evidence reviewed demonstrates that this population is at increased risk of developing both conventional eating disorders and diabetes-specific behaviours, particularly intentional insulin restriction or omission, which contribute to poor glycaemic control, recurrent diabetic ketoacidosis, accelerated diabetes-related complications, reduced quality of life, and increased mortality.

The development of eating disorders in T1DM is multifactorial, arising from the interaction of biological changes associated with insulin therapy, the psychological burden of intensive diabetes self-management, body image concerns, diabetes distress, and sociocultural influences. Because many diabetes self-management behaviours overlap with eating disorder symptomatology, diagnosis remains challenging, and clinically significant pathology may go unrecognized unless healthcare professionals actively assess psychological well-being alongside metabolic outcomes. Diabetes-specific screening instruments, such as the Diabetes Eating Problem Survey–Revised (DEPS-R), improve the identification of high-risk individuals but should be used as part of comprehensive clinical assessment rather than as standalone diagnostic tools.

Effective management requires integrated multidisciplinary care involving endocrinologists, mental health professionals, diabetes specialist nurses, and dietitians. Although awareness of this clinical problem has increased substantially in recent years, important evidence gaps remain regarding prevention, long-term outcomes, and optimal treatment strategies. Future research should focus on developing standardized diagnostic approaches, evaluating multidisciplinary interventions, and determining how emerging diabetes technologies can support both metabolic control and psychological well-being. Earlier recognition and coordinated, person-centered care has the potential to improve both physical and mental health outcomes for individuals living with T1DM and eating disorders.

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