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Kicking in Diabetes Support (KIDS) Intervention Effects: Parent Reports of Diabetes Management

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# Abstract

Objectives: The Kicking In Diabetes Support (KIDS) Project is a semistructured multifamily group therapy (MGT) intervention for adolescents who have type 1 diabetes (T1D) and their parents, which incorporates both peer support and family systems processes to improve diabetes management skills. The purpose of the present study was to evaluate the clinical utility of this intervention by examining parent perspectives and health-related outcomes. Methods: Adolescents and their parents participated in the 8-session (6 core sessions and 2 booster follow-up sessions at 2 and 4 months) intervention in 1 of 8 waves of the group administration over a four-year period. Parents completed self-report measures (e.g., readiness to change behaviors, self-management, and responsibility in T1D management) at baseline, posttreatment, and follow-up. A medical chart review documented health care utilization and hemoglobin A1c (HbA1c) levels. Results: Of the 38 families that completed baseline assessments, 20 families had parent self-report measures for all 3 timepoints. There were significant improvements in parents’ reports of readiness to change behaviors and self-management. There was variability in reports of parent-adolescent division of T1D responsibility across the 3 timepoints. In addition, adolescent HbA1c levels, the number of clinic visits, and emergency room utilization were significantly reduced over time. Conclusions: The results of this study suggest that parents are amenable to a MGT intervention for adolescents with T1D conducted in a clinical setting. Further, there are sustained improvements in the parent–child interactional processes related to T1D management, glycemic levels, and health care utilization during an often-difficult developmental period.

# Keywords

multifamily interventions, type 1 diabetes, adolescents, groups

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Two types of therapy modalities, peer groups and family-based interventions, have been widely studied, with some preliminary research in youth with type 1 diabetes (T1D). In one study of diabetes peer support groups, where participants were randomized to peer-group intervention or to standard care, there was a reduction in the worsening of glycemic levels over time and increased use of self-management information when exercising among the intervention group participants ([Anderson et al., 1989](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c2)). Family-based interventions, such as Multisystemic Therapy (MST; [Ellis et al., 2005](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c6)) and Behavioral Family Systems Therapy (BFST; [Wysocki et al., 2000](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c20)) have also been examined within an adolescent population. [Ellis et al. (2005)](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c6) suggest that these intensive, individual MST family-based interventions at home improve frequency of blood glucose (BG) checking and metabolic stability as well as decrease inpatient admissions among the patients with T1D who have elevated glycemic levels. [Wysocki and colleagues (2000](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c20), [2007](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c19)) found that individual family-based interventions using BFST showed improvement in parent-adolescent relationships and glycemic levels, as well as reduced diabetes-specific conflict, as compared with the randomized education group or standard of care therapy group. However, there was no impact of this intervention on self-management, and the impact on psychological functioning was less robust and depended on age and sex ([Wysocki et al., 2000](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c20), [2007](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c19)).

Given that previous research on adolescents with T1D has demonstrated the advantage of each of the peer and family-based interventions separately, [Opipari-Arrigan et al. (2005)](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c15) combined these two types of treatment modalities by including multiple families in peer groups in the Kicking In Diabetes Support (KIDS) Project to incorporate the potential benefits of both types of interventions. Specifically, the researchers utilized a multifamily group therapy (MGT) approach in which both adolescents and parents received peer support within their own cohort groups as well as the family systems approach where each family also worked on their specific goals. The MGT approach can provide a unique therapeutic opportunity for families with a shared experience to collaborate in a nonjudgmental setting to acquire skills and to foster positive changes in one another ([Steinglass et al., 2019](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c17)). Further, retention of diverse racial/ethnic minority families in behavioral health group interventions could potentially be improved by involving parents more ([Jelalian et al., 2008](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c8)). In diabetes care, MGT has been available for many decades ([Smith et al., 1989](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c16)); but the utilization of this treatment modality has not been fully realized or investigated for medical conditions ([Steinglass et al., 2019](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c17)). The KIDS Project pilot study used wait list control (WLC) methodology in a randomized control trial (RCT; [Kichler et al., 2013](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c11)). Parents and adolescents reported increased parent responsibility, and parents reported improved readiness to change the transfer of responsibility at posttreatment, which has been shown to be related to improving diabetes stability ([Kichler et al., 2013](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c11)). The study results were promising, but the attrition rate was higher (i.e., 33%) than in other diabetes intervention studies that involve parents (e.g., 21% in [Marker et al., 2020](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c13)).

Subsequently, [Carpenter and colleagues (2014)](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c3) conducted a MGT intervention primarily focused on supporting problem-solving skills among adolescents with T1D and their parents. While it was determined to be a promising intervention for improving glycemic levels, that study did not explore the impact of the intervention on other diabetes management or health care utilization outcomes.

Given the paucity of research on the impact of MGT in adolescents with T1D and the recommendations by [Drotar (2010)](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c5) to complete replication studies for clinically significant interventions, the present study is a replication of [Kichler et al. (2013)](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c11). This replication study addresses two points: (1) demonstrate the clinical relevance of the KIDS Project in a different clinical setting and (2) refine the assessment of relevant diabetes management processes. Although the KIDS Project is a MGT intervention which includes both parents and adolescents with T1D, the focus of the current paper highlights the importance of including parental targets in family-based intervention. Therefore, the results presented will be primarily from the parent perspective with future publications examining the adolescent perspective.

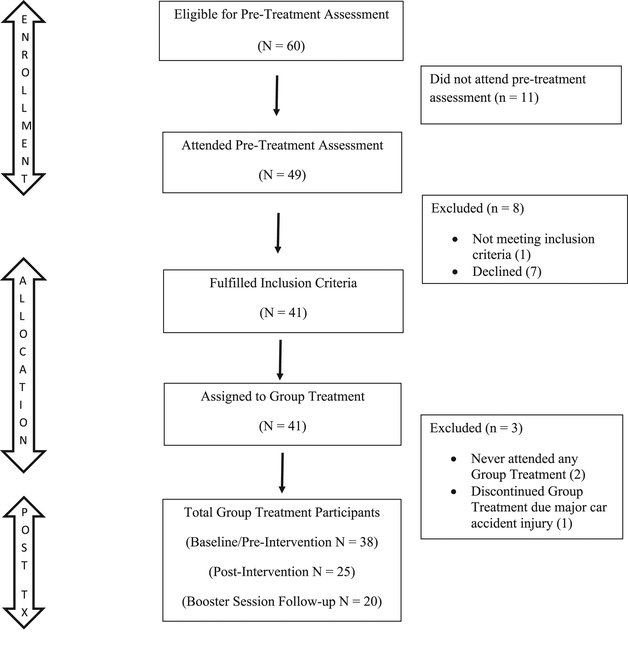
The parent intervention portion of the KIDS Project provides training in how to (1) improve interpersonal skills to decrease diabetes-related family conflict and (2) work collaboratively with their adolescent to increase motivation for behavior change. Each of the parent sessions includes diabetes psychoeducation topics with developmentally appropriate content. Further, parents are supported in skill acquisition around engaging in positive communication, negotiating appropriate goal setting, using problem-solving techniques, behavioral contracting, and employing contingency management strategies (See Supplemental Table 1). Given that the parents are among their own peers (i.e., other parents) during the first portion of each group session, they often learn from one another and provide feedback directly to each other on these skills. Then, the second portion of each session is an in-vivo family exercise within parent–child dyads to allow the parent to immediately practice their new parenting strategies with their adolescent. The group leaders provide parental scaffolding and real-time in-vivo coaching as parents implement evidence-based approaches during each session. This approach allows for consideration of the context of each family’s specific diabetes management regimen.

The KIDS Project aims to impact and assess family processes that are critical in effectively managing T1D during adolescence. Developmentally, parents and adolescents must successfully negotiate the shift of responsibility for diabetes management from parent to adolescent (while still maintaining parental oversight) during adolescence ([Anderson et al., 1990](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c1); [Kaugars et al., 2011](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c9)). Therefore, it is imperative for parents to be able to determine their adolescent’s readiness to assume this responsibility for their diabetes management prior to actually shifting these tasks, so that the adolescent is more likely to be successful in their self-management ([Kaugars et al., 2011](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c9)). Thus, to be most effective in achieving in-target glycemic levels and reducing the risk for increased health care utilization during the adolescent period, self-management interventions need to target these critical skill sets for both parents and adolescents separately, as well as within the context of the family.

The purpose of the present study was to evaluate, from a parent perspective, the clinical utility of this semistructured MGT intervention to improve and sustain appropriate diabetes management tasks and health outcomes in adolescents with T1D. Parents reported on 1) their adolescent’s readiness to assume responsibility for health management, 2) their adolescent’s diabetes self-management behaviors, and 3) family allocation of diabetes management tasks. It was hypothesized that over the course of the intervention and follow-up, parents would report greater adolescent readiness to assume responsibility for diabetes management tasks while parents supervised, increased diabetes self-management behaviors, and improvements in sharing of responsibility for diabetes management between the parent and adolescent. It was also expected that health-related outcomes for the adolescents would also be improved through decreased hemoglobin A1c (HbA1c) levels and reductions in health care utilization [that is, clinic visits, diabetes-related emergency room (ER) visits and hospitalizations as obtained via medical record review].

# [Method](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#toc)

## Participants

Families were recruited from a Midwestern pediatric diabetes clinic by their diabetes provider or social worker. Each family was given initial information verbally and a brochure describing the nature of the intervention. A referral for group therapy was sent to the behavioral health clinic during their diabetes clinic visit. To be eligible to participate, youths needed to have a T1D diagnosis, be diagnosed with T1D for >6 months, and have at least one parent/caregiver to participate with them. Participants were included if they had other chronic medical illnesses (e.g., celiac disease) and/or if they were dose stable for at least 3 months on any psychotropic medications. Participants were excluded if they had coexisting significant developmental delays (e.g., autism spectrum disorder) or acute psychiatric needs (e.g., active suicidality), which were determined not clinically appropriate for this MGT setting. The age criteria varied for groups as early adolescents ages 10 to 12 were recruited for preteen groups, and older adolescents ages 13–17 were recruited for teen groups. Thirty-eight families completed intake paperwork, agreed to participate in the group therapy intervention, and participated in at least one group therapy session (see [Figure 1](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#fig1)).  
  


*Figure 1. Participant Flow Chart*

## Procedure

Following parental consent, parents completed standardized measures of general demographic information, diabetes-related functioning (e.g., readiness to change responsibility allocation, self-management, and responsibility for diabetes management tasks) at baseline. The adolescents also provided assent and completed their own battery of standardized measures; however, for the purposes of the present study, analyses were only conducted with parent-report measures and adolescents’ medical data. Measures were administered again at posttreatment and follow-up booster sessions. This project was approved by the IRB at the lead author’s institution at the time, and there were no protocol deviations reported from the study as planned.

## Self-Management Treatment Protocol for Parents

The KIDS Project intervention was designed as a six-session (1 hr in duration), MGT intervention for parents and adolescents with T1D for >6 months, with two booster sessions at two- and four-months posttreatment ([Kichler et al., 2013](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c11); [Opipari-Arrigan et al., 2005](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c15)). In the present study, multiple unique groups were held over a four-year period (2012–2016) in eight different waves, which included four preteen (ages 10–12 years) and four teen (ages 13–17 years) groups. The same semistructured manual was utilized for both age groups, as there is enough flexibility to developmentally tailor the intervention to the preteen and teen group participants. The groups were led by a diabetes psychologist and psychology trainees in parallel sessions. Given the clinical need to implement this intervention in a real-world setting and to bring evidence-based interventions to practice, the KIDS Project intervention was completed in an outpatient behavioral health setting. In each session, parents and adolescents met separately in parallel peer support groups for the first portion of the session (∼35–40 minutes).Then, they all convened in a large group, where they separated into parent-adolescent dyads to work within their own family system on their personal diabetes management goals (∼20–25 minutes). This type of therapeutic process also provided an opportunity for families to learn from and support one another in addition to the group facilitators directly teaching parenting strategies. The KIDS Project was delivered in a small, closed-group format with an average of 4.7 families participating in each group (range = 3 to 8), so families were also able to build therapeutic alliances with one another.

## Parent Measures

### *General Demographic and Family History Form (*[***Kichler & Crowther, 2001***](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c10)*)*

This questionnaire assesses general demographic information, family constellation, diabetes diagnosis duration, and family history of other medical and psychological conditions. The form was completed by parents at baseline, with an opportunity to update any changes at subsequent visits.

### *Readiness to Change the Balance of Responsibility—Parent Version (RCBRS;*[***Kaugars et al., 2011***](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c9)*)*

Seven items describe specific diabetes-related behavior and then ask the respondent to select one of five statements that best describes his or her current attitude regarding changing the behavior to have the adolescent assume more responsibility for T1D with the parent supervising. Five items assessed the degree to which five different factors relevant to readiness to change the balance of responsibility impacted parents’ ability to make changes in routines, responsibilities, and supervision of youths’ diabetes care: family schedules, conflicts and disagreements, dependence/independence, diabetes knowledge, and influence of other people. Each of the five statements represent the stages of readiness to change: precontemplation, contemplation, preparation, action, or maintenance. A mean score of the twelve items was calculated with a higher score representing maintenance of adolescent direct responsibility with parent supervision. Excellent internal consistency (αs = .87–.90) has been found previously for parent reports ([Kaugars et al., 2011](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c9)).

### *Self-Care Inventory—Revised (SCI-R;*[***Weinger et al., 2005***](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c18)*)*

This15-item self- and parent-report questionnaire measures T1D self-management across a series of self-care activities (e.g., glucose checking and attending appointments). Respondents indicate on a 5-point Likert scale how often each task is completed by the adolescent. Scores were computed based on [Weinger et al. (2005)](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c18) procedure, where higher scores indicate more self-management behaviors occurring. Adequate internal consistency (α = .72) has been previously reported for parents ([Lewin et al., 2009](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c12)). For the present sample, adolescent-report scores for the SCI-R were strongly correlated with parent-report scores (*r* = .58, *p* = .007).

### *Diabetes Family Responsibility Questionnaire (DFRQ;*[***Anderson et al., 1990***](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c1)*)*

The DFRQ is a 17-item self- and parent-report instrument designed to measure tasks in the family that contribute to the adolescent’s diabetes management. For each situation or task, respondents are asked to indicate whether the parent or adolescent initiates responsibility almost all the time or whether the parent and adolescent share responsibility. Responsibilities are reflected in three domains: general health maintenance, regimen tasks, and social presentation. A total mean score across items was calculated with a higher score reflecting the adolescent taking or initiating responsibility almost all the time. Previous studies reported an alpha of .85 for the total scale ([Anderson et al., 1990](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c1)).

### *Health Status and Utilization*

Each adolescent’s medical record, including diabetes clinic notes, were reviewed for the six months prior to baseline (preintervention visit), during the intervention period (represented in the postintervention timepoint), and for the six months after the completion of the booster session. Specifically, the medical record review identified diabetes treatment regimen (pump vs. injections), clinic visit frequency; hospital admissions and ER visits related to diabetes; and glycemic levels (HbA1c) at clinic visits.

## Statistical Analyses

Statistical analyses were completed using SPSS Version 26.0. Based on the medium effect sizes found in a preliminary study ([Kichler et al., 2013](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c11)); a sample of 26 participants was needed to find a large effect size at α = .05 ([Cohen, 1992](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c4)). Participant demographic and medical condition characteristics were determined using descriptive analyses. Paired samples t-tests were conducted for the three primary diabetes management variables of interest, HbA1c, and three health care utilization variables. Three comparisons were made for each variable: (1) preintervention and postintervention, (2) postintervention and follow-up at the last booster visit, and (3) preintervention and follow-up at the last booster visit. Effect sizes are reported using Cohen’s *d* (*d* = .20 represents a small effect, *d* = .50 represents a medium effect, and *d* = .80 represents a large effect; [Cohen, 1992](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c4)). Since only data from participants with complete data at all three time points (*n* = 20) was included in analyses, there was no missing questionnaire data. There was minimal missing demographic data; two parents did not report their age, and four did not report the number of people in their household. Two participants did not have any diabetes clinic visits during one assessment period of the medical review; therefore, analyses with HbA1c values were conducted for 18 participants.

# [Results](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#toc)

Analyses were completed with the 20 families who completed questionnaires at all three time-points; baseline, postintervention, and the booster session follow-up. Demographic and medical condition characteristics for those 20 participants are presented in [Table 1](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#tbl1) and [Table 2](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#tbl2) presents the results of the analyses. There were no statistically significant differences in the listed characteristics between the adolescents and parents who did (*n* = 20) and did not (*n* = 18) complete the assessment at all three timepoints. Pearson correlations between the age at time of the intervention and length of T1D diabetes diagnosis and the primary variables of interest were conducted. The only statistically significant associations were between age at time of group therapy and DFRQ scores for all three timepoints (*r =* .56, *p* = .01; *r* = .58, *p* = .007, *r* = .58, *p* = .008, respectively). There were small to medium effects, but no statistically significant correlations among preintervention diabetes management variables (i.e., RCBR and SCI, *r* = .20, *p* = .39; RCBR and DFRQ, *r* = .29, *p* = .22; and SCI and DFRQ, *r* = .02, *p* = .95), indicative of independent constructs being measured.

Table 1. Demographic and Medical Condition Characteristics

|  |  |  |
| --- | --- | --- |
| Characteristic | M (SD) | N (%) |
| Adolescent sex (female) |  | 15 (75.0) |
| Adolescent race/ethnicity |  |  |
| Caucasian |  | 16 (80.0) |
| African American |  | 1 (5.0) |
| Other |  | 3 (15.0) |
| Adolescent age at pretreatment (years) | 13.69 (1.83) |  |
| Adolescent use of pump therapy |  | 12 (60.0%) |
| Time since T1D diagnosis (years) | 5.33 (4.01) |  |
| Parent sex (female) |  | 19 (95.0) |
| Parent race/ethnicity |  |  |
| Caucasian |  | 19 (95.0) |
| African American |  | 1 (5.0) |
| Parent age (years) | 43.22 (11.16) |  |
| Parent marital status |  |  |
| Biological Parents Married |  | 12 (60.0) |
| Biological Parents Not Married |  | 7 (35.0) |
| Other |  | 1 (5.0) |
| Number of people in household | 4.02 (1.10) |  |
| Parent annual household income |  |  |
| Less than $25,000 |  | 4 (21.1) |
| $26,000–$50,000 |  | 2 (10.5) |
| $51,000–$75,000 |  | 4 (21.1) |
| More than $76,000 |  | 9 (47.4) |

Table 2. Means, Standard Deviations, and Statistical Differences for Study Variables at Three Timepoints

|  |  |  |  |
| --- | --- | --- | --- |
|  | Pre-Intervention | Post-Intervention | Booster Follow-Up |
| Variable | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) |
| Readiness to Change the Balance of Responsibility (RCBR) | 3.74 (0.93) | 4.13 (0.81)a | 4.20 (0.81)a |
| Self-Care Inventory (SCI) | 66.17 (15.23) | 71.25 (11.58)a | 72.92 (11.65)a |
| Diabetes Family Responsibility Questionnaire (DFRQ) | 33.40 (4.36) | 31.63 (3.28)a | 33.50 (4.47)b |
| HbA1c (%) | 9.27 (1.72) | 8.36 (1.66)a | 8.61 (1.46)a |
| Number of T1D clinic visits | 2.35 (1.09) | 1.95 (1.05)a | 1.95 (1.15) |
| Number of T1D-related ER visits | 0.60 (0.88) | 0.00 (0.00)a | 0.25 (0.44)b |
| Number of T1D-related hospitalizations | 0.05 (0.22) | 0.20 (0.52) | 0.10 (0.31) |

*Note.* T1D = type 1 diabetes; HbA1c = Hemoglobin A1c; ER emergency room.

aStatistically significant different from Pre-Intervention value.

bStatistically significant different from Post-Intervention value.

Parents reported statistically significant differences for two of the time point comparisons in their adolescents’ readiness to assume more health management responsibility under parental supervision (RCBRS; see [Table 2](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#tbl2) for means and standard deviations). Postintervention scores were statistically significantly higher than preintervention scores, *t*(19) = −3.15, *p* = .005, *d* = .45. Booster follow-up scores were statistically significantly higher than preintervention scores, *t*(19) = −3.17, *p* = .005, *d* = .53, but not statistically significantly different from postintervention scores, *t*(19) = −1.00, *p* = .33, *d* = .09.

There was the same pattern of results in parents’ reports of their adolescents’ diabetes self-management behaviors (SCI) over time. Postintervention scores were statistically significantly higher than preintervention scores, *t*(19) = −2.61, *p* = .017, *d* = .38. Booster follow-up scores were statistically significantly higher than preintervention scores, *t*(19) = −3.07, *p* = .006, *d* = .50, but not statistically significantly different from postintervention scores, *t*(19) = −1.04, *p* = .31, *d* = .14.

Postintervention scores for sharing of diabetes management responsibilities between parents and adolescents (DFRQ) were statistically significantly lower than preintervention scores, *t*(19) = 2.65, *p* = .016, *d* = .46, and booster follow-up scores, *t*(19) = −3.31, *p* = .004, *d* = .48. However, there were no statistically significant differences between preintervention and booster follow-up scores, *t*(19) = −.14, *p* = .89, *d* = .02.

Adolescents’ HbA1c values at preintervention were statistically significantly higher than values at postintervention, *t*(17) = 2.55, *p* = .021, *d* = .54, and at booster follow-up, *t*(17) = 2.57, *p* = .020, *d* = .41. There were no statistically significant differences between postintervention and booster follow-up, *t*(17) = −1.02, *p* = .320, *d* = .16.

Adolescents had statistically significantly more diabetes clinic visits at preintervention than at postintervention, *t*(19) = 2.37, *p* = .028, *d* = .37. The number of diabetes clinic visits at booster follow-up was not statistically significantly different from preintervention, *t*(19) = 1.57, *p* = .13, *d* = .36, and postintervention, *t*(19) = .00, *p =* 1.00, *d* = .00.

The number of ER visits at preintervention was statistically significantly higher at preintervention than at postintervention, *t*(19) = 3.04, *p* = .007, but then there was a statistically significantly increase from postintervention to booster follow-up, *t*(19) = −2.52, *p* = .021, since there were no ER visits reported at postintervention. There was not a statistically significant difference in the number of ER visits from preintervention to booster follow-up, *t*(19) = 1.79, *p* = .09, *d* = .50. There were no statistically significant differences in diabetes-related hospitalizations between preintervention and postintervention, *t*(19) = −1.14, *p* = .27, *d* = .38, between postintervention and booster follow-up, *t*(19) = .81, *p* = .43, *d* = .23, and between preintervention and booster follow-up, *t*(19) = −.57, *p* = .58, *d* = .19.

# [Discussion](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#toc)

The KIDS Project intervention examined in this study demonstrated improvements in both the family process constructs (i.e., readiness to change responsibility allocation and diabetes self-management) as well as the adolescents’ health-related outcomes (i.e., glycemic levels and health care utilization). Specifically, parents reported an increase in adolescents’ readiness to assume more responsibility for diabetes management tasks while parents supervised and improved adolescent self-management behaviors over time. Similar to these diabetes management improvements, adolescents’ HbA1c levels dropped significantly, and there were reductions in diabetes-related ER utilization and clinic appointment frequency over time, but not hospitalization rates. Despite the small sample size, the observed changes represent mostly medium effect sizes. The results of this study indicate that parents are amenable to a MGT intervention conducted in a clinical setting, and that the intervention’s positive effects on these family processes and health-related outcomes can be sustained during the follow-up time period.

The KIDS Project is an innovative MGT intervention for both parents and adolescents with T1D, as all the participants receive the benefits of both the peer support and the tailored collaborative family treatment. In the parent portion of the MGT approach, there is a blending of parent training components (i.e., effective communication, goal setting, problem-solving, and contingency management) with immediate in-vivo practice all in one session. This can be particularly useful to parents in applying what they just learned with readily available feedback and support from the other parent peers. Moreover, this approach allows for parents to also work with their adolescents directly (who are also learning new approaches to interacting with their parents in their own parallel group) to improve their functioning as a family unit. Concurrently, group facilitators provide graduated therapeutic support based on the specific family’s need in various parent–child relationship areas.

The measurement approach used to evaluate the KIDS Project intervention adds to the growing literature in this area in that parents’ perspectives of numerous dimensions of family functioning were assessed over time. The parent-adolescent interactional process measures collected in the KIDS Project were not just parent assessments of their own psychosocial well-being throughout the intervention, but they were assessments of parents’ perceptions of the how they and their adolescent were collaborating on diabetes management (i.e., readiness to change responsibility allocation, self-management behaviors, and responsibility for diabetes management tasks). Measuring these family dynamics from parents’ perspectives during a diabetes intervention helps highlight one aspect of the parent-adolescent relationship that is thought to be critical to behavioral change over time ([Steinglass et al., 2019](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c17)).

Although the KIDS Project yielded positive findings with regards to several parent-adolescent interactional processes and adolescent health-related outcomes, there are several limitations to the present study that are to be noted. Due to the smaller number of participants who completed the entire intervention through to the follow-up period, the authors were not able to conduct analyses by subgroups (i.e., preteen vs. teen groups). There were no between-group differences for age at baseline, but adolescent age was associated with scores for diabetes responsibility management allocation. Older adolescents reported taking or initiating responsibility for T1D management tasks almost all the time—rather than sharing it equally with parents. While this is developmentally appropriate, due to small subgroup sizes, it was not possible to clarify whether findings varied for different age subgroups. Thus, it is recommended that future implementation of the KIDS Project intervention continues with preteen and teen groups conducted separately until more data can be gathered on a larger sample of participants.

Although there were some participants of color in the KIDS Project intervention groups, only one of seven parents had data for all three time points. The numbers are too small to conduct any analyses on this subgroup; however, they are reflective of other behavioral health group therapy studies which demonstrates disproportionately higher attrition rates in racial/ethnic minority youth and their parents ([Jelalian et al., 2008](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c8)). Therefore, focus group feedback may be helpful to identify factors that may impact behavioral intervention uptake and strategies to retain individuals who represent diverse racial/ethnic groups or socioeconomic status levels. As outlined in [McQuaid and Everhart (2020)](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c14), as a field, pediatric psychology needs to develop more innovative care delivery models to address health disparities in pediatric populations, including the use of more paraprofessionals in the community to be the group therapists. It also may be that the burden of multiple sessions is too great for some families logistically, and that a briefer intervention of the core sessions may be worthwhile ([Steinglass et al., 2019](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c17)). For example, the authors of the currently study have begun administering a four-session (plus one booster session) KIDS Project intervention for families whose adolescents are recently diagnosed (<6 months) with diabetes as a next iteration of this clinical intervention. Given the attrition rates for the current study in the whole cohort, it may be that this shorter approach is beneficial for all families, regardless of racial/ethnic status. In addition, the adaptation of this MGT intervention to a telemedicine platform may reduce the family burden and still maintain the clinical utility, similar to the findings from MGT interventions with other parent populations during the COVID-19 pandemic ([Fogler et al., 2020](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#c7)). In the future, it will also be important to measure aspects of peer support and how it may be contributing to positive outcomes as well as refine the measurement of how parents and adolescents share diabetes management responsibilities during this developmental timeframe.

The KIDS Project is a clinically relevant MGT intervention for T1D that has been implemented in a real-world setting with positive outcomes on both parent-reported T1D-related family processes and adolescent health-related variables. The participants were referred to a behavioral health clinic by the diabetes clinic team and were not paid to participate in the study. The outpatient diabetes psychologist specifically enlisted the support of the in-clinic social work team for recruitment of families for the MGT intervention, which was invaluable to gaining family interest in the project. This semistructured MGT approach allows for adaptation to different families’ needs within a wide age range of adolescents, who had varying glycemic levels and diabetes treatment regimens. Similarly, the MGT methodology can be readily conducted in other diabetes clinics with minimal infrastructure and resources.

# [References](https://0-web-s-ebscohost-com.libus.csd.mu.edu/ehost/detail/detail?vid=2&sid=4a897472-4f9e-4405-a344-e96b2fa3939b%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#toc)

Anderson, B. J., Auslander, W. F., Jung, K. C., Miller, J. P., & Santiago, J. V. (1990). Assessing family sharing of diabetes responsibilities. *Journal of Pediatric Psychology*, *15*(4), 477–492. 10.1093/jpepsy/15.4.477

Anderson, B. J., Wolf, M. T., Burkhart, R. G., Cornell, R. G., & Bacon, G. E. (1989). Effects of peer-group intervention on metabolic control of adolescents with IDDM. Randomized outpatient study. *Diabetes Care*, *12*(3), 179–183. 10.2337/diacare.12.3.179

Carpenter, J. L., Price, J. E. W., Cohen, M. J., Shoe, K. M., & Pendley, J. S. (2014). Multifamily group problem-solving intervention for adherence challenges in pediatric insulin-dependent diabetes. ***Clinical Practice in Pediatric Psychology***, *2*(2), 101–115. 10.1037/cpp0000059

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. 10.1037/0033-2909.112.1.155

Drotar, D. (2010). Editorial: A call for replications of research in pediatric psychology and guidance for authors. *Journal of Pediatric Psychology*, *35*(8), 801–805. 10.1093/jpepsy/jsq049

Ellis, D. A., Frey, M. A., Naar-King, S., Templin, T., Cunningham, P., & Cakan, N. (2005). Use of multisystemic therapy to improve regimen adherence among adolescents with Type 1 Diabetes in chronic poor metabolic control. A randomized control trial. *Diabetes Care*, *28*(7), 1604–1610. 10.2337/diacare.28.7.1604

Fogler, J. M., Normand, S., O'Dea, N., Mautone, J. A., Featherston, M., Power, T. J., & Nissley-Tsiopinis, J. (2020). Implementing group parent training in telepsychology: Lessons learned during the Covid1-19 pandemic. *Journal of Pediatric Psychology*, *45*(9), 983–989. 10.1093/jpepsy/jsaa085

Jelalian, E., Hart, C. N., Mehlenbeck, R. S., Lloyd-Richardson, E. E., Kaplan, J. D., Flynn-O'Brien, K. T., & Wing, R. R. (2008). Predictors of attrition and weight loss in an adolescent weight control program. *Obesity*, *16*(6), 1318–1323. 10.1038/oby.2008.51

Kaugars, A. S., Kichler, J., & Alemzadeh, R. (2011). Assessing readiness to change the balance of responsibility for managing type 1 diabetes mellitus: Adolescent, mother, and father perspectives. *Pediatric Diabetes*, *12*(6), 547–555. 10.1111/j.1399-5448.2010.00737.x

Kichler, J. C., & Crowther, J. H. (2001). The effects of maternal modeling and negative familial communication on women’s eating attitudes and body image. *Behavior Therapy*, *32*(3), 443–457. 10.1016/S0005-7894(01)80030-7

Kichler, J. C., Kaugars, A. S., Marik, P., Nabors, L., & Alemzadeh, R. (2013). Effectiveness of groups for adolescents with type 1 diabetes mellitus and their parents. *Families, Systems & Health*, *31*(3), 280–293. 10.1037/a0033039

Lewin, A. B., LaGreca, A. M., Geffken, G. R., Williams, L. B., Duke, D. D., Storch, E. A., & Silverstein, J. H. (2009). Validity and reliability of an adolescent and parent rating sale of Type 1 Diabetes adherence behaviors: The Self-Care Inventory (SCI). *Journal of Pediatric Psychology*, *34*(9), 999–1007. 10.1093/jpepsy/jsp032

Marker, A. M., Monzon, A. D., Nelson, E.-L., Clements, M. A., & Patton, S. R. (2020). An intervention to reduce hypoglycemia fear in parents of young kids with Type 1 Diabets through video-based telemedicine (REDCHiP): Trial design, feasibility, and acceptability. *Diabetes Technology & Therapeutics*, *22*(1), 25–33. 10.1089/dia.2019.0244

McQuaid, E. L., & Everhart, R. S. (2020). Introduction to the special issue: Clinical approaches to address health disparities in pediatric psychology. ***Clinical Practice in Pediatric Psychology***, *8*(2), 97–102. 10.1037/cpp0000325

Opipari-Arrigan, L., Kichler, J., Fredericks, E., Burkhart, N., Dale, L., Eder, S., & Foster, C. (2005). Self-management intervention improved diabetes-related functioning in at-risk adolescents with type 1 diabetes. *Published abstract at the American Diabetes Association 65th Scientific Sessions. San Diego, CA*.

Smith, K. E., Dickerson, P., Saylor, C. F., & Jones, C. (1989). Issues of managing diabetes in children and adolescents: A multifamily group approach. *Children’s Health Care*, *18*(1), 49–52. 10.1207/s15326888chc1801\_7

Steinglass, P., Sanders, C., & Wells, F. (2019). Multiple family group therapy. In B. H.Fiese, M.Celano, K.Deater-Deckard, E. N.Jouriles, & M. A.Whisman (Eds.), *APA handbook of contemporary family psychology: Family therapy and training* (pp. 155–169). American Psychological Association. 10.1037/0000101-010

Weinger, K., Welch, G., Butler, H., & La Greca, A. (2005). Measuring diabetes self-care: A psychometric analyses of the Self-Care Inventory with adults. *Diabetes Care*, *28*(6), 1346–1352. 10.2337/diacare.28.6.1346

Wysocki, T., Harris, M. A., Buckloh, L. M., Mertlich, D., Lochrie, A. S., Mauras, N., & White, N. (2007). Randomized trial of behavioral outcomes in adolescents. Maintenance of effects on diabetes outcomes in adolescents. *Diabetes Care*, *30*(3), 555–560. 10.2337/dc06-1613

Wysocki, T., Harris, M. A., Greco, P., Bubb, J., Danda, C. E., Harvey, L. M., McDonell, K., Taylor, A., & White, N. H. (2000). Randomized, controlled trial of behavior therapy for families of adolescents with insulin-dependent diabetes mellitus. *Journal of Pediatric Psychology*, *25*(1), 23–33. 10.1093/jpepsy/25.1.23