Effectiveness of a Daily Educational and Monitoring Tool for Diabetes Management in Youth with Type 1 Diabetes

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BACKGROUND

- Management of type 1 diabetes (T1D) in children and adolescents is a difficult and complex process that includes consideration of timing of insulin administration, dietary intake, and physical activity
- A certain level of cognitive ability, emotional maturity, and support from caregivers are part of optimal management of T1D in youth
- Thus, efforts to promote optimal management should focus on specific tasks (e.g., logging of blood glucose values) and behaviors and emotions that come along with managing T1D
- The AT-A-GLANCE® Balance and Stretch® Day Planner was developed to provide a new educational and monitoring tool for youth to focus on daily health and life tasks. The Planner cover page and sample log are displayed to the right.
- To test the effectiveness of this tool, we implemented it in the curriculum at the Elliott P. Joslin Camp for Children with Diabetes

Study Aims

Aim 1 Determine the feasibility of using the Planner in a diabetes camp setting and how use relates to diabetes self-efficacy and knowledge
Aim 2 Determine the impact of using the Planner and receiving the Education (i.e., experimental group) on diabetes-related quality of life, negative feelings about blood glucose monitoring (BGM), and glycemic control.

Procedure

- Upon arrival at camp, caregivers and youth were approached about interest in participating
- Consent and assent forms were completed
- Participants were assigned to study group by random selection of week they attended (i.e., all campers for particular week were in one group)

Methods and Results

Procedure (continued)

- Experimental group participants used the Planner and received education while at camp and could use it at home for 3 months following camp
- Control group received the same education at camp, but did not use the Planner
- Three measurements were taken:
  - Pre-Camp (at check-in); Post-Camp (at check-out; two weeks later); Follow-up (approx. 3 months later)
- Chart reviews were conducted to determine demographic and diabetes-specific characteristics
- Participants completed questionnaires on site at pre- and post-camp and through the mail at follow-up
- A1c measurement was obtained via DCA2000 (Bayer®) at pre- and post-camp. A1c at follow-up was obtained either through chart review or parent report of lab value

Youth Surveys
1) Pediatric Quality of Life Inventory (PedsQL)
2) Blood Glucose Monitoring Communication (BGMC) Questionnaire
3) Survey of Diabetes Understanding
4) Child Self-Efficacy for Diabetes Management

Participants

	Control (n = 18)	Experimental (n = 42)
Age (yrs)	12.9 ± 1.8	12.1 ± 2.1
T1D duration (yrs)	4.5 ± 2.7	5.8 ± 3.4
BMI (kg/m^2)	21.1 ± 2.4	21.6 ± 3.6
Pump use (%)	28	76

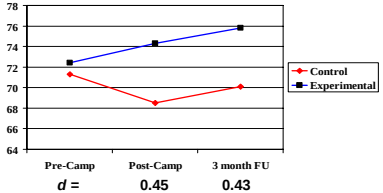
Aim 1 – Qualitative Outcomes

- Each Planner was coded based on criteria for frequency of use and the completeness of recording. Those youth who used the Planner more frequently and more completely while at camp:
  - Had higher self-efficacy scores post-camp ($r = 0.39$, $p < 0.02$)
  - Had higher knowledge scores post-camp ($r = 0.41$, $p < 0.01$)

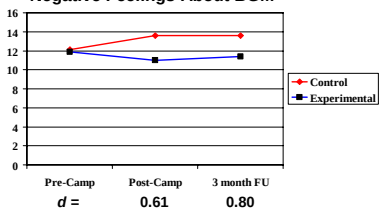
Aim 2 – Outcomes

- Trends in group means by surveys are displayed in the following graphs and chart
- Effect sizes (Cohen's *d*; mean difference / pooled standard deviation) were calculated to demonstrate the magnitude of difference between groups
  - *d* of 0.2 = small effect size
  - *d* of 0.5 = medium effect size
  - *d* of 0.8 = large effect size

Diabetes Quality of Life

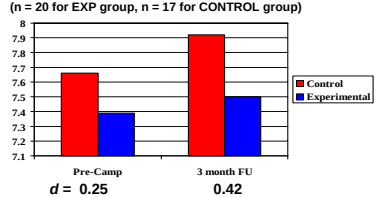


Negative Feelings About BGM



Glycemic Control

(n = 20 for EXP group, n = 17 for CONTROL group)



SUMMARY and CONCLUSIONS

- Results indicate that this educational and monitoring tool can be readily implemented in to a diabetes camp setting
- Further, campers who used the planner showed improvements in diabetes self-efficacy and knowledge
- Campers who used the Planner also had higher diabetes quality of life scores and fewer negative feelings about BGM compared to controls
- The deterioration in glycemic control seen in the control group was less pronounced in the campers who used the Planner. There was a positive trend toward more optimal glycemic control in the group who used the Planner.

IMPLICATIONS

- These findings show that the AT-A-GLANCE® Balance and Stretch® Day Planner represents a promising approach to improving the management of T1D in children and adolescents.
- Future directions include evaluation of this tool in a clinic setting to further elucidate the Planner's relationship to diabetes-specific health outcomes.

ACKNOWLEDGEMENTS

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