

# Telehealth Occupation-Based Coaching for Rural Parents of Children With Type 1 Diabetes: A Randomized Controlled Trial

Vanessa D. Jewell, Marion Russell, Julia Shin, Yongyue Qi, Amy A. Abbott, Emily Knezevich

**Importance:** Because of the complexity of their child's diabetes management, parents often assume all care duties and report needing additional assistance to resume family routines.

**Objective:** To examine the preliminary efficacy of a telehealth occupation-based coaching intervention for rural parents of a child living with Type 1 diabetes (T1D) to improve child glycemic levels, family quality of life, and parental self-efficacy.

**Design:** Double-blinded, two-arm, pilot randomized controlled trial.

**Setting:** Telehealth video conferencing at home.

**Participants:** 16 dyads of rural parents and children ages 2 to 12 yr diagnosed with T1D.

**Intervention:** Occupation-based coaching delivered through telehealth sessions, once weekly for 12 wk, informed by community partners.

**Outcomes and Measures:** Child measures: hemoglobin A1c and glucose time in range. Family measures: Parenting Sense of Competence, World Health Organization Quality of Life Brief Questionnaire, Goal Attainment Scale, Evidence of Independent Capacity Rating Scale (EICRS), and caregiver talk.

**Results:** Families in the intervention group were more likely to achieve family-centered participation goals ( $p = .006$ ) than those in the controlled group. Caregiver talk increased significantly over the 12-wk period ( $p = .034$ ), and the average rating on the EICRS also improved significantly ( $p < .001$ ). There were no statistically significant changes in glycemic levels or family quality of life.

**Conclusions and Relevance:** OBC may be more efficacious in helping families to improve health management routines after a child's diagnosis with T1D than usual endocrinology care alone. Most child health outcomes were in target range at the start of the study; therefore, it was not expected to see significant improvements.

**Plain-Language Summary:** Occupational therapy is an untapped resource in the provision of care for children with Type 1 diabetes (T1D). Occupational therapy practitioners can also provide families with evidence-based support to address the self-management skills of children with this chronic condition. This clinical trial examined the preliminary efficacy of a new 12-wk telehealth occupational therapy intervention for rural families with a child living with T1D to improve caregiver diabetes management skills, family participation, and child health. Families who received occupational therapy services were more likely to improve their family participation in meaningful activities and diabetes self-efficacy; however, there were no differences in the child's health outcomes or the family's quality of life.

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Type 1 diabetes (T1D), one of the most prevalent childhood diseases, requires immediate intervention and ongoing disease management to prevent severe, long-term complications such as stroke,

cardiovascular disease, neuropathies, and blindness (Centers for Disease Control and Prevention, 2024). Because of the complex health management routines that are required to maintain target blood glucose

levels, prevent serious lifelong health conditions, and enable a child's participation in everyday routines, roles, and occupations, parents of children living with T1D frequently assume most or all medical care duties. The constant monitoring of the child's activity levels, carbohydrate intake, sleep patterns, glucose levels, medical appointments, and more can cause parental feelings of overwhelm, stress, anxiety, and depression (Bassi et al., 2020; Gallegos et al., 2023; Noser et al., 2019; Wozniak et al., 2023).

Access to adequate diabetes care with consideration of family-centered routines is necessary for optimum child health outcomes and parent health and well-being (ElSayed et al., 2023). However, because of health care inequities experienced in rural and medically underserved communities, children living with T1D and their families can struggle to get sufficient care (Jewell, et al., 2023; Lewis et al., 2023). Not only are T1D incidence rates 2.28 times higher in rural than in urban locations (Rogers, 2019), but children with T1D who live in rural communities are also more likely to have significantly higher blood glucose levels (Gill et al., 2022). Furthermore, families residing in rural communities frequently experience barriers to health care access that are related to transportation, socioeconomic status, and lack of providers (Brundisini et al., 2013; Coughlin et al., 2019; Jewell et al., 2023; Oser & Oser, 2020).

Occupational therapy is an untapped resource in the provision of care for children with T1D and their families, with evidence-based support for addressing the self-management skills of people with chronic conditions (Fields & Smallfield, 2022; Smallfield et al., 2021), caregivers of people with chronic conditions (Mack & Hildebrand, 2022; Rouch et al., 2021), diabetes management (Cahill et al., 2016; Mitchell et al., 2023; Pyatak et al., 2018, 2019), and the use of telehealth as a delivery model (Feldhacker et al., 2022; Harkey et al., 2020). However, there is no evidence, to date, to support the use of telehealth occupational therapy interventions for rural families with a child living with T1D. Occupational therapy's holistic, strengths-based approach is ideal for promoting parental self-efficacy of health management tasks, supporting parents' psychosocial and participation needs, and providing services to optimize child and family health outcomes (Jewell et al., 2020; Pyatak, 2011). Trained to take the client's context and sociocultural factors into account and build on existing strengths, occupational therapy practitioners are a logical choice in bridging the gap in services for rural families with a child with T1D.

In the treatment of T1D in children, diabetes management can be considered an occupational role for the adults responsible for the child's care. The practitioner can provide education on how to complete an occupational self-analysis by guiding caregivers on how to analyze the person factors, environmental factors, and occupational demands of specific diabetes

management care duties to maximize autonomy, empowerment, and participation and increase the self-efficacy of diabetes management. Diabetes management becomes part of a family's routine, either purposefully or by circumstantial integration, potentially disrupting existing routines and leading to increased parental stress. Diabetes management has become more complex with the advancement of technologies (e.g., to monitor blood glucose or administer insulin through an infusion pump) that can further exacerbate parental stress. However, the additional challenges that are posed to families who live in rural communities, such as a shortage of providers and decreased access to specialty care, require alternative formats for service delivery (Gill et al., 2022; Oser & Oser, 2020).

Occupation-based coaching (OBC) is one intervention with demonstrated preliminary efficacy to promote parental self-efficacy and child participation goals and is a feasible intervention that can be successfully implemented through telehealth to families with young children who have a chronic condition (Little et al., 2018; Rush & Shelden, 2020; Smith et al., 2023), but it has never been applied to caregivers with a child with T1D. OBC is a family-centered intervention in which practitioners and families collaboratively engage in reflection and problem solving to achieve self-identified participation goals. Specifically, OBC uses five strategies:

- benefit finding or using a strengths-based approach to identify something positive from the previous week (Pierce et al., 2019)
- reflection and feedback
- guided discovery
- joint plan creation
- summary of the session (Little et al., 2018).

Practitioners strategically use four types of reflective questioning to increase clients' awareness of resources and contexts, encourage problem solving, and facilitate formation of action plans. OBC allows clients to develop self-efficacy for long-term diabetes self-management. Therefore, to evaluate the preliminary efficacy of a novel telehealth OBC intervention, we completed the following pilot randomized controlled trial aims:

Aim 1: Evaluate the preliminary efficacy of OBC delivered through telehealth to improve family quality of life, participation, and self-efficacy (i.e., parenting competence, evidence of independent capacity, and problem solving and/or parent talk) for rural parents of children living with T1D.

Aim 2: Evaluate the preliminary efficacy of OBC delivered through telehealth to improve child health outcomes—that is, hemoglobin A1c (HbA1c) and glucose time in range (TIR)—for rural-dwelling children living with T1D.

## Method

### Research Design

In this pilot study, we used a two-arm, randomized controlled trial design and adhered to the guidelines

from the Consolidated Standards of Reporting Trials (CONSORT; [Eldridge, Chan, et al., 2016](#)). The design, protocol, and health outcomes were informed by the researchers' previous community-engaged research project that built a patient-centered rural T1D research agenda, ensuring alignment with community needs ([Jewell & Abbott, 2020; Jewell et al., 2023](#)). We used a pilot study design to inform a future full-scale randomized trial ([Eldridge, Lancaster, et al., 2016; Thabane et al., 2010](#)). The Creighton University Institutional Review Board approved the study. The parents provided consent and parental permission, and children of age provided assent.

## Participants

Researchers recruited parents and children with T1D who lived in rural communities in Nebraska, Iowa, Minnesota, or Colorado, and who had internet access, through the Diabetes Research & Wellness Collaborative's registry and laboratory website (led by Vanessa D. Jewell), social media, and outreach through a regional Breakthrough T1D chapter. Parents were required to be age 19 yr or older and designated as the guardian of the child living with T1D. Children were ages 2 to 12 yr and lived in a community that was a minimum of a 1-hr commute to a pediatric endocrinology office (our definition of *rural*). Children who were receiving occupational therapy services were excluded from the study. Because this was a pilot study, sample size was not calculated *a priori* for statistical power ([Thabane et al., 2010](#)). Instead, a research assistant enrolled the first 16 dyads that met criteria and consented in the study. Then, the team biostatistician used simple randomization to allocate the dyads into the intervention group (IG) or the control group (CG). Recruitment closed after 1 wk because of meeting enrollment needs ( $n = 16$ ). Participants were numbered in chronological order of consent completion before enrollment; the biostatistician then used simple random assignment and was not involved in the implementation of the study ([Figure 1](#)).

## Instruments

### Demographic Form

The demographic form included information about the family's background, members, race/ethnicity, socioeconomic status and associated variables, and years of education of the parents ([Little et al., 2018](#)).

### Primary Outcomes

**Parenting Sense of Competence.** The Parenting Sense of Competence (PSoC) is a 17-item scale that has two subscales: parent efficacy and parent satisfaction ([Johnston & Mash, 1989](#)). The items are rated on a 6-point scale ranging from 1 (*strongly agree*) to 6 (*strongly disagree*). It is among the most frequently used scales to assess parents' assessment of their parenting ability and has acceptable internal consistency,

structural validity, and convergent validity ([Blower et al., 2019; Karp et al., 2015](#)).

**Caregiver Talk.** The "caregiver talk" analysis yields the percentage of parent engagement in each delivered OBC session ([Little et al., 2018; Shin et al., 2022](#)). The words uttered from a parent are extracted, counted, and divided by the word count for the entire transcript where a higher percentage of caregiver talk indicates higher parent engagement.

### Evidence of Independent Capacity Rating Scale.

The Evidence of Independent Capacity Rating Scale (EICRS) evaluates the parent's ability to formulate and execute the joint plan with increasing independence from the interventionist. Each OBC session receives a rating where "A" is given if a parent independently initiates action plans and "C" is given if a parent continues to depend on the interventionist on formulating and executing action plans, demonstrating a low degree of independent capacity in applying and internalizing the principles of OBC ([Abbott et al., 2024; Shin et al., 2022](#)).

**Goal Attainment Scale.** The Goal Attainment Scale (GAS) is used to document and chart progress on participation in everyday life activities. It has been shown to be an effective means of measuring psychosocial interventions in pediatric community settings with sound psychometrics ([Steenbeek et al., 2007](#)). A parent identifies the current behavior of a child and then describes the indications of progressive improvements in the child's behavior on a 4-point scale (0 = *What does the child's behavior look like now?* –1 = *What would the child's behavior look like if it got worse?* 1 = *What would the behavior look like if it got slightly better?* and 2 = *What would the behavior look like if it were perfect?*).

### World Health Organization Quality of Life Brief Questionnaire.

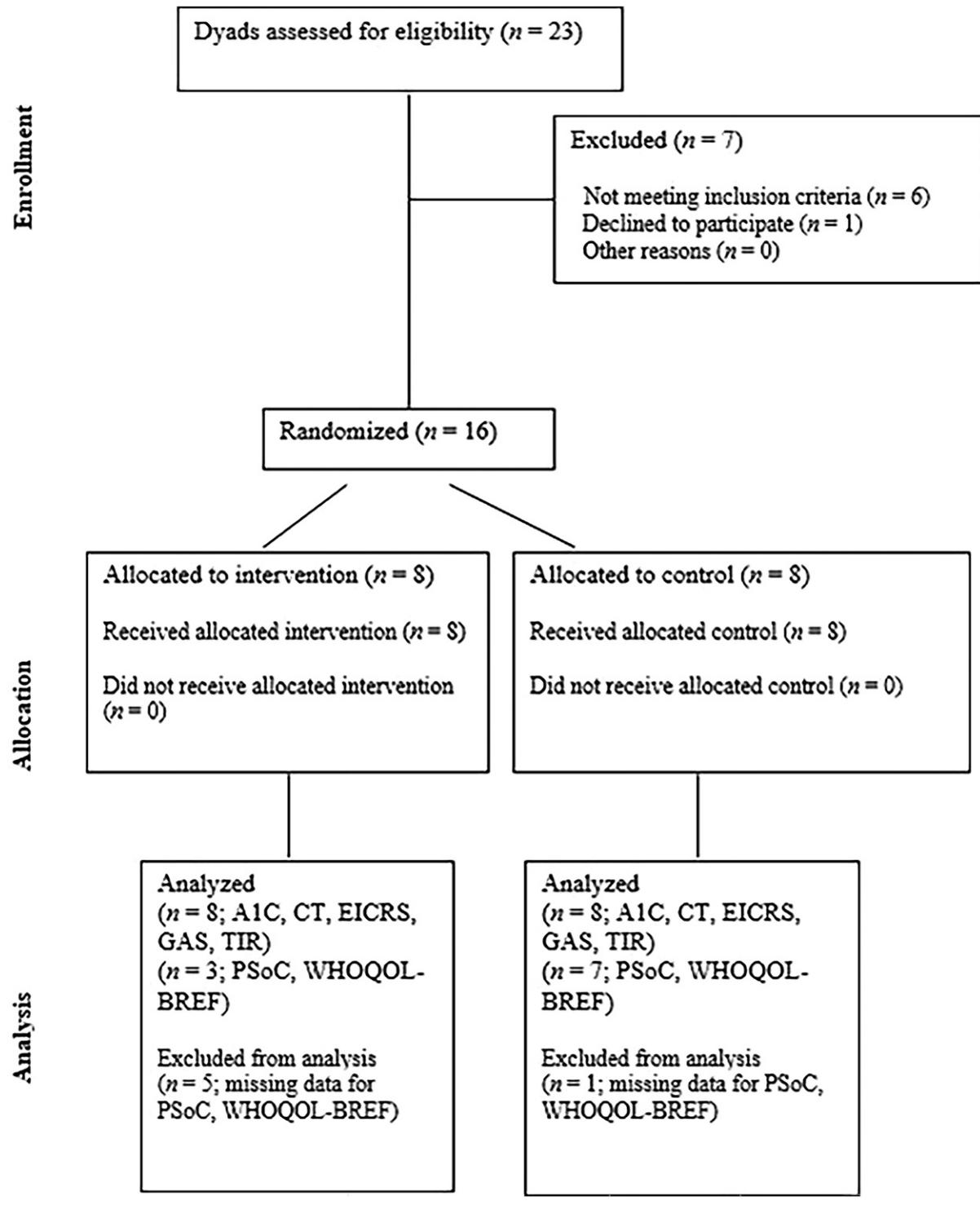
The World Health Organization Quality of Life Brief Questionnaire (WHOQOL-BREF) is a 26-item Likert scale that measures four domains of health: physical, psychological, social, and environment. Internal consistency ( $\alpha$ ) ranges from .68 to .82 with strong discriminant validity of well versus illness samples ( $p < .01$ ; [Skevington et al., 2004; WHO, 1996](#)).

### Secondary Outcomes

**Hemoglobin A1c.** HbA1c is a standard measurement to indicate target glucose level and provides a numeric average of a person's average glucose levels over 2 to 3 mo, with a target of less than 7.5% ([American Diabetes Association, 2020](#)).

**Time in range.** The Dexcom G6® 10-day sensor is a medical device that allows for real-time analysis of the percentage of time each child's blood glucose levels

**Figure 1.** Consolidated Standards of Reporting Trials (CONSORT) flow diagram for participant enrollment and study participation.



are in very low, low, target, high, and very high ranges (Dexcom, n.d.). *Target range* is defined as 70 to 180 mg/L, with targets set for 60% of the day in target range. This outcome measure is considered the gold-standard blood glucose measurement, because it accounts for variability and fluctuation that the HbA1C does not (Battelino et al., 2019; Vigersky & McMahon, 2019).

## Intervention

### Intervention Description

Researchers used the Zoom platform, a Health Insurance Portability and Accountability Act (HIPAA; Pub. L. 104–19)—compliant videoconferencing technology for pre- and posttest measures, and the OBC intervention (HIPAA, 1996; [Zoom Video Communications, 2016](#)). The IG completed 1-hr OBC sessions

for 12 wk plus standard diabetes care; the CG received usual endocrinology care for 12 wk with an option to receive the OBC intervention at the study conclusion.

### Interventionists

Entry-level occupational therapy doctoral students provided the interventions after completing a series of trainings in responsible conduct of research, diversity and inclusion, T1D management, telehealth, and OBC. Next, interventionists delivered sessions with real-life and simulated clients, self-evaluated performance, and received feedback from mentors trained in OBC until achieving competency. All sessions were directly supervised by a licensed occupational therapist; the quality and fidelity of the sessions were monitored through weekly debriefing sessions.

### Intervention Fidelity

To ascertain that the sessions were delivered as intended, two blinded raters used fidelity instruments from the OBC Fidelity Protocol. Six randomly selected recorded sessions, transcripts, interventionist notebooks, and client notebooks from each family were assessed for adherence, drift from adherence, and evidence of parent's developing capacity (Shin et al., 2022). To monitor and assess fidelity, two raters watched 10 practice videos that were specifically developed for training and ranged from low to high fidelity. The raters achieved near-perfect inter-rater agreement ( $p < .001$ ), and then monitored six randomly selected transcribed intervention sessions for fidelity per family. The raters independently evaluated these sessions on key components of a fidelity checklist (e.g., word count of interventionist versus parents, number of yes–no questions, and evidence of independent capacity). More details on the fidelity framework development and monitoring are reported elsewhere (Abbott et al., 2024; Shin et al., 2022).

### Data Collection

Three parents opted for Dexcom G6 continuous glucose monitor (CGM) training with a certified diabetes educator and care specialist 2 wk before baseline data collection to ensure that all families could adjust to a new CGM system. However, all families had prior experience with the CGM system. After the 2-wk CGM training period, data were collected from the IG and CG pre- and postintervention by trained blinded assessors. Researchers collected data for all measures through videoconferencing (for HbA1c and GAS), remote monitoring (for TIR), or paper or electronic surveys (for the Demographic Form, WHOQOL-BREF, and PSoC). OBC telehealth sessions were digitally recorded and transcribed verbatim for fidelity monitoring and assessment of caregiver talk and EICRS.

### Data Analysis

We used descriptive statistics to characterize participants' demographics and mean scores for all outcome measures. Normality was examined using the Shapiro-Wilk test, and nonparametric methods were applied to the analysis for groups without normal distribution. Specifically, the Wilcoxon signed-rank test was used for within-group comparisons and the Mann–Whitney *U* test was used for between-groups comparisons for the outcome measures of TIR, PSoC, HbA1C, and the four domains of quality of life on the WHOQOL-BREF. We conducted an independent samples *t* test to examine the differences of postintervention GAS scores between groups. All statistical analyses were performed with IBM SPSS Statistics (Version 25). A *p* value less than 0.05 was considered statistically significant, whereas a decrease of 0.5% in HbA1c was considered clinically significant.

We retrospectively analyzed the intervention transcripts of 10 rural-dwelling parents with a child (age range = 2–12 yr) diagnosed with T1D who received 1-hr weekly OBC sessions across 12 wk. Two verbatim transcriptions were randomly selected from the beginning, middle, and end phases per family, yielding 60 transcriptions for a retrospective analysis. We used a repeated-measures ANOVA to analyze the data collected on the EICRS to evaluate the progression of the parent's developing competence with managing the health of their child diagnosed with T1D.

## Results

A total of 16 rural parent–child dyads (IG = 8; CG = 8) participated in the study and completed child and parent outcome measures; however, four dyads in the IG did not return their demographic forms and baseline assessments for the PSoC and the WHOQOL-BREF. The mean age of mothers was 38.5 yr ( $SD = 4.2$ ), similar to the fathers' mean age of 40.8 yr ( $SD = 4.8$ ), and the children's mean age was 95.8 mo (~8 yr;  $SD = 31.1$  mo). In terms of parent education, 75% of mothers reported that they had a bachelor's or master's degree, and approximately 55% of fathers held either a bachelor's or an advanced degree. The demographic characteristics of the dyads by groups are shown in Table 1.

### Child Health Outcomes

TIR and HbA1c did not differ significantly before and after telehealth OBC sessions between or within groups. Both the IG and CG maintained HbA1c levels less than 7.5% during the study period. (Table 2).

### Family Quality of Life and Participation

Table 3 shows the mean and SD of each domain of the WHOQOL-BREF at baseline and postintervention, and the values changed between the two time points with 95% confidence interval (CI) and *p* values. The IG scores increased after intervention sessions in all

**Table 1.** Participant Demographics

Demographic	Intervention Group		Control Group	
	n (%)	Range	n (%)	Range
Age				
Child, mo	102.63 (43.06)	28–153	106.62 (25.27)	61–140
Mother, yr <sup>a</sup>	37.50 (3.35)	33–41	39.12 (4.61)	31–48
Father, yr <sup>a</sup>	38.32 (4.00)	33–43	42.43 (4.61)	37–49
T1D diagnosis, yr <sup>a</sup>	5.38 (3.09)	1–8	5.47 (2.18)	2.75–9
Miles to pediatric endocrinologist	202.46 (97.65)	93.7–346.0	142.39 (97.11)	19.8–275.0
Gender				
Male	4 (50.0)		2 (25.0)	
Female	4 (50.0)		6 (75.0)	
Siblings <sup>a</sup>	2 (50.0)		8 (100)	
Child's ethnicity <sup>a</sup>				
White–Caucasian	4 (100)		7 (87.5)	
Multiracial <sup>b</sup>	—		1 (12.5)	
Mother's ethnicity <sup>a</sup>				
White–Caucasian	4 (100)		8 (100)	
Family income, \$ <sup>a</sup>				
20,000–39,999	—		1 (12.5)	
40,000–59,999	2 (50.0)		1 (12.5)	
60,000–79,999	—		1 (12.5)	
80,000–99,999	2 (50.0)		1 (12.5)	
>100,000	—		3 (37.5)	
Mother's education				
Associate's	1 (25.0)		2 (25.0)	
Bachelor's	—		5 (62.5)	
Master's	3 (75.0)		1 (12.5)	
Father's education				
High school	1 (25.0)		—	
Some college	—		2 (25.0)	
Associate's	—		1 (12.5)	
Bachelor's	—		4 (50.0)	
Master's	2 (50.0)		—	
Doctorate	1 (25.0)		—	
State of residence				
IA	2 (25.0)		5 (62.5)	
MN	2 (25.0)		1 (12.5)	
CO	1 (12.5)		—	
NE	3 (37.5)		2 (25.0)	

Note. T1D = Type 1 diabetes.

<sup>a</sup>Four of 8 participants in the intervention group returned demographics forms.

<sup>b</sup>Multiracial = White, African American, and Hispanic.

four domains from 4.00 to 8.67; however, these changes did not reach a significant level. No statistically significant differences in the changes of four domain scores between groups were observed.

However, the mean postintervention GAS score in the IG ( $M = 60.63$ ,  $SD = 3.77$ ) was significantly higher than that in the CG ( $M = 51.88$ ,  $SD = 6.75$ ),  $t(14) = 3.20$ ,  $p = .006$  (Table 3). The effect size of the

**Table 2.** Child Health Outcomes Within-Group and Between-Groups Results

Variable	M (SD)		Changes from Baseline to Postintervention	
	Baseline	3 Mo Postintervention	Median [95% CI]	p
TIR				
IG	0.57 (0.21)	0.57 (0.16)	-0.01 [-0.90, 0.08]	.100
CG	0.60 (0.19)	0.61 (0.13)	-0.01 [-0.14, 0.12]	.93
Between-groups differences			-0.01 [-0.15, 0.14]	.96
HbA1c				
IG	7.10 (0.71)	7.26 (1.10)	-0.16 [-0.55, 0.23]	.48
CG	7.28 (1.11)	7.43 (0.99)	-0.15 [-0.69, 0.39]	.36
Between-groups differences			-0.01 [-0.59, 0.61]	.65

Note. IG, n = 8; CG, n = 8. CG = control group; CI = confidence interval; HbA1c = hemoglobin A1c; IG = intervention group; TIR = time in range.

independent-samples *t* test for the comparison of post-GAS scores between groups was 1.60 by Cohen's *d* (95% CI [0.44, 2.72]), which is considered large.

### Parental Self-Efficacy

Mean scores on the PSoC increased from 66.67 to 80.00 in the IG and from 79.57 to 81.57 in the CG; no

significant differences were found between or within groups (Table 4). The word count for caregiver talk increased significantly from 67.2% at the beginning phase and 67.9% at the middle phase to 72.4% at the end phase (*p* = .034). The percentage of interventionist word count significantly decreased from the beginning to end phases (beginning: *M* = 32.8, *SD* = 15.0; middle: *M* = 27.6, *SD* = 12.9; *p* = .034) and showed a significant

**Table 3.** Family Quality of Life Outcomes

Scale and Variable	M (SD)		Changes from Baseline to Postintervention	
	Baseline	3 Mo Postintervention	M [95% CI]	p
WHOQOL-BREF				
Physical health				
IG <sup>a</sup>	75.33 (12.50)	79.33 (15.57)	-4.00 [-37.42, 29.42]	.66
CG <sup>a</sup>	75.14 (15.31)	75.00 (13.94)	0.14 [-9.20, 9.49]	.89
Between-groups differences			-4.14 [-21.71, 13.42]	1.00
Psychological				
IG <sup>a</sup>	66.67 (9.71)	75.33 (27.30)	-8.67 [-55.56, 38.23]	.29
CG <sup>a</sup>	72.43 (11.43)	77.86 (12.36)	-5.43 [-16.13, 5.28]	.22
Between-groups differences			-3.24 [-25.15, 18.67]	.83
Social relationships				
IG <sup>a</sup>	66.67 (9.71)	71.00 (22.07)	-4.33 [-48.79, 40.13]	1.00
CG <sup>a</sup>	65.14 (29.16)	70.57 (25.97)	-5.43 [-33.65, 22.80]	.58
Between-groups differences			1.10 [-43.31, 45.50]	.52
Environment				
IG <sup>a</sup>	71.00 (6.93)	79.33 (20.43)	-8.33 [-42.15, 25.49]	.29
CG <sup>a</sup>	80.29 (13.34)	84.86 (12.93)	-4.57 [-14.44, 5.30]	.30
Between-groups differences			-3.76 [-22.03, 14.51]	1.00
GAS	M (SD)		M Difference [95% CI]	p
	IG	CG		
GAS score at postintervention	60.63 (3.77)	51.88 (6.75)	8.75 [2.89, 14.62]	.006

Note. For the WHOQOL-BREF: IG, n = 3; CG, n = 7. For the GAS, IG, n = 8; n = 8. CG = control group; CI = confidence interval; GAS = Goal Attainment Scale; IG = intervention group; WHOQOL-BREF = World Health Organization Quality of Life Brief Questionnaire.

<sup>a</sup>Indicates missing data.

**Table 4.** Parental Self-Efficacy

PSoC	M (SD)		Changes from Baseline to Postintervention	
	Baseline	3 Mo Postintervention	Median [95% CI]	p
IG <sup>a</sup>	66.67 (17.90)	80.00 (20.08)	-13.33 [-34.46, 7.79]	.109
CG <sup>a</sup>	79.57 (10.03)	81.57 (6.27)	-2.00 [-10.32, 6.32]	.553
Between-groups differences			-11.33 [-25.46, 2.80]	.183

Note. For the IG,  $n = 3$ ; for the CG,  $n = 7$ . Findings regarding caregiver talk and the Evidence of Independent Capacity Rating Scale, as well as parental self-efficacy outcomes, are reported in the Results section. CI = confidence interval; CG = control group; IG = intervention group; PSoC = Parental Sense of Competence.

<sup>a</sup>Indicates missing data.

linear trend ( $p = .019$ ). The average rating on the EICRS (on which A indicates a high level of independence from the interventionist and C indicates a low level of independence from the interventionist) increased from the average rating close to B at the beginning and middle phases to a rating close to A at the end phase ( $p < .001$ ), with a significant linear trend of improvement noted ( $p < .001$ ). (See Table 4.)

## Discussion

In this pilot study, we examined the preliminary efficacy of OBC delivered through telehealth in addition to usual diabetes care, compared with usual diabetes care alone, to improve child health outcomes, parental self-efficacy, and quality of life for families living in rural communities. With caution, increasing parental engagement and autonomy were observed across the sessions, and enhanced achievement of family participation goals were noted pre- and postintervention; no significant improvements were noted for child health outcomes or family quality of life. According to Dunn et al. (2018), when caregiver talk increases, it is hypothesized that “the participant is becoming more skilled and requiring fewer interventionist prompts to engage in problem solving” (p. 102). However, it is important to note that the caregiver talk does not descriptively capture the content and quality of the conversations carried out by the client. Specifically, words uttered by the client may include topics that are irrelevant to the receipt and enactment of the principles of OBC. A subsequent paper is in preparation to descriptively analyze and evaluate the content of caregiver talk. Nevertheless, dovetailed with increasing autonomy with formulating and executing joint plans as captured by EICRS, there is an indication that the OBC may yield observable changes in the caregiver capacity.

It was not surprising that no significant changes were seen related to child health outcomes, because the children who were enrolled in the study had an average HbA1c of 7.5% and 60% TIR at baseline. The American Diabetes Association guidelines indicate that the target HbA1c is less than 7.5% and target TIR is more than 60%, indicating that the families who were enrolled in the study met standard health outcomes before the intervention. In addition, because the HbA1c is an average of the past 3 mo of glucose levels,

it is reasonable to expect needing more than 3 mo to see a change in glucose levels (Radin, 2014).

Consistent with the study findings, we expected the families in this study to demonstrate improvements in family participation goals as indicated on the GAS. Prior studies indicated improvements in family participation (i.e., on the GAS) for family-centered telehealth coaching interventions, including a 10-wk intervention for families with a child (ages 2–17 yr) with special health needs ( $p < .001$ ; Smith et al., 2023) and a 12-wk intervention for families with a child (ages 26–79 mo) who was diagnosed with autism spectrum disorder ( $p < .05$ ). In addition, Mitchell and colleagues (2023) found that a 12-session, 6-mo, diabetes-specific Lifestyle Redesign® telehealth intervention with young adults (ages 18–30 yr) improved their occupational satisfaction, occupational performance, and health management ( $p < .02$ ).

Because of the nature of pilot studies, these results should be interpreted with caution. The study limitations include a lack of generalizability that is due to the small sample size, utilization of student interventionists instead of licensed occupational therapists, and employment of outcome measures (i.e., parent talk and EICRS) that do not have established psychometric properties. Another limitation was the fact that blood glucose levels were within target ranges at the beginning of the study for all participants, which made it difficult to determine improvement in HbA1c or TIR. Recall bias is a potential limitation that is due to the survey format for the WHOQOL-BREF and PSoC. Future studies should include a larger sample size, with licensed occupational therapists delivering the OBC intervention, with families that have children who are at higher risk for poor glucose levels.

## Implications for Occupational Therapy Practice

Given the number of children diagnosed with T1D and the effects of the lack of access to appropriate health management support for those living in rural communities, it is important that occupational therapists develop and test innovative intervention frameworks with formats that are alternatives to traditional in-person care. As a field, occupational therapy is well suited to the provision of services through

telehealth, such as the OBC model investigated here. This study has the following implications for occupational therapy practice:

- If practitioners choose to implement OBC telehealth services for families with a child with T1D, it is critical to document treatment content, family responses to treatment, and any changes in family functioning (or occupational engagement) from the evaluation to discharge.
- Occupational therapy practitioners should increase advocacy for their role in T1D treatment and inclusion on endocrinology and primary care teams.
- Because of limited telehealth funding by health care insurance companies, practitioners need to advocate for continued policy changes for the inclusion of occupational therapy telehealth services.

## Conclusion

This innovative, novel study evaluated the findings from a pilot randomized controlled trial utilizing OBC through telehealth to address a critical gap in health care needs experienced by rural families with a child living with T1D. OBC is a promising intervention framework that demonstrates preliminary evidence to support improving family participation and enhancing parents' overall health management self-efficacy for their child living with T1D. Preliminary evidence suggests that telehealth OBC sessions have the potential to improve family-centered, participation-level goals for rural families with a child with T1D. However, because of a small sample size and the nature of pilot studies, it is critical that additional research is completed to further explore how occupational therapy can address child health outcomes, parental diabetes self-efficacy, and overall family health and well-being. 

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## References

- Abbott, A. A., Shin, J., Russell, M., Storm, H., & Jewell, V. D. (2024). Achieving inter-rater agreement and reliability to assess fidelity of an occupation-based coaching (OBC) clinical trial intervention. *British Journal of Occupational Therapy*. Advance online publication. <https://doi.org/10.1177/03080226241283292>
- American Diabetes Association. (2020). 2. Classification and diagnosis of diabetes: *Standards of medical care in diabetes—2020*. *Diabetes Care*, 43(Suppl. 1), S14–S31. <https://doi.org/10.2337/dc20-S002>
- Bassi, G., Mancinelli, E., Di Riso, D., & Salcuni, S. (2020). Parental stress, anxiety and depression symptoms associated with self-efficacy in paediatric type 1 diabetes: A literature review. *International Journal of Environmental Research and Public Health*, 18, 152. <https://doi.org/10.3390/ijerph18010152>
- Battelino, T., Danne, T., Bergenstal, R. M., Amiel, S. A., Beck, R., Biester, T., ... Phillip, M. (2019). Clinical targets for continuous glucose monitoring data interpretation: Recommendations from the International Consensus on Time in Range. *Diabetes Care*, 42, 1593–1603. <https://doi.org/10.2337/dci19-0028>
- Blower, S. L., Gridley, N., Dunn, A., Bywater, T., Hindson, Z., & Bryant, M. (2019). Psychometric properties of parent outcome measures used in RCTs of antenatal and early years parent programs: A systematic review. *Clinical Child and Family Psychology Review*, 22, 367–387. <https://doi.org/10.1007/s10567-019-00276-2>
- Brundisini, F., Giacomini, M., DeJean, D., Vanstone, M., Winsor, S., & Smith, A. (2013). Chronic disease patients' experiences with accessing health care in rural and remote areas: A systematic review and qualitative meta-synthesis. *Ontario Health Technology Assessment Series*, 13, 1–33.
- Cahill, S., Polo, K. J., Egan, B. E., & Marasti, N. (2016). Interventions to promote diabetes self-management in children and youth: A scoping review. *American Journal of Occupational Therapy*, 70, 7005180020. <https://doi.org/ajot.2016.021618>
- Centers for Disease Control and Prevention. (2024). *National diabetes statistics report*. <https://www.cdc.gov/diabetes/php/data-research/index.html>
- Coughlin, S. S., Clary, C., Johnson, J. A., Berman, A., Heboyan, V., Benevides, T., ... George, V. (2019). Continuing challenges in rural health in the United States. *Journal of Environment and Health Sciences*, 5, 90–92
- Dexcom, I. (n.d.). Dexcom G6®. <https://www.dexcom.com/en-us/g6-cgm-system>
- Dunn, W., Little, L. M., Pope, E., & Wallisch, A. (2018). Establishing fidelity of occupational performance coaching. *Occupational Therapy Journal of Research*, 38, 96–104. <https://doi.org/10.1177/1539449217724755>
- Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., & Lancaster, G. A.; PAFS Consensus Group. (2016). CONSORT 2010 statement: Extension to randomized pilot and feasibility trials. *BMJ*, 355, i5239. <https://doi.org/10.1136/bmj.i5239>
- Eldridge, S. M., Lancaster, G. A., Campbell, M. J., Thabane, L., Hopewell, S., Coleman, C. L., & Bond, C. M. (2016). Defining feasibility and pilot studies in preparation for randomized controlled trials: Development of a conceptual framework. *PLoS One*, 11, e0150205. <https://doi.org/10.1371/journal.pone.0150205>
- ElSayed, N. A., Aleppo, G., Aroda, V. R., Bannuru, R. R., Brown, F. M., Bruemmer, D., ... Gabbay, R.; on behalf of the American Diabetes Association. (2023). 14. Children and adolescents: *Standards of Care in Diabetes—2023*. *Diabetes Care*, 46(Suppl. 1), S230–S253. <https://doi.org/10.2337/dc23-S014>

- Feldhacker, D. R., Jewell, V. D., Jung LeSage, S., Collins, H., Lohman, H., & Russell, M. (2022). Telehealth interventions within the scope of occupational therapy practice: A systematic review. *American Journal of Occupational Therapy*, 76, 7606205090. <https://doi.org/10.5014/ajot.2022.049417>
- Fields, B., & Smallfield, S. (2022). Occupational therapy practice guidelines for adults with chronic conditions. *American Journal of Occupational Therapy*, 76, 7602397010. <https://doi.org/10.5014/ajot.2022/762001>
- Gallegos, E., Harmon, K. B., Lee, G., Qi, Y., & Jewell, V. D. (2023). A descriptive study of the quality of life and burden of mothers of children with type 1 diabetes. *Occupational Therapy in Health Care*, 37, 296–312. <https://doi.org/10.1080/07380577.2022.2038401>
- Johnston, C., & Mash, E. J. (1989). A measure of parenting satisfaction and efficacy. *Journal of Clinical Child Psychology*, 18, 167–175. [https://doi.org/10.1207/s15374424jccp1802\\_8](https://doi.org/10.1207/s15374424jccp1802_8)
- Gill, A., Gothard, M. D., & Briggs Early, K. (2022). Glycemic outcomes among rural patients in the type 1 diabetes T1D Exchange registry, January 2016–March 2018: A cross-sectional cohort. *British Medical Journal Open Diabetes Research and Care*, 10, e002564. <https://doi.org/10.1136/bmjdrc-2021-002564>
- Harkey, L. C., Jung, S., Newton, E. R., & Patterson, A. (2020). Patient satisfaction with telehealth in rural settings: A systematic review. *International Journal of Telerehabilitation*, 12, 53–64. <https://doi.org/10.5195/ijt.2020.6303>
- Health Insurance Portability and Accountability Act of 1996 (HIPAA), Pub. L. 104-191, 42 U.S.C. § 300gg, 29 U.S.C. §§ 1181–1183, and 42 U.S.C. §§ 1320d–1320d9.
- Jewell, V. D., & Abbott, A. A. (2020). Utilizing a diverse stakeholder group to build a patient-centered type 1 diabetes research agenda. *Diabetes*, 69(Suppl. 1), 2228-PUB. <https://doi.org/10.2337/db20-2228-PUB>
- Jewell, V. D., Russell, M., Feiten, B., & Ludwig, E. (2020). Occupation-based coaching as a novel intervention for families with a young child with type 1 diabetes. *OT Practice*, 25(7), 16–19.
- Jewell, V. D., Wise, A., Knezevich, E., Abbott, A. A., Feiten, B., & Dostal, K. (2023). Type 1 diabetes management and health care experiences across rural Nebraska. *Journal of Pediatric Health Care*, 37, 48–55. <https://doi.org/10.1016/j.pedhc.2022.07.005>
- Karp, S. M., Lutembacher, M., & Wallston, K. A. (2015). Evaluation of the Parenting Sense of Competence Scale in mothers of infants. *Journal of Child and Family Studies*, 24, 3474–3481. <https://doi.org/10.1007/s10826-015-0149-z>
- Lewis, L. F., Brower, P. M., & Narkewicz, S. (2023). “We operate as an organ”: Parent experiences of having a child with Type 1 diabetes in a rural area. *Science of Diabetes Self-Management and Care*, 49, 35–45. <https://doi.org/10.1177/26350106221144962>
- Little, L. M., Pope, E., Wallisch, A., & Dunn, W. (2018). Occupation-based coaching by means of telehealth for families of young children with autism spectrum disorder. *American Journal of Occupational Therapy*, 72, 7202205021. <https://doi.org/10.5014/ajot.2018.024786>
- Mack, A., & Hildebrand, M. (2022). Education and support interventions for caregivers of persons with stroke (January 1, 1999–December 31, 2019). *American Journal of Occupational Therapy*, 76, 7603393020. <https://doi.org/10.5014/ajot.2022.763003>
- Mitchell, S., Sideris, J., Blanchard, J., Granados, G., Diaz, J., & Pyatak, E. (2023). Telehealth Lifestyle Redesign occupational therapy for diabetes: Preliminary effectiveness, satisfaction, and engagement. *Occupational Therapy Journal of Research*, 43, 426–434. <https://doi.org/10.1177/15394492231172933>
- Noser, A. E., Dai, H., Marker, A. M., Raymond, J. K., Majidi, S., Clements, M. A., ... Patton, S. R. (2019). Parental depression and diabetes-specific distress after the onset of Type 1 diabetes in children. *Health Psychology*, 38, 103–112. <https://doi.org/10.1037/he0000699>
- Oser, S. M., & Oser, T. K. (2020). Diabetes technologies: We are all in this together. *Clinical Diabetes*, 38, 188–189. <https://doi.org/10.2337/cd19-0046>
- Pierce, J. S., Wasserman, R., Enlow, P., Aroian, K., Lee, J., & Wysocki, T. (2019). Benefit finding among parents of young children with type 1 diabetes. *Pediatric Diabetes*, 20, 652–660. <https://doi.org/10.1111/pedi.12860>
- Pyatak, E. (2011). The role of occupational therapy in diabetes self-management interventions. *Occupational Therapy Journal of Research*, 31, 89–96. <https://doi.org/10.3928/15394492-20100622-01>
- Pyatak, E., King, M., Vigen, C. L. P., Salazar, E., Diaz, J., Schepens Niemiec, S. L., ... Shukla, J. (2019). Addressing diabetes in primary care: Hybrid effectiveness–implementation study of Lifestyle Redesign® occupational therapy. *American Journal of Occupational Therapy*, 73, 7305185020. <https://doi.org/10.5014/ajot.2019.037317>
- Pyatak, E. A., Carandang, K., Vigen, C. L. P., Blanchard, J., Diaz, J., Concha-Chavez, A., ... Peter, A. L. (2018). Occupational therapy intervention improves glycemic control and quality of life among young adults with diabetes: The Resilient, Empowered, Active Living with Diabetes (REAL Diabetes) randomized controlled trial. *Diabetes Care*, 41, 696–704. <https://doi.org/10.2337/dc17-1634>
- Radin, M. (2014). Pitfalls in hemoglobin A1c measurement: When results may be misleading. *Journal of General Internal Medicine*, 29, 388–394. <https://doi.org/10.1007/s11606-013-2595-x>
- Rogers, M. A. M. (2019). Onset of type 1 diabetes mellitus in rural areas of the USA. *Journal of Epidemiology and Community Health*, 73, 1136–1138. <https://doi.org/10.1136/jech-2019-212693>
- Rouch, S. A., Fields, B. E., Alibrahim, H. A., Rodakowski, J., & Leland, N. E. (2021). Evidence for the effectiveness of interventions for caregivers of people with chronic conditions: A systematic review. *American Journal of Occupational Therapy*, 75, 7504190030. <https://doi.org/10.5014/ajot.2021.042838>
- Rush, D. D., & Shelden, M. L. (2020). *The early childhood coaching handbook* (2nd ed.). Brookes.
- Shin, J., Jewell, V., Abbott, A. A., Russell, M., Carlson, K., & Gordon, M. (2022). Development of the Occupation-Based Coaching Fidelity Protocol. *Canadian Journal of Occupational Therapy*, 89, 159–169. <https://doi.org/10.1177/00084174221078644>
- Skevington, S. M., Lotfy, M., & O’Connell, K. A.; WHOQOL Group. (2004). The World Health Organization’s WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A report from the WHOQOL group. *Quality of Life Research*, 13, 299–310. <https://doi.org/10.1023/B:QURE.000018486.91360.00>
- Smallfield, S., Fang, L., & Kyler, D. (2021). Self-management interventions to improve activities of daily living and rest and sleep for adults with chronic conditions: A systematic review. *American Journal of Occupational Therapy*, 75, 7504190010. <https://doi.org/10.5014/ajot.2021.046946>
- Smith, S. L., Aytur, S. A., & Humphreys, B. P. (2023). Effects of telehealth parent coaching in supporting family participation, cohesion, and adaptability. *Occupational Therapy Journal of Research*, 43, 24–34. <https://doi.org/10.1177/1539449221083664>
- Steenbeek, D., Ketelaar, M., Galama, K., & Gorter, J. W. (2007). Goal attainment scaling in paediatric rehabilitation: A critical review of the literature. *Developmental Medicine and Child Neurology*, 49, 550–556. <https://doi.org/10.1111/j.1469-8749.2007.00550.x>
- Thabane, L., Ma, J., Chu, R., Cheng, J., Ismaila, A., Rios, L. P., ... Goldsmith, C. H. (2010). A tutorial on pilot studies: The what, why and how. *BMC Medical Research Methodology*, 10, 1–10. (<https://doi.org/10.1186/1471-2288-10-1>)
- Vigersky, R. A., & McMahon, C. (2019). The relationship of hemoglobin A1c to time-in-range in patients with diabetes. *Diabetes Technology and Therapeutics*, 21, 81–85. <https://doi.org/10.1089/dia.2018.0310>

- World Health Organization. (1996). *WHOQOL-BREF: Introduction, administration, scoring and generic version of the assessment: Field trial version, December 1996*. <https://www.who.int/publications/item/WHOQOL-BREF>
- Wozniak, E., Cover, L., Qi, Y., & Jewell, V. D. (2023). Mixed-method study of the experiences and routines of caregivers of children with type 1 diabetes. *Open Journal of Occupational Therapy*, 11, 1–14. <https://doi.org/10.15453/2168-6408.1956>
- Zoom Video Communications. (2016). *Security guide*. <https://d24cgw3uvb9a9h.cloudfront.net/static/81625/doc/Zoom-Security-WhitePaper.pdf>

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**Vanessa D. Jewell, PhD, OTR/L, FAOTA**, is Associate Professor, Division of Occupational Science and Occupational Therapy and Division of

Endocrinology and Metabolism, University of North Carolina, Chapel Hill; [vanessa\\_jewell@med.unc.edu](mailto:vanessa_jewell@med.unc.edu)

**Marion Russell, OTD, MOTR/L, SCFES**, is Assistant Professor, Department of Occupational Therapy, Creighton University, Omaha, NE.

**Julia Shin, EdD, OTR/L**, is Assistant Professor, Department of Occupational Therapy, Creighton University, Omaha, NE.

**Yongyue Qi, PhD**, is Associate Professor, Department of Occupational Therapy, Creighton University, Omaha, NE.

**Amy A. Abbott, PhD, RN**, is Associate Professor, College of Nursing, Creighton University, Omaha, NE.

**Emily Knezevich, PharmD, CDECS**, is Professor, Department of Pharmacy Practice, Creighton University, Omaha, NE.