Successful use of family-based therapy interventions for uncontrolled type 1 diabetes in an adolescent

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Abstract
Adolescents with type 1 diabetes mellitus (T1DM) are at increased risk for poor treatment adherence and glycaemic lability. Parental involvement in a youth’s diabetes regimen is associated with better outcomes, yet supported treatments may be inaccessible due to limited community resources and financial constraints. Furthermore, existing interventions emphasise a collaborative effort between family members, which may not be effective with youth with particular vulnerabilities. Similarities between T1DM and anorexia nervosa prompted our use of modified family-based therapy (FBT) with a 16-year-old male with poor glycaemic control. FBT-guided strategies were brief and implemented by a family medicine physician at routine visits. Medical symptoms dramatically improved over a four-month period, demonstrating that FBT tailored to T1DM warrants further investigation for youth with poor treatment adherence. Copyright © 2017 John Wiley & Sons. Practical Diabetes 2017; 34(3): 95–98

Key words
family-based therapy; case report; adolescence; type 1 diabetes; insulin-dependent diabetes mellitus

Introduction
Youth with type 1 diabetes mellitus (T1DM) are particularly vulnerable to poor treatment adherence. Adolescence is associated with a decline in self-management of T1DM and poor glycaemic control, with non-adherence rates up to 93\%.\textsuperscript{1} Youth with T1DM face a cumbersome medical regimen while concurrently navigating the complexities of adolescence.\textsuperscript{2,3} Social pressure, individuation and puberty can negatively influence a teen’s perception of T1DM and reduce the priority placed on care management.\textsuperscript{4}

Incorporating caregivers into treatment for youth with T1DM is associated with improved outcomes. As such, behavioural family systems therapy for diabetes (BFST-D) is associated with improved family communication and problem solving, glycaemic control and treatment adherence.\textsuperscript{5} BFST-D focuses on problem-solving and communication training, cognitive restructuring, and functional-structural family therapy. BFST-D delivered via teleconferencing is also effective, with notable improvements in glycaemic control, family functioning and depressive symptoms.\textsuperscript{6–8} Multi-systemic therapy (MT) has also provided promising results for the improved management of adolescents with T1DM.\textsuperscript{9} MT is an integration of cognitive behavioural therapy (CBT), systematic monitoring, behaviour management via rewards and consequences, family organisational routines, communication training, and enlisted support from peers and community. MT is associated with increased frequency of blood glucose testing, improved metabolic control, and decreased hospitalisations. More recently, MT for T1DM indicated improved metabolic control and improved adherence at seven- and 12-month follow-up compared to weekly, client-centred telephone support.\textsuperscript{10}

Albeit promising, the feasibility of BFST-D and MT in communities lacking medical resources is questionable. In this regard, Wysocki and colleagues’ BFST-D study included 12 intensive sessions conducted by highly-trained therapists under optimal conditions (for example participants were paid and scheduling was very flexible).\textsuperscript{5} Ellis and colleagues’ MT studies included an average of 47 sessions.\textsuperscript{9,10} In well-equipped communities, growing pressure for providers to maximise clinical productivity in a health care system wrought with financial concerns may also present implementation challenges.
Family-based therapy interventions for uncontrolled type 1 in an adolescent

Case report

These limitations, coupled with increased adherence issues for youth with T1DM, piqued our interest in implementing a modified Maudsley family-based therapy (FBT) approach for adolescent T1DM. FBT is the gold standard treatment for adolescents with anorexia nervosa.\textsuperscript{11-13} Interestingly, parallels can be drawn between T1DM and anorexia nervosa. Both illnesses are chronic in nature, and if poorly managed can threaten life. T1DM and anorexia nervosa each require complex manipulation of food intake, physical activity and medications.\textsuperscript{14,15} Burden on the adolescent and family, including emotional distress and increased conflict, and structural family shifts are associated with both conditions.\textsuperscript{16-18} Family-based interventions are recommended and are associated with better treatment outcomes in anorexia nervosa and in T1DM.\textsuperscript{5,10,11,18}

FBT draws on the neurobiological underpinnings of anorexia nervosa, emphasising that brain impairment secondary to starvation hinders the sufferer’s ability to make appropriate health choices, including self-regulation of food intake. As such, caregivers are considered the primary treatment resource; they are encouraged to remove food-related decision making from the adolescent and assume responsibility for meal planning, preparation and supervision of eating behaviours until weight restoration is achieved. FBT also emphasises the externalisation of illness-driven behaviours, whereby the eating disorder is considered at fault in periods of stress, not the child. This facilitates minimising emotional reactions to illness behaviours, lessening guilt and blame, and empowers parents to confidently use behavioural strategies.

Standard FBT for anorexia nervosa occurs within the context of nine to 12 months of outpatient therapy, and is characterised by three distinct treatment phases.\textsuperscript{19} Phase one focuses on weight restoration: parents are given primary responsibility for this task, assuming control of all of their adolescent’s eating behaviours (e.g. planning, preparing and supervising meals). Therapy sessions are structured in a problem-solving format, with the clinician guiding the family to determine means of facilitating the adolescent’s weight gain. Phase two involves the gradual return of control over eating to the adolescent. The therapist guides parents throughout this task, in line with the youth’s age, developmental status, and parenting style. Finally, phase three focuses on helping the family address other adolescent challenges associated with normal developmental tasks and identity formation.\textsuperscript{12}

Whereas BFST-D and MT for T1DM emphasise a collaborative approach between youth and caregivers, sufferers with poorly managed T1DM may benefit from a treatment framework similar to phase one FBT. In cases where youth are incapable of making appropriate treatment decisions, as evidenced by ongoing poor glycaemic control, it may be critical for the caregiver to temporarily assume full responsibility for health-related behaviours (for example glucose monitoring, insulin dosage, meal planning and preparation). Moreover, although counter-intuitive for adolescents with growing autonomy needs, an FBT approach may offer a reprieve from the youth’s cumbersome medical demands, as is often the case in anorexia nervosa.\textsuperscript{19}

Like BFST-D and MT, traditional FBT for anorexia nervosa is time-intensive and relies on trained specialists. However, we are optimistic that an abbreviated FBT-guided intervention is feasible for youth with T1DM and their families who do not have access, or are poor responders, to first-line interventions. As such, FBT tenets could be provided by disparate medical providers (e.g. endocrinologists, nurse practitioners, and primary care physicians) in collaboration with a trained mental health provider, in the context of routine medical appointments for T1DM.

In this article, we present a single-case study illustrating the use of a brief, FBT-inspired intervention for adolescent T1DM within an outpatient family medicine setting.

The purposes of this case report are to: (1) demonstrate the clinical effectiveness of family-based strategies in youth with T1DM; and (2) provide implications for clinical interventions within the context of primary care.

Case history

‘Mark’, a 16-year-old Caucasian male, presented to a family medicine practice with a three-year history of T1DM. At presentation, his mother played a role in his treatment (e.g. attending medical appointments, encouraging appropriate nutritional choices and following treatment recommendations), but Mark was primarily responsible for his self-care. He prepared the majority of his meals and snacks, administered insulin, and monitored his blood sugars.

Mark lived with his mother and siblings in rural Minnesota, where he attended a small public school that offered limited resources to support his medical care. His mother was a full-time nurse and his father had died from cardiac arrest shortly before Mark’s T1DM diagnosis. Mark had a comorbid diagnosis of ADHD and took methylphenidate (10mg extended release in the morning and 5mg immediate release in the afternoon). Depressive symptoms and superficial self-injurious behaviours were reported at age 15, which had since resolved.

Poor treatment adherence was evident since illness onset. At 12 months post diagnosis, discrepancies between Mark’s report of glucose testing and meter downloads were common and self-care equipment was frequently misplaced. Mark dosed insulin without regard to carbohydrate ingestion, which fluctuated widely. In high school, he joined the football team and his blood sugars plummeted severely, occasionally causing cessation of game play to treat hypoglycaemia. His driver’s licence was delayed due to recurrent loss of consciousness. Mark acquired hypothyroidism, and his subsequent thyroid-stimulating hormone results reflected no better adherence to levothyroxine dosing than to glycaemic care. His meter at the end of his second year of treatment showed an average glucose of 211mg/dl, 137 SD; high readings 64%, low readings 11%.

Adherence concerns had been addressed with a number of therapeutic approaches. In-home counselling focused on behavioural...
coaching and communication strategies, yet Mark was ‘checked out’ and his mother grew frustrated. The use of a reward economy, wherein privileges were contingent upon glucose tracking, was ineffective. Individual CBT targeting comorbid concerns (that is, depression, self-injurious behaviours, grief related to the father’s death) improved mental health symptoms, but not glycaemic control.

At presentation, Mark’s health status and intake HbA1c (9.1%) were of concern. Failed attempts at past therapy interventions prompted the physician’s recommendation of a streamlined FBT-guided intervention. This intervention was provided at routine medical visits by the physician, in consultation with a psychologist trained in FBT for anorexia nervosa. Mark’s mother was identified as the primary resource by which Mark could overcome poor glycaemic control and improve his health. Consistent with FBT for anorexia nervosa, Mark was considered unable to make appropriate nutritional choices; his mother was advised to assume control over Mark’s eating and glucose measurement. She was encouraged to provide him with consistent carbohydrate intake via a ‘Magic Plate’ method, a style of FBT intervention in which the teen’s only ‘job’ is to arrive at the table and eat meals prepared by the caregiver, who provides food without the child’s input. Mark’s mother was instructed to provide foods that he historically enjoyed, matching carbohydrate portions to administered insulin doses. She was encouraged to eat with Mark at his meals and pack his school lunches. For further support and education, she was provided with internet resources to learn more about the tenets of FBT.

Mark embraced the new approach. He described coy satisfaction in being ‘served’ rather than arranging his own carbohydrates and having to worry about subsequent health consequences. FBT allowed Mark the freedom to participate in football without medical consequences and to restore driving privileges with renewed confidence. Glycaemic control promptly improved. Six weeks post FBT implementation, significant declines in average glucose and HbA1c readings were evident (162mg/dl [SD 50], and 7.7%, respectively). After four months, HbA1c continued to decrease (to 7.3%), treatment for hypoglycaemia was discontinued, and consciousness losses were not evident.

Within nine months of the initial FBT intervention, Mark was incrementally given more responsibility in managing aspects of his care. His mother was satisfied with the treatment approach, noting: ‘I absolutely think my taking charge helped his numbers. He needed that break from trying to manage being a kid and virtually making adult decisions about his health and what to eat. It allowed him to then begin to reap the benefits of feeling better, so he had reason to want to keep his numbers in goal range. And now for the most part he manages his diabetes on his own. During football it was difficult at times, so I had to help with his highs and lows then. We are in the process of picking out a pump for him. I need to have him completely able to manage all aspects of his diabetes by this summer when he graduates and is ever so gently booted out of the nest!’

**Discussion**

In this case study, streamlined FBT for an adolescent with poorly-managed T1DM resulted in improved glycaemic control and full resolution of hypoglycaemic symptoms. These findings support further investigation of FBT-guided interventions in adolescents with poor T1DM treatment adherence. Whereas previous research indicates a positive association between parental involvement in diabetes care and adherence,5,9 standard protocol promotes collaboration between youth and parents. Implementing FBT-guided interventions, as illustrated in this case, may be necessary for youth who have not responded positively to traditional family interventions for T1DM (e.g. BFST-D, MT). Parental assumption of health behaviours (e.g. meal planning, preparation, glucose monitoring) may be necessary to maintain the adolescent’s health until they are better equipped to manage this role. Whereas FBT challenges traditional treatment approaches that emphasise the youth’s need to individuate from parents and take a more active role in self-care, teens with psychiatric comorbidities and psychosocial stressors may be incapable of managing their own regimen, as evidenced in Mark’s case. Although Mark will ultimately need to assume responsibility of his self-care to be a functioning adult, we believe that these interventions were critical to restore his health.

Use of FBT-guided principles within T1DM treatment could be a cost-effective alternative to BFST-D and MT,9 which are generally time-intensive, require highly trained providers, and may be inaccessible to youth with limited resources. In this case, Mark’s mother was educated by a generalist physician who consulted with a trained psychologist. Although the intervention was abbreviated and provided during routine medical visits, the results were profound. It is plausible that Mark’s improved medical status will significantly improve his long-term medical prognosis and ultimate care utilisation.

It is uncertain whether an FBT-guided intervention for youth with T1DM yields sustained success. In FBT for anorexia nervosa, self-care

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**Key points**

- Adolescence is associated with a decline in self-management of type 1 diabetes and poor glycaemic control, with non-adherence rates up to 93%
- Existing interventions targeting non-adherence may be inaccessible and ineffective in youth with particular vulnerabilities
- Modified family-based therapy (FBT), provided by a primary care physician in consultation with a trained psychologist, resulted in improved glycaemic control in an adolescent with poorly-managed type 1 diabetes
- FBT-guided treatment may be a viable and cost-effective intervention for non-adherent youth with type 1 diabetes
is transferred back to the adolescent upon weight restoration, with the goal of resuming normal developmental tasks over time. In T1DM, a clear transitional phase would be necessary, with the adolescent slowly assuming responsibility for his treatment regimen to foster independence. It is also unclear if FBT would be helpful for all adolescents with poorly-controlled T1DM and, if not, which adolescents would most benefit from this type of intervention. It is noteworthy that Mark’s family had numerous stressors beyond his illness that were more severe than those of most T1DM sufferers. Mark experienced comorbid ADHD, had a history of depression with self-injurious behaviour, grief related to his father’s death, limited school resources, and a single-parent household that created barriers in treatment adherence. Given that his psychosocial stressors were significant, generalisability of FBT interventions for youth with T1DM is questionable: these stressors may have increased the likelihood of procuring benefit from FBT.

Despite potential shortcomings, findings from this case study are promising. Additional research is needed to demonstrate the efficacy of FBT-guided interventions in adolescents with poorly-controlled T1DM. These findings suggest that FBT for T1DM sufferers, as provided by the treating physician, could positively impact on treatment adherence in at-risk youth.

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Declaration of interests
There are no conflicts of interest declared.

References