ISPAD CLINICAL PRACTICE CONSENSUS GUIDELINES 2022:

Psychological care of children, adolescents and young adults with diabetes

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1. WHAT IS NEW OR DIFFERENT

- Psychological care of youth with type 1 diabetes (T1D) as well as type 2 diabetes (T2D) are included.
- Additional sections on the psychological assessment, communication, the health care team and psychological impact of technology are added.

2. EXECUTIVE SUMMARY AND RECOMMENDATIONS

Collaborative care

- Psychosocial care should be integrated with collaborative, person-centered medical care and provided to all youth with diabetes and their families, to optimize health outcomes and health-related quality of life. A
- Resources should be available to include professionals with expertise in the mental health of children and adolescents within interdisciplinary diabetes health care teams. These mental health specialists include psychologists, social workers, psychiatrists and other pediatric mental and behavioral health specialists. E
- Mental health professionals should be available to interact not only with youth and their families at clinic visits to conduct screening and more complete assessments of psychosocial functioning, but also to support the diabetes team in the recognition and management of mental health and behavior problems. E
- All mental and behavioral health specialists should have training in diabetes and its management. E

Integrating psychosocial assessments in routine diabetes care

- Age-appropriate and validated assessment tools should be routinely implemented in clinical practice to monitor and discuss overall psychosocial well-being and quality of life of all youth with diabetes. A
  This should include the well-being of caregivers. B
- Screening for symptoms of depression, diabetes distress and disordered eating in children aged 12 and above using validated tools should be done at initial visit, at periodic intervals and when there is a change in disease, treatment, or life circumstance. B
• Psychosocial problems should be addressed upon identification. If an intervention cannot be initiated during the visit when the problem is identified, a follow-up visit or referral to a qualified behavioral health care provider should be scheduled during the visit. E

• Cognitive capacity and school functioning should be monitored especially in children with early onset of T1D, hypoglycemic events, persistent hyperglycemia and diabetic ketoacidosis (DKA) around diabetes onset. A

Diabetes management

• Routine assessment should be done for developmental adjustment to, and understanding of, diabetes management, including diabetes-related knowledge, insulin adjustment skills, goal setting, problem-solving abilities, and self-management autonomy and competence. This is especially important during late childhood and prior to adolescence. B

• When making treatment recommendations providers should consider the perceived treatment burden and self-efficacy, level of social and family support, and presence of significant mental health issues. E

Diabetes in context

• The interdisciplinary team should assess general family functioning (stress, conflict, cohesion, adaptability, parental psychopathology), and diabetes-related functioning (communication, parental involvement and support, roles and responsibilities for self-management behaviors) especially during periods of transition (e.g., at diagnosis, at start of a new treatment plan, adolescence) and when there may be cultural or family-based difficulties in adjustment to diabetes. B

Appropriate referrals to trained mental health professionals should be provided when necessary. E

• Adolescents should assume increasing responsibility for diabetes management tasks with continuing, mutually agreed, parental involvement and support. B

• Providers need to navigate the shift in responsibilities from parents to their children by being attuned to youth’ evolving competencies and readiness for independent self-care, whilst also taking into account the need for parental and provider support and guidance. E

• Authorative, responsive, respectful and autonomy supportive communication should be encouraged. B

• Communication about the demands, expectations (‘who does what’) and burden of diabetes management should be continuous. E
Diabetes Technology

• Technological advances in insulin delivery and glucose monitoring should be available for all youth with T1D and tailored to individual wishes and needs. B

Psychosocial Interventions

• The interdisciplinary team should aim to provide preventive interventions for youth with diabetes and families at key developmental times, particularly after diagnosis and prior to adolescence. A

• These interventions should emphasize appropriate family involvement and support in diabetes management, effective problem-solving-, coping-, and self-management skills, and realistic glycemic expectation. A

• Evidence-based psychosocial, behavioral, or psychiatric interventions should be available for youth with diabetes or families exhibiting conflict, disordered communication, diabetes distress, behavioral or psychiatric difficulties in conjunction with collaborative care with the diabetes treatment team. A

• Developmental needs of children and adolescents should be considered while planning interventions incorporating social, emotional and tangible support. E
3. INTRODUCTION

The biopsychosocial model proposes that understanding illness requires understanding the complex interactions between biology (e.g., genes, viruses), psychology (e.g., mood, behavior) and social factors (e.g., family, society); treatments must include attention to all of these domains. Being diagnosed with diabetes in childhood or adolescence can interfere with the normative developmental changes and interact with psychological and social factors in youth and their families. Integrated, collaborative care is therefore necessary. Although routine psychosocial screening in pediatric diabetes clinics effectively identify youth struggling with psychosocial problems and facilitate referrals them to appropriate care resources, screening and referral alone are not sufficient to ensure care is actually received. Integrated care models ensure that youth with diabetes access mental health care. When screening programs are initiated, there also must be a process for appropriate referrals to address identified concerns.

Here we review the main findings from studies on stress, resilience and coping, psychological and psychiatric problems, neurocognitive functioning, and integration of psychosocial assessments. We also discuss the importance of diabetes in context, including family dynamics, social support, and the diabetes team. Given the rapid technological advances in diabetes management, we further review the psychological advantages and challenges of technology. We conclude this chapter with a review of psychological and behavioral interventions in children and adolescents with diabetes. Based on these research findings, recommendations for optimal psychological care are offered and detailed in the Executive Summary.

4. STRESS, RESILIENCE AND COPING

Childhood and adolescence are challenging developmental stages. Young children get stressed navigating their social worlds, particularly family, school, and friendships. Adolescence is characterized by major physical, hormonal, and psychological changes; hence it has been described as a period of stress and storm. Chronic illnesses such as diabetes exacerbate stress in children and adolescents, and it is uncommon for children and adolescents with diabetes not to report stress. The relationship between stress and diabetes is suggested to be bidirectional; stress can increase the risk of T2D, and living with diabetes can also cause stress. Managing diabetes, family conflicts around diabetes management, and dealing with diabetes emotions are often a major source of stress. Adversities and pandemics such as COVID-19 also accentuate stress levels in persons already affected by (diabetes-specific) stress. For example, the perceived increased risk of death due to COVID-19 and breakdowns in the supply chain affecting access to insulin and other supplies have
contributed to anxiety and stress in the family related to diabetes care and management. Stressors can be subjective and the interpretation and perception of stressors or the actual exposure to stress events vary depending on age, geography, and socioeconomic factors, assessment of stressors should therefore part of person-centered care. In developing as well as in high income countries, low income is a major stressor. Race, ethnicity, and other sociodemographic factors are also associated with stress and coping strategies. Stress affects the management of diabetes in children and adolescents, and the support that is much needed from their families to support diabetes care. Both general and diabetes-specific parenting stress are associated with lower quality of life and less optimal glycemic management for children and adolescents.

**Diabetes distress**

Diabetes distress (also referred to diabetes-related or diabetes-specific distress) is an emotional response to living with and managing diabetes. One in three adolescents with T1D, one in three adolescents and young adults with T2D and up to 60% of emerging adults report elevated diabetes distress. Although longitudinal studies are scarce, diabetes distress also seems to be persistent over time. Diabetes distress is best viewed as an expected emotional response to diabetes and not as co-morbid disorder. The constant demands of diabetes management, including the relentless treatment tasks and decision-making, are key contributors to diabetes distress, particularly as these constant efforts do not always lead to the expected outcomes. Although they can co-exist, diabetes distress differs conceptually from depression and requires a different care pathway.

Diabetes distress may negatively impact engagement with treatment, and subsequent glucose outcomes. However, the evidence of the relationship between diabetes distress and HbA1c is not straightforward. Whether diabetes distress is more strongly related to glycemic management and self-management than depression and anxiety (as has been found in adults) is unclear and warrants further investigation.

**Diabetes burnout**

Diabetes burnout is a relatively new and not yet well-researched concept without a widely-used psychometric scale. The term diabetes burnout is sometimes used interchangeably with diabetes distress or depression, however it relates to high levels of diabetes distress and/or depression that produce significant barriers to diabetes management and glycemic management. It is characterised by feelings of mental, emotional and physical exhaustion of living with diabetes, leading to a detachment from diabetes and ignoring self-management responsibilities. As a consequence, burnout may lead to an experience of detachment from self, support systems (i.e.
years of not attending diabetes appointments) and is associated with the lack of acceptance of the condition. The concept is mainly described in adults with diabetes (T1D and T2D), not in children, adolescents or parents/caregivers. The Diabetes Burnout Scale (DBS) measures diabetes burnout specifically and was recently validated scale in adults. Further investigation of this concept in youth with diabetes, particularly young adults and parents, is warranted.

**Resilience and coping**

The complex management of T1D makes it difficult for youth and their families to be consistent with their treatment recommendations, putting them at risk for short- and long-term mental and physical health complications. Despite these risks, the degree to which youth with diabetes experience problematic outcomes such as deteriorating diabetes management varies. Diabetes Resilience is achievement of optimal diabetes outcomes (i.e., good quality of life, high engagement in self-management behaviors, and close to target glycemic outcomes) despite the numerous challenges inherent to having diabetes. Attention to protective skills and behaviors (i.e., strengths) that promote resilient outcomes, can enhance understanding of adjustment to diabetes and may have implications for clinical care. These strengths include confidence or self-efficacy to manage the demands of diabetes, seeking and receiving developmentally appropriate help and support from family and others, and adaptability to handle unpredictable diabetes-related challenges (e.g., effective problem-solving and coping). Children and families who use adaptive coping strategies such as problem-solving have a better quality of life, family functioning and report fewer depressive and anxiety symptoms. Maladaptive coping strategies such as avoidance have been associated with more significant diabetes-specific distress and poor diabetes management, including fewer glucose checks, less frequent self-care behaviors, and suboptimal glycemic management.

Evidence-based interventions for children with diabetes such as cognitive behavioral therapy and interventions that promote parental involvement, goal setting, and problem-solving and reduce family conflict could be helpful in promoting resilience and addressing stress. Interventions targeting parents/caregivers that help relieve their stress and enhance social support are equally needed.

5. **PSYCHOLOGICAL AND PSYCHIATRIC PROBLEMS**

Based on evidence from large, population-based cohort studies youth and young adults with T1D are around twice as likely to be diagnosed with a psychiatric disorder, especially eating, mood, anxiety and behavior disorders, as peers without diabetes. ADHD, personality disorders and substance use disorders are also elevated, with the latter especially in males. Multi-morbidities are common:
1 in 5 youth has two or more psychiatric diagnoses.\textsuperscript{45} Overall, psychiatric disorders are associated with poorer self-management (e.g. insulin-manipulation) and quality of life.\textsuperscript{48,49}

\textit{Disordered eating and eating disorders}

Research suggests children and adolescents with diabetes have increased rates of eating disorders (ED) and disordered eating behaviors (DEB) rates compared to peers without diabetes.\textsuperscript{50-53} These issues are especially magnified in older adolescents and young adults. Consequences of eating disorders and disordered eating include increased risk and frequency of DKAs, accelerated development of vascular complications and mortality.\textsuperscript{54,55} Even mild symptoms are relevant, as they still impact self-management.\textsuperscript{56}

Population cohort studies show 1 to 10\% of adolescents and young adults with T1D have ED.\textsuperscript{45-47} Prevalence rates vary due to differences in the methods used to assess eating problems, participant characteristics and comparison groups used.\textsuperscript{57} Bulimia and ‘other specified feeding and eating disorders’ are more common, but not anorexia nervosa.\textsuperscript{57} Most youth diagnosed with an ED are female, only about 10\% are male.\textsuperscript{47} Longitudinal studies of youth with T1D reveal that ED behaviors and symptoms are likely to persist and become more severe in young adulthood.\textsuperscript{58,59} ED in youth with diabetes are often associated with comorbid psychiatric disorders and poorer glycemic management. Relationships between disordered eating and depression symptoms, anxiety symptoms and lower quality of life in populations with T1D and T2D\textsuperscript{60} are bi-directional. Risk factors for eating disorders and disordered eating include female gender (related to societal pressure to be thin, pubertal changes), DKA, and hyperglycemia.\textsuperscript{61}

DEBs such as dietary restriction and intentional insulin omission,\textsuperscript{62} are more prevalent than eating disorders. In children with T1D, DEBs affect about 30–50\% of females and 10–20\% of males.\textsuperscript{57} In youth with T2D the prevalence of DEB has been found to be about 50\%.\textsuperscript{60} Youth with T2D and DEB had a significantly higher BMI, lower insulin sensitivity, more depressive symptoms, and poorer quality of life than those without DEB, with no differences between males and females.\textsuperscript{60} A maladaptive family environment (e.g., poor family mealtime structure, parent-child relationship quality) together with parents’ personal eating attitudes (e.g., weight/shape concerns) and habits (e.g., attempts at weight loss) and negative comments about their child’s weight are important when it comes to DEB in their children.\textsuperscript{63} DEBs often go unnoticed as adolescents and young adults refrain from being open and providers do not always feel equipped to identify and talk about them.\textsuperscript{64,65} What usually is symptomatic and raises the attention of HCPs is frequent hospital admissions associated with DKA. Given the high prevalence and serious consequences, this calls for routine monitoring and screening of eating behaviors. A stepped approach, starting with screening with
more detailed assessment following positive screens could be considered to facilitate discussion in clinical practice.\textsuperscript{64}

**Depressive and anxiety symptoms and disorders**

Initial elevation of depressive symptoms and anxiety at diagnosis is often a transitional normal adaptive response.\textsuperscript{66} Thereafter, symptoms of depression and anxiety appears to increase once again with longer disease duration, corresponding with the children’s experience of diabetes management and implications as being more difficult and upsetting. For a smaller group of children, psychological problems persist.\textsuperscript{66}

**Depressive symptoms and disorders**

Youth with T1D are at an increased risk of elevated self-reported depressive symptoms compared to peers with prevalence rates ranging from 17 to 63%, depending on population, design and diagnostic tool.\textsuperscript{67-69} Core symptoms include low mood, no enjoyment and negative cognitions, although coexistent irritability or oppositional behaviour may lead to missed diagnosis. Somatic symptoms such as fatigue and brain-fog may overlap with T1D symptoms from hypo- or hyperglycemia. European-based population-based studies also show an increased risk in diagnosed mood disorders in youth with T1D as well, both in boys and girls.\textsuperscript{45-47} Females and youth with a history of depressive episodes are especially at an increased risk. Despite the increased risk of depression, population-based studies do not find an increased risk of suicides attempts in youth with T1D compared to peers.\textsuperscript{45,46}

Fewer studies have been conducted in youth with T2D. In the TODAY study the prevalence of elevated depressive symptoms in youth with T2D study was 15%, comparable to US population without diabetes.\textsuperscript{70} The SEARCH study did not report prevalence rates for T2D specifically, however males with T2D were reported to have an increased risk of elevated depressive symptoms compared to males with T1D.\textsuperscript{71} Recent studies in Canada and the US showed an increased risk in depressive disorders as well as attempted and completed suicides in youth with T2D compared to peers without diabetes.\textsuperscript{24,72}

Small to moderate cross-sectional association with diabetes self-management and glycemic outcomes have been found\textsuperscript{73,74} Longitudinal studies show mixed results when it comes to fluctuations in depressive symptoms and glycemic changes. Over a 6 month period within-person increases in depressive symptoms related to concurrent declines in glycemic management\textsuperscript{75} However, 3 to 5-year longitudinal studies did not show significant within-person associations between fluctuations in depressive symptoms and changes in glycemic management in adolescents or in young adults with T1D.\textsuperscript{76-78}
Anxiety symptoms and disorders

Anxiety disorders are characterised by a predominance of exaggerated fear or worry, dysfunctional coping behaviors (e.g., preoccupation or avoidance of feared situations or experiences, the use of safety behaviors to mitigate perceived threats) and adrenergic symptoms. Generalised anxiety is described as ‘free floating’ with continual symptoms and no specific focus. There is substantial comorbidity with depression. As a counter to chronic uncomfortable feelings of anxiety, a person will compensate by avoiding as many stressful experiences as possible. In the context of diabetes, this could include not attending appointments, testing blood glucose or taking insulin.

Studies of anxiety symptoms in children and adolescents with T1D show mixed results with elevated levels of anxiety symptoms up to 32% but not necessarily higher compared to peers without diabetes. A large population-based cohort study using national registry data in Sweden showed that children with T1D had an increased risk for anxiety disorders compared to controls. However, in line with depressive problems, the difference in risk of anxiety disorders among youth with T1D in comparison with controls declined over the years after diagnosis. The highest risk is for those with onset of diabetes between age 10-14 years and increasing risk with diabetes duration. Smaller studies have reported varying prevalence rates for any anxiety disorder in children with diabetes (e.g. in Nigeria and India ranging from 15.5% to 32.1% compared to 0% to 8% in the control groups). In Europe, prevalence rates of anxiety disorders range from 11 to 21%.

A cohort study in young adults diagnosed with T1D in childhood found that anxiety disorders were the most frequently diagnosed of all psychological difficulties, about 9%, with an increased risk for young adults with T1D compared to controls. In youth with T2D there seems to be an increased risk of anxiety compared to peers, both before and after diagnosis of T2D. Children with diabetes and anxiety disorders have more hyperglycemia (higher HbA1c, more DKA), more hospitalizations, and poorer self-management, lower quality of life, more depressive symptoms and higher family conflict than peers with diabetes without anxiety disorders.

More recent studies seem to show similar prevalence rates of depressive and anxiety symptoms and disorders as the general pediatric population, possibly reflecting the advances in diabetes treatment and awareness for mental health problems. Nevertheless, still about 1 in 7 young people with diabetes experience psychological problems which tend to rise with diabetes duration and remain elevated in young adults with type 1 and T2D. The high prevalence and the possible detrimental impact of these psychological symptoms and disorders on diabetes self-management and quality of life indicates that ongoing monitoring and screening and integration of psychological support in the care for youth with diabetes is warranted. An approach is outlined...
There should also be easy access to consulting psychiatrists for cases involving severe psychopathology and the potential need for psychotropic medications.

6. NEUROCOGNITIVE FUNCTIONING

Growing evidence documents that children and adolescents with T1D are more at risk for pathophysiological brain changes \(^{86-92}\) and neurocognitive deficits (e.g., memory, learning and executive functioning) \(^{90,91,93-98}\) than their healthy peers. Although limited, research in youth T2D also shows deficits in memory and processing speed compared with youth without diabetes who are matched by obesity status. \(^{99-101}\)

IQ scores of youth with diabetes are statistically significantly lower than those of their peers without T1D, with one study showing that having T1D puts youth at risk for a decline in certain aspects of IQ over time (verbal IQ and full scale IQ but not performance IQ). \(^{90}\) However, IQ scores win youth with diabetes are typically still well within the average range and the clinical significant impact might be minimal. In addition to lower IQ, youth with diabetes are at risk for specific neurocognitive deficits such as information processing difficulties (attention, memory, processing speed), learning disabilities and problems with executive functions. \(^{90,98-101}\) Executive functions involve goal-oriented behavior, and other key skills for self-management such as planning, problem solving and organization. Because of the importance of executive function skills for diabetes self-management, a growing body of research has focused on the study of executive functions in youth with T1D, confirming an association between problems in child executive functions and suboptimal diabetes self-management and glycemic outcomes such as HbA1c. \(^{102-105}\) While executive function deficits an make diabetes self-management more difficult, in turn, these difficulties in self-management could lead to worsening glycemic outcomes, which may lead to a dysfunctional cycle of further brain injury and even greater neurocognitive function deficits. \(^{91}\) Additionally, worse executive functions have been shown to be linked to lower quality of life and mental health problems. \(^{106-108}\)

Hypoglycemia, hyperglycemia and ketoacidosis, especially if recurrent, can impact school functioning and educational attainment via the combination of mechanisms including altered cognitive function and non-attendance for acute treatment. \(^{109}\) However, findings regarding the impact of T1D on academic performance in young people are mixed. Older studies reported young people with T1D have poor academic performance compared to their peers or siblings without T1D \(^{110,111}\) while more recent studies have not found differences in academic performance compared to peers, \(^{112-115}\) although there is some evidence that young people with optimal glycemic management perform better academically. \(^{112,113,115}\)

Research has identified several illness-related risk factors that contribute to the greater risk for these brain changes and neurocognitive deficits in youth with type1 diabetes. A specific risk
factor for a decline in IQ over time and for neurocognitive deficits is an early age of diabetes onset. Further, exposure to severe hypoglycemia and hypoglycemic seizures and long-term poor metabolic outcomes have also been associated with cognitive deficits, yet findings are inconsistent. More recent research suggests that time in range (i.e., TIR - the percentage of time blood glucose levels are in the target range of 3.9-10 mmol/L (70-180 mg/dl) and a history of hyperglycemia may be even more important for brain development in youth with T1D, and several studies have also linked DKA, particularly at the time of diagnosis with a decline in IQ over time and/or neurocognitive deficits. Protective factors have also been identified, such as improving child sleep, continued family support, reducing caregiver distress and diabetes device use have been identified. Collectively, studies identified early disease onset, higher HbA1c, hypoglycemic events and DKA around onset as major contributors to initial cognitive decrements, and subsequently demonstrate no or limited decline in cognitive abilities. It is hypothesized that these early-disease factors provide an ‘initial strike’, after which the brain adapts to the new situation of fluctuating glucose levels.

When comparing youth with T1D and T2D, the SEARCH for Diabetes in Youth study found that executive function skills in youth with T2D compared with those with T1D can be attributed, in part, to differences in acquired knowledge (e.g. vocabulary), obesity, and depression between the two groups. Moreover, acquired knowledge, obesity, and depression were found to be significant factors contributing to executive functioning across both youth-onset diabetes types.

Clinically, interdisciplinary diabetes teams should be aware of these risk and protective factors for neurocognitive deficits in youth with all types of diabetes. Ideally, questionnaire- or performance-based measures of neurocognitive function should be available for assessment when youth with diabetes are at risk and when they show signs of neurocognitive deficits in dealing with their diabetes self-management tasks (e.g., planning, prioritizing).

7. PSYCHOLOGICAL ASSESSMENT: ROUTINE MONITORING AND SCREENING

Given the critical role of self-management and psychosocial factors impacting diabetes outcomes and quality of life, it is imperative that psychological assessment be integrated into clinical diabetes care. Validated psychological questionnaires are instrumental for screening and assessment. Such measures can facilitate addressing relevant psychosocial needs in a dialogue with the person with diabetes and their family as part of routine diabetes team consultations. The use of these assessments is feasible and accepted by children and youth with diabetes, families and HCPs and helps focus the clinical encounter more on psychosocial factors, facilitate shared-decision making and drive care decisions instead of mainly focusing at the medical outcomes such as HbA1c and time in range.
Routine assessments have been shown to positively impact well-being and satisfaction with care in young people with diabetes, without direct impact on self-management and glycemic outcomes. Assessment tool choice depends on the purpose, and age and literacy of the person with diabetes. Children from the age of 8 years onwards are generally able to complete self-report questionnaires. In younger children, often parent-proxy measures are used although instruments enabling the assessment of how the child is doing are available. There is a distinction between generic and diabetes-specific questionnaires. Generic questionnaires can be used across different populations and capture more common aspects of the person’s life, allowing for comparison to normative populations. Diabetes-specific questionnaires tap into and are more sensitive to symptoms and problem areas experienced by young people with diabetes. Diabetes specific measures should be considered for the assessment of DEB because generic measures might capture behaviors that are part of treatment (e.g., carbohydrate counting and calorie restriction), and adverse effects of treatment such as excessive hunger secondary to hypoglycemia. In addition, generic measures are not able to capture insulin restriction or omission to lose weight. Several standardized and validated measures are available for providers to monitor well-being and screen for psychological difficulties of young people with diabetes. Monitoring tools can track changes over time and become part of person-centered care when feedback is provided to the person with diabetes during a clinical consultation. Profile measures are especially suitable for this purpose as they provide multiple scores across a broad range of domains. An example is routine monitoring of Health-Related Quality of Life (HRQOL) which provide scores across different domains that matter to the person. This facilitates discussion between adolescents with diabetes and clinicians regarding psychosocial concerns as well as the different domains of HRQOL and the impact on diabetes self-management and well-being.

Screening tools can help identify problems that may have gone otherwise unnoticed. Often, the score is weighted based on norm scores. An example is screening for depressive symptoms, where a cut-off is used to screen for young people at risk for clinical depression. This is especially of importance in adolescence as this is a critical developmental period where most psychological problems first arise. Routine screening for psychological difficulties from 12 years onwards, at least once a year, is therefore recommended. Comprehensive psychosocial screening is feasible and can efficiently detect with potential mental health problems and other issues impacting diabetes management. This comprehensive screening included well-being, depressive symptoms, anxiety, intrinsic motivation for diabetes management, family conflict, diabetes distress and disturbed eating behavior.
Many instruments have been developed to monitor quality of life and screen for psychological problems in adolescents. There are still few instruments that capture the specific developmental domains of young adults, with some exceptions. Screening for depressive symptoms, anxiety, diabetes distress and DEB should be continued in this age group. Psychological problems that typically arise in this developmental age range are substance (ab)use and personality disorders.

Questionnaires used for psychosocial screening tend to focus on problems, risks, and vulnerabilities and do not automatically direct the conversation to the bigger picture of living with diabetes. Therefore, standardized and validated questionnaires for psychosocial monitoring, assessment, and diagnosis can be used in a stepped approach with positive findings leading to further evaluation. Starting with informal verbal inquiries for monitoring well-being and/or quality of life, including mood and distress where positive responses can be probed with additional questions and/or use of standardized measures and finally by structured interviews for diagnosis. These formal diagnostic assessments and interviews should be conducted by a qualified mental health professional, familiar with the care of young people with diabetes and help guide the selection of most appropriate intervention.

Mental health specialists should train and training members of the health care team in use of screening instruments. Further, if formal assessments are used, there must be a process for appropriate referrals to mental health specialists to address identified concerns. Screening and referral alone are not sufficient to impact clinical and psychological outcomes nor can it ensure referrals are done so that mental health care is actually received. Integrated care models are critical.

8. DIABETES IN CONTEXT

Diabetes self-management is most effective in the context of collaborative interpersonal relationships. This involves the family context, peers, and diabetes team. The Social Ecological Theory and the biopsychosocial model consider the social environment or “interpersonal context of illness” as key to understanding the development and behavior of youth with diabetes to improve their health outcomes. The interactions between youth with diabetes and their environments are reciprocal, and an individual’s characteristics interact uniquely with their environment, creating a developmental context that is specific to that individual. This view helps to explain the differing developmental trajectories and outcomes of individuals with the same diagnosis of diabetes.

Impact of Parental Mental Health
Parental well-being affects their children’s outcomes. Levels of psychological distress among parents of children with diabetes are greater than parents whose children do not have diabetes. Many parents report significant distress after their child’s diabetes diagnosis and have difficulty coping with their child’s diabetes management. Parental depression and anxiety symptoms are common in the months following diagnosis, as well as symptoms of post-traumatic stress, with nearly one in five parents reporting distress up to four years after diagnosis. A recent synthesis of qualitative studies reported the family life changes after diagnosis of T1D. The diagnosis may be experienced as a traumatic event and lead to depression and stress due to the new responsibilities. Parents of younger children report an all-encompassing impact due to constant worry and the perceived need for vigilance. Fear of hypoglycaemia in parents of younger children, and distress about caring for a child with diabetes, affect parental wellbeing and relationships. This could in turn affect parenting behavior and the child’s glycemic management. Encounters with healthcare professionals, while generally perceived as helpful, could also be a source of frustration and anxiety. Greater social support is associated with less stress in parents of children with recent diagnosis of diabetes. Connecting with other parents caring for a child with T1D could provide valued emotional and practical support. In addition, this study showed that use of diabetes technologies could lessen some of these burdens as well. Literature on the specific impact of T2D in youth on parental well-being is scarce. Parental well-being and coping also impacts on their child’s physical and mental health. When parents have adjustment difficulties and are greatly stressed, studies indicate they also have less self-efficacy for diabetes management and their children have more behavioral problems. A meta-analysis of 19 studies concluded that parental stress is common and linked with suboptimal diabetes management. For example, psychological maladjustment of fathers predicted suboptimal glycemic management in children five years after diagnosis. Maternal depression increases the risk of psychiatric disorders in their offspring, especially depression. A recent study demonstrated that parental stress and anxiety was associated with maladaptive parent-child interactions during mealtime in school-age children. A study of fathers revealed that avoidant coping was related to increased parenting stress when they were more involved in diabetes management. After the diagnosis of diabetes in their child, providing psychological support to parents is an important clinical need and helping parents can lead to more effective management of diabetes. A meta-analysis involving 17 randomized controlled trials (RCTs) showed parenting interventions in parents of children and adolescents with T1D could significantly reduce parents’ depression and distress, and help them ask for positive social support. Family-based interventions support improving health and family outcomes. Common principles and intervention strategies across these interventions included problem-solving, communication skills training, responsibility
sharing, cognitive restructuring, and advanced diabetes education. However, results were inconsistent across interventions and key intervention components responsible for positive diabetes outcomes have yet to be identified. Recent studies suggest that mindfulness\textsuperscript{164} and reflective functioning (or mentalizing)\textsuperscript{165} may be protective factors for parents’ stress related to diabetes management.

\textit{Familial and social support}

Parent support, levels of parent involvement, family conflict, parenting style, and family/parent-child relationship quality are all associated with psychological health outcomes in youth with diabetes, with some associations varying by parent gender, child age, demographic factors and internalizing versus externalizing behavior problems.\textsuperscript{166} Continued parental involvement in diabetes care throughout adolescence and into young adulthood is beneficial\textsuperscript{167,168} as premature responsibility transition may be detrimental.\textsuperscript{169} This involves parental monitoring of their child’s behavior, which has favorable effects on youth internalizing and externalizing symptoms.\textsuperscript{166} Especially close parental monitoring of self-management tasks requiring executive functioning skills like problem solving and impulse control is warranted to prevent glycemic outcomes worsening.\textsuperscript{103} The way parents are involved in their child’s management matters. Diabetes-specific family conflict negatively affects treatment plan, glycemic management as well as quality of life and depressive and/or anxiety symptoms in young people.\textsuperscript{170} Over-involvement, or unsupportive behaviors (such as nagging), could have adverse effects.\textsuperscript{148,171} Parenting styles are important in these family interactions. An authoritative and responsive style (i.e. clear levels of expectations for self-management and warmth and sensitivity) is associated with better self-management (e.g., checking blood glucose levels more frequently, making healthy food choices) and glycemic management, and less overweight (therefore perhaps preventive for T2D); more psychological control, conversely, is associated with poorer outcomes.\textsuperscript{168,172} The benefits of an authoritative parenting style transcend ethnicity, socioeconomic status, and household composition.\textsuperscript{172} Studies that explored relationship quality and child psychological health generally found that more cohesive family relationships were associated with lower youth externalizing symptoms. There may be a relationship between higher quality family relationships and lower internalizing in youth with T1D, especially for youth of color.\textsuperscript{166} In addition, a warm and accepting environment is associated with better physiologic and psychosocial outcomes.\textsuperscript{167,171} Most research on the social context of youth with diabetes has focused on the family environment while, especially in adolescent years, peer relationships become more important.
Supportive friends can complement parents’ involvement in psychological outcomes\textsuperscript{173,174} with youth receiving instrumental support from their families and also considerable emotional support from their friends. On the other hand, social conflict and extreme peer orientation is found to have a negative effect on diabetes outcomes.\textsuperscript{174,175} When youth attribute negative peer reactions to their self-management, they are more likely to have difficulties being consistent with their treatment plan and have increased diabetes stress, which in turn worsens glycemic management. Overall, the research linking peer relations to diabetes outcomes is mixed. Although qualitative studies reveal that adolescents believe peers have an impact on their diabetes, the quantitative findings are inconclusive.\textsuperscript{175}

\textit{Communication}

Pediatric diabetes care is characterized by a triadic relationship between youth, parents, and pediatric care providers.\textsuperscript{176} Communication is a cornerstone of this triadic process – it is imperative that youth, parents and pediatric care providers sustain effective communication about the demands, expectations (‘who does what’) and burden of diabetes management\textsuperscript{177} as youth face many physical and psychosocial developmental changes from childhood to adolescence, responsibility for diabetes management gradually shifts from parents to youth. Providers need to navigate this shift by being attuned to youth’ evolving competencies and readiness for independent self-care,\textsuperscript{178,179} while also taking into account the need for parental and provider support and guidance. Research has shown that responsive and supportive communication between youth with diabetes and their family, caregivers and the broader social environment (e.g. peers, school system, other relatives, sport coaches) is essential for youth well-being, including better glycemic outcomes, self-management, quality of life, and satisfaction with care.\textsuperscript{125,137,180,181} Patient-centered communication by providers, which is closely linked to autonomy-supportive communication (i.e., explaining the personal relevance of treatment guidelines and offering choices),\textsuperscript{176,180,182} puts the young person with diabetes and their family at the forefront by eliciting their perspectives on the proposed treatment recommendations, and by engaging in a shared-decision making process. This communication style promotes openness and trust, and fosters dialogue about the best way forward towards optimal diabetes management and outcomes for each specific young person with diabetes and their families.\textsuperscript{182} Clinically, person-centered communication includes elements of motivational interviewing. At the core of motivational interviewing are reflective listening, being empathic, not engaging in arguments or persuasion and focusing on changing behavior and enhancing self-efficacy.\textsuperscript{182,183} In clinical practice, communication is an effective, modifiable tool to enhance diabetes
self-management and to establish a constructive relationship between providers, youth with diabetes, and their families.

**Diabetes team**

Given the burden of living with a chronic illness, and the greater incidence of mental health problems in youth with diabetes compared to their peers, psychosocial care should be an integral part of the collaborative, person-centered medical care for youth with diabetes. The Collaborative Care Model (CCM) has emerged as a promising clinical model to facilitate the integration of mental health care with physical health care to simultaneously address co-occurring physical and mental health problems. The shared goal of care should be to optimize health outcomes and health-related quality of life. It is imperative that resources are made available to include easy access to mental health professionals such as psychologists, social workers and psychiatrists. These mental health professionals should have training in diabetes and its management, have expertise in the mental and behavioral health of youth, and should be available to interact with youth with diabetes and families at clinic visits to conduct screening and more complete assessments of psychosocial functioning at a regular basis. In addition, the mental health professionals should support the diabetes team in the recognition and management of mental health and behavior problems. In case of severe psychopathology and the potential need for psychotropic medications, referral to a psychiatrist is indicated.

9. **DIABETES TECHNOLOGY**

Technological advances in diabetes care have changed the way many persons manage diabetes in the last two decades; in some countries more than half of children and adolescents use insulin pumps and glucose monitoring. Developments such as continuous subcutaneous insulin infusion (CSI, ‘insulin pumps’), flash glucose monitoring (FGM), continuous glucose monitoring (CGM) and automated insulin delivery systems (i.e. artificial pancreas, semi-artificial pancreas, do-it-yourself artificial pancreas systems) improve diabetes management, health outcomes and reduce hypoglycaemia frequency in the majority of those using it. Technology uptake is increasing, mainly in the pediatric population, and in some countries more than half of children and adolescents use insulin pumps and CGM. CGM use is also considered as a ‘standard of care’ for people with T1D and is recommended by the EASD/ADA Clinical Consensus Report 2021 to manage T1D.
Psychological advances associated with diabetes technology usually reflect improved quality of life (QoL), reduced diabetes distress, reduced fear of hypoglycaemia, as well as ‘better sleep, safety and flexibility’ – mainly with CGM use. The widespread migration from self-monitoring of blood glucose (SMBG) to continuous glucose monitoring (CGM) has greatly increased the amount of real time blood glucose information available to parents and children. In a randomized-controlled crossover trial, children with T1D aged 2 to 12 participated in a three-month period of SMBG (control) and a three-month period of CGM with remote monitoring (intervention). Parents fear of hypoglycaemia was found to be lower while their children were using CGM. Also, parental-related QoL and family functioning, stress, anxiety and sleep measures all improved significantly after use of CGM. For insulin pump therapy (CSII), the evidence regarding quality of life benefits are not that clear, with data from randomized controlled trials not showing the difference between CSII and multiple daily injections (MDI). These studies, are, however, limited by small sample sizes as outlined in systematic reviews, therefore the consensus statement on insulin pump use in children and adolescents states that QoL with insulin pump therapy is similar to, or higher than of children and adolescents with MDI. The benefits are more obvious from the emerging evidence on automated insulin delivery systems: these improve clinical outcomes (time in range, HbA1c, reduction in the number of hypoglycemic events), and also enhance QoL, reduce diabetes distress, and improve sleep quality in children and caregivers.

Some psychological disadvantages of diabetes technology adoption are reported. This included issues with body image, disruptive alarms, painful insertions and the large amount of data to interpret. A large amount of data and real-time remote glucose monitoring have the potential to be a source of conflict between children with T1D and their parents, as deviations from recommended diabetes management are more readily and immediately noticeable to caregivers. The research literature, however, does not demonstrate any evidence of increased family conflict following the introduction of CGM. A randomized study found similar levels of family conflict between the intervention group (CGM) and a control group (SMBG) in children aged 8 to 17 years old and parents/carers of children with diabetes. Furthermore, one study with children aged 8 to 17 years and another study with children aged 12 to 19 years found no difference in family conflict after CGM starts, while one study with children aged 2 to 12 years and another study with children aged 8 to 18 years found a reduction in family conflict after the commencement of CGM.

The issue of ‘body image’ in technology adoption is not very well-researched, however, according to a systematic review on this topic, there were no differences in body image between those with T1D using technology (insulin pumps, CGM) than those who did not use technological advances. Anecdotal evidence from diabetes clinics often lists ‘body image’ as an obstacle to
technology adoption, as some people with diabetes (adolescents, young adults), ‘do not want to
have anything attached to their bodies’. For those using technology, when the user of a device, or
a parent/carer of a child with diabetes using technology is frequently exposed to alarms (in particular
false or unnecessary ones), it can result in poor or interrupted sleep and/or unwelcomed
distractions, as well as ‘alarm fatigue’, when, over time, becomes less likely to respond to true
alarms. The disadvantages of technology used in diabetes management mentioned above are usually
listed as barriers to its adoption, but rarely, these might be the reasons for children and adolescents
with diabetes to discontinue pump or CGM despite the advantages. Evidence from T1D Exchange,
US-based diabetes registry highlights that the overall pump discontinuation was 3% (4% in
adolescents and 3% in younger children). Those who discontinued insulin pump therapy were more
likely to have higher HbA1c levels at baseline, and the most frequently listed reasons for
discontinuation were problems with wearability (57%), disagreeing the pump or feeling anxious (44%).
Therefore, the fears and obstacles should be acknowledged and discussed with adolescents with T1D
and their parents/carers, and advantages should be well explained, so the family could make an
informed decision on adopting technological devices - person-centred care to discuss these issues is
critical in this process. Future advances in technology may also mitigate some of the psychological
barriers to technology use (e.g., better device “wearability” with smaller devices).

Very little information is available regarding the use of diabetes technology in youth with
underlying mental health issues. Registry-based data from the German and Austrian DPV diabetes
registry showed that the use of CSII was more common in youth with depression, anxiety disorders,
or needle phobia compared with people without any mental health issues. On the other hand, those
with psychotic disorders least frequently were using pumps, and those with eating disorders and
ADHD had similar levels of uptake. There is some indication that the use of CSII is associated with
fewer disordered eating behaviours because of the flexibility CSII provides, however youth with ED
or depression are more likely to discontinue CSII use than children without co-morbid mental health
conditions.

10. PSYCHOSOCIAL AND BEHAVIORAL INTERVENTIONS

There is a substantial literature addressing various types of psychosocial and behavioral interventions
for the treatment of children and adolescents with T1D. Systematic reviews including meta-analyses
have shown the efficacy of various approaches including family-based interventions. While
methodological limitations have been noted, it can generally be concluded that there is a
solid evidence base for psychosocial and behavioral interventions although the effects on glycemic
outcomes is inconsistent. Many children and adolescents receive psychosocial interventions, as demonstrated by a nationwide study in Germany revealed that approximately 30% receive psychosocial support; these youth had suboptimal glycemic management but with continued psychosocial support, this remained stable over time. A recent study documented that having pediatric psychologists integrated with the interdisciplinary health care team has benefits for youth as well as insurers: youth who met with psychologists during their clinic visit had better subsequent glycemic management and reduced health care costs. It should be noted that almost all research has been conducted in children and adolescents with T1D and the evidence-base in young adults and youth with T2D is scarce.

Family-based Interventions. Reviews of family-based interventions including 25 RCTs showed improved psychosocial outcomes for youth and families such as reducing family conflict and improved parent-child relationships, but mixed results for glycemic outcomes. Family-based, behavioral interventions include goal-setting, problem-solving, self-monitoring, parental praise for regimen-related behaviors, use of behavioral contracts, clear and consistent parental communications, and appropriately shared responsibility for diabetes management tasks. Behavioral family systems therapy with diabetes-specific tailoring, and use of behavioral contracting reduced family conflict and improved ability to be consistent with treatment plans, with improved glycemic management over 18 months, by means of improve parent-adolescent communication and problem-solving.

It is important to provide psychosocial interventions during the period after diagnosis as this is a stressful time not only for the child but also for the family. Several interdisciplinary programs for newly-diagnosed children have been reported to improve child outcomes. Promoting problem-solving skills and increasing parental support for children was demonstrated to improve glycemic management two years after diagnosis. Other studies examining the effects of psychosocial intervention soon after diagnosis, have shown improved family functioning without effects on glycemic management.

Youth are more likely to have difficulties with diabetes management when parents allow them to have self-management autonomy before they have sufficient cognitive and social maturity. Therefore, it is important for parents to be involved and supportive in their children’s daily care without being intrusive and argumentative. Controlled research has shown that positive parenting can improve parent and family outcomes as well as improve emotional and behavioral adjustment in children.
Psychosocial Interventions during Clinic Visits. One approach is to deliver brief psychosocial interventions during routine clinic visits. Research has shown that an intervention that focused on improving family teamwork increased positive parental involvement and reduced family conflict related to diabetes management, and helped prevent worsening of glycemic management.\textsuperscript{233} Similarly, when a psycho-educational intervention addressing various diabetes management issues was delivered by a “care ambassador” at regular outpatient clinic visits, results showed reduced hypoglycemia and emergency department visits.\textsuperscript{234}

There are other examples of research addressing behavioral interventions integrated with outpatient clinic appointments. One study showed that monitoring and discussing quality of life issues with adolescents improved their subsequent psychosocial functioning.\textsuperscript{125} A RCT showed that a cognitive-behavioral intervention improved psychosocial well-being, without improving glycemic management.\textsuperscript{235} Another family-centered program integrated with routine clinic appointments focused on improving problem-solving and communication skills, and appropriate sharing of responsibility for diabetes management; results showed improvements in glycemic management and parental involvement when families participated in two or more sessions.\textsuperscript{236} Results of a multi-site randomized trial demonstrated that a family teamwork intervention delivered during routine outpatient clinic visits led to improved glycemic management in younger but not older youth.\textsuperscript{237,238}

High-Risk Patients. Other studies have targeted psychological interventions to youth at high risk for poor health outcomes, such as low-income, ethnic minority adolescents with chronically sub-optimal glycemic management. For example, controlled research has shown that intensive home-based multi-systemic therapy that addressed the individual adolescent, the family system, and the broader community systems (i.e., school and health care system) was found to improve blood glucose monitoring and glycemic management, as well as reduce health care utilization and medical costs.\textsuperscript{239,240} The subgroup of youth with chronically suboptimal glycemic management is a high-risk population that requires novel approaches to intervention.\textsuperscript{241} Studies suggest that high-intensity frequent contact with these youth through various means of communication may be necessary to improve diabetes management outcomes.\textsuperscript{242,243}

Peer Group Interventions. Another approach to psychosocial intervention involves the use of adolescent peer groups. An early randomized study indicated that peer group support and problem-solving improved short-term glycemic management.\textsuperscript{244} Peer group training in effective coping skills has been shown to improve glycemic management and quality of life.\textsuperscript{245,246} Other studies have shown that stress management and problem-solving and coping skills training delivered to small peer groups of youth with diabetes reduced diabetes-related stress,\textsuperscript{247,248} improved social relationships,\textsuperscript{249} and increased blood glucose monitoring and improved glycemic management.\textsuperscript{250}
Coping skills training has also been examined with younger, school-age children. Research findings have shown that this approach has some positive effects on quality of life and family functioning.\textsuperscript{251} A recent study conducted in China showed that coping skills training was more effective for younger than older youth.\textsuperscript{252} Results from controlled studies support the use of peer group interventions for children in this age range.\textsuperscript{253}

**Interventions with Individual Participants.** Other psychosocial interventions have addressed individual youths. A recent review of 14 studies of cognitive behavior therapy for youth with diabetes concluded that this approach is feasible and acceptable, with improvements noted in psychosocial functioning.\textsuperscript{213,254} As research has shown that higher levels of intrinsic management predict improved diabetes management, glycemic management, and psychosocial functioning,\textsuperscript{255} motivational interviewing is designed to increase this intrinsic motivation. Results from a multi-center randomized trial showed that adolescents who participated in a motivational interviewing program delivered by a psychologist had long-term improvements in glycemic management and quality of life.\textsuperscript{256} In another study that focused on improving motivation, results showed improved glycemic management in older but not younger adolescents.\textsuperscript{257} It should be noted that these types of interventions are generally delivered by a mental or behavioral health professional trained in this approach. A multicenter study examined the effects on adolescents of motivational interviewing delivered by non-psychologist health care providers who were trained in motivational interviewing; results did not indicate improved glycemic management,\textsuperscript{258} a finding likely was due to inadequate training and counselling skills.\textsuperscript{259} A large RCT with adolescents showed that a motivational intervention combined with problem-solving training (FLEX) resulted in significant improvements in motivation, problem-solving, diabetes management, quality of life, and reduced family conflict, but not glycemic management.\textsuperscript{260} A recent small randomized Turkish study showed a positive effect of a motivational intervention delivered by a nurse during home visits for adolescents with suboptimal glycemic management over six months.\textsuperscript{261} Another approach, to increase external motivation for diabetes management, used monetary reinforcement to improve youths’ performance using a hybrid closed loop system,\textsuperscript{262} suggesting behavioral economics may be a feasible way to improve self-management behaviors.

Another approach to psychosocial interventions with individual youth targets distress and depression prevention by promoting resilience. A large RCT examined the impact of an 8-session diabetes distress and depression prevention program for adolescents (STePS). Adolescents reported significant reductions in diabetes distress and depressive symptoms after 1 and 3 years.\textsuperscript{263} Recent intervention research has employed several innovative approaches. For example, mindfulness-based stress reduction in older adolescents was found to reduce stress but there were
no effects on diabetes management or glycemic management.\textsuperscript{264} A pilot gratitude intervention for young adolescents, in which they engaged in journaling, showed no differences in psychosocial functioning, with slight improvements in glycemic management were observed.\textsuperscript{265}

Internet-based and Digital Interventions. Another way to deliver behavioral interventions is through use of the Internet; several studies have been conducted using this modality to address issues related to diabetes management and psychosocial adjustment in adolescents. One study delivered an Internet program for diabetes problem-solving; results demonstrated significant improvements in diabetes management and problem-solving, with stable glycemic management, and was especially helpful in dealing with diabetes management barriers.\textsuperscript{266} A randomized controlled multi-site study compared Internet-delivered coping skills training to a diabetes education intervention for adolescents; results showed clinical improvements in both groups, providing support for the idea that the Internet can be a helpful modality for delivering behavioral interventions to youth with diabetes.\textsuperscript{267}

Recent studies using the Internet or other digital modalities have shown that adolescents respond well to behavioral intervention using Skype,\textsuperscript{243} text messaging,\textsuperscript{242,268} and can receive social support via chat rooms.\textsuperscript{269} Telehealth has also been shown to reduce fear of hypoglycemia and distress in school-age children and their parents, particularly when families are more engaged.\textsuperscript{270} In a study targeting youth with suboptimal glycemic management and emotional regulation difficulties, an Internet-delivered multicomponent motivational and cognitive intervention including parent contingency contracting resulted in increased frequency of blood glucose monitoring, improved working memory, and improved glycemic management; youth with more emotional control problems benefited the most from this approach.\textsuperscript{271}

A review of technology-based interventions including mobile phones and websites for youth with T1D found these approaches were acceptable to youth, with the most beneficial effect of improving frequency of glucose monitoring; however, there were not enough studies of technology-based interventions to determine their impacts on insulin use, dietary habits, and physical activity.\textsuperscript{273} A more recent review of digital health interventions for youth with diabetes identified 15 randomized studies and found some evidence for improved self-efficacy, but few consistent effects for other psychological, behavioral, or health outcomes; results also indicated studies showed high risk of bias and more research was needed using theory-based approaches with stronger methodologies.\textsuperscript{274}

Interventions for Parents. As noted in the above section on parental stress and adjustment, parents often need additional support for their own coping with their children’s diabetes management. Studies suggest that coping skills training for parents of young children may be helpful.\textsuperscript{275} Recent
work has focused on interventions to reduce distress in mothers of adolescents: in a randomized
pilot study, the Communications and Coping program led to reduced distress in mothers and less
family conflict.\textsuperscript{276} An uncontrolled pilot test showed that a weekend parent group reduced stress in
parents three months later.\textsuperscript{277} A controlled test of a video-based telehealth intervention (REDCHiP)
was designed to reduce fear of hypoglycemia and parenting stress in mothers of young children;
results showed significant reductions in both hypoglycemia fear and parenting stress.\textsuperscript{278} Using input
from parents, a website designed for parents of children with diabetes has shown promise for
improving parental knowledge about diabetes management as well as their life satisfaction.\textsuperscript{279}

In summary, the results of controlled intervention research for individual and family-based
interventions show promising effects when it comes to psychosocial outcomes, with inconsistent
results for glycemic outcomes. Future work should consider the competency of the interventionists
delivering a therapy and whether the psychological approaches employed match to a person and
their life course, investigating which key intervention components may be attributed to positive
diabetes outcomes. There is growing evidence supporting the use of the Internet and other digital
approaches to deliver behavioral interventions, and also a need for higher quality studies. In general,
the psychosocial and behavioral intervention research is limited by not including enough high-risk
youth—i.e., low income, ethnic minority, single-parent youth—in their study samples.\textsuperscript{280,281} as well as
targeting youth with T2D and young adults specifically. There are also opportunities for more
research using clinic-based brief interventions during routine care that focus on improved self-
management and reduction of diabetes distress; such an intervention approach can maximize reach
and impact through its scalability.\textsuperscript{282}
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