

A Data Management Protocol to Improve Outcomes for Adolescents with Type 1 Diabetes

Katie Fox, DNP, APRN, FNP-BC

PROBLEM STATEMENT

Only 20% of adolescents with Type 1 Diabetes (T1D) meet the American Diabetes Association's (ADA) glucose control targets.

- Worst glycemic control across the lifespan
- 21% of adolescent patients at the project site met ADA goals for percentage of time spent in therapeutic range (70 mg/dL – 180 mg/dL over a two-week time period).
- 14 days of continuous glucose monitor (CGM) data strongly correlates with three months of data for time in range (Johnson et al., 2019).
- By 2050, there are expected to be almost 600,000 pediatric patient with T1D

PROJECT PURPOSE

To improve overall glycemic control in adolescent patients with T1D.

Aim: Increase the percentage of time adolescent patients with T1D spend in range (70 mg/dL – 180 mg/dL over a two-week time period) following implementation of a data management protocol.

Clinical question: Does implementation of a data management protocol improve glycemic control for adolescents ages 14-21 years as evidenced by an increase in time spent in therapeutic range based on data received from the CGM ambulatory glucose profile over three months?

MODEL/NURSING THEORY

Iowa Model for evidence-based practice change was utilized in this EBP project

Dorothea Orem's self-care deficit theory provides a conceptual framework

- Adolescents with T1D perform numerous self-care activities to reach and maintain glycemic control but are often overwhelmed resulting in a self-care deficit.

METHODS

Participants: Convenience sample of 14 adolescent patients (ages 14-21 years) seen at the practice during January 2021 who had T1D, used a Dexcom® CGM and participated in either face to face or telemedicine visits.

Setting: Large metropolitan outpatient endocrinology clinic.

Intervention:

Data management protocol including:

- Updated clinic workflow algorithm
- Patient-parent dyad education
 - Educational infographics (Time in Range, Sharing CGM Data, Understanding CGM Data)
 - Audiovisual presentations (Steps to share CGM Data, Understanding CGM Data)
 - Resource linkages (Diabetes resources, EHR, support groups, CGM support, tech support)
- Site staff educated on implementation

Data Collection:

Review of 14-days of CGM data from visits between January 1, 2021– January 31st to establish baseline % time in range

Review of 14-days of CGM data at three-month follow-up appointment noting % TIR

Patient data was collected, de-identified and kept on encrypted, password protected flash drive.

RESULTS

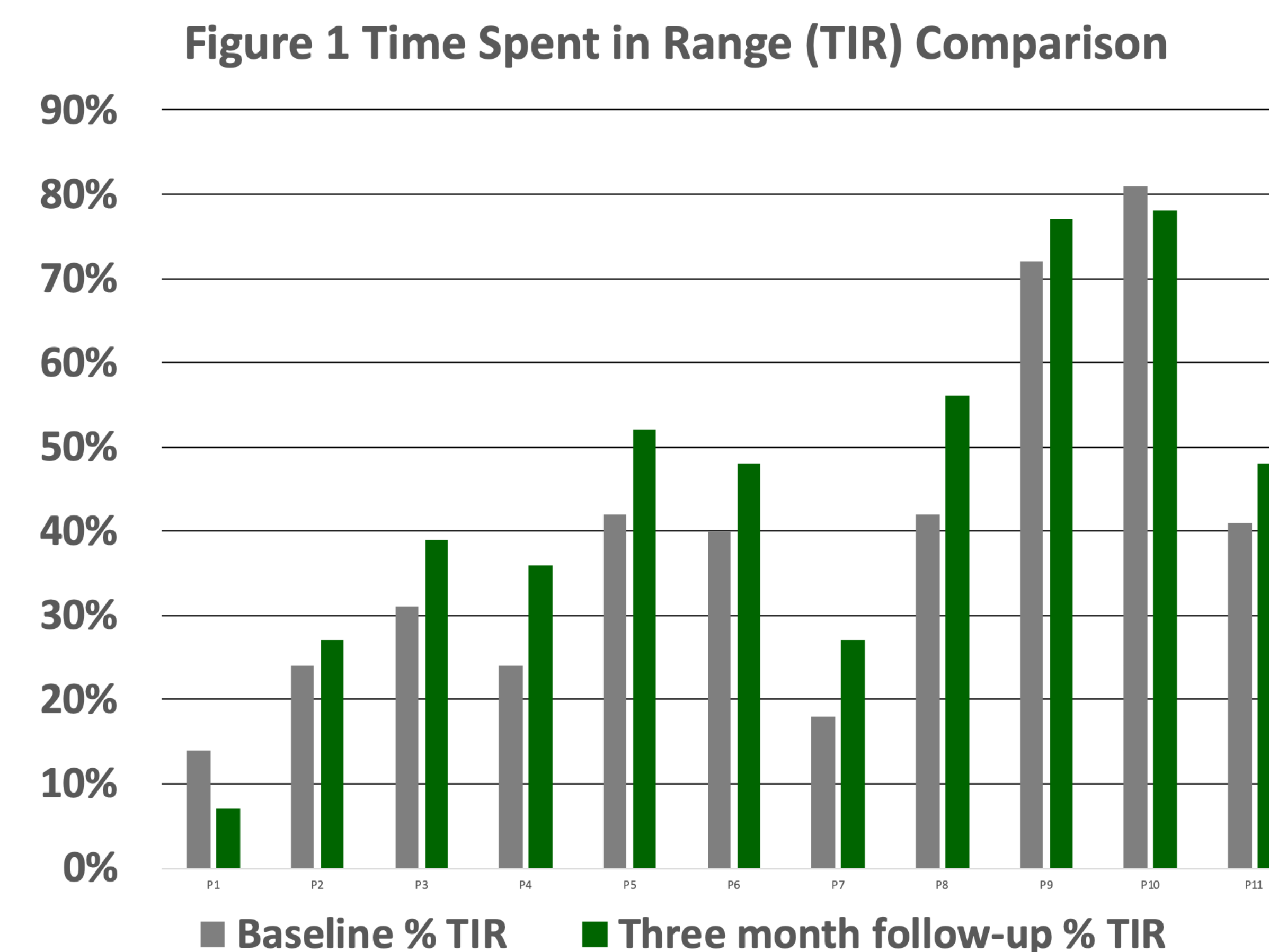
Sample: 14 adolescent patients with 3 lost to follow-up (N = 11)

Table 1 Demographics	
Gender	Female (71%) Male (29%)
Race	White (57%) Black (7%) Hispanic (7%) Not disclosed (29%)
Age	14-16 yrs. (35%) 17-19 yrs. (42%) 20-21 yrs. (21%)
Device(s)	Dexcom G6 (43%) Dexcom G6 + Insulin Pump (57%)

Analysis: The majority of participants increased % TIR

- 82% of participants increased % TIR
- 18% of participants decreased % TIR

Dependent t-test: Increase in the % TIR after the intervention ($M = -6.10$, $SD = 6.35$), $t = 3.212$, $\alpha = 0.05$, $p = 0.0093$, 95% CI for mean -10.366 to -1.834



DISCUSSION

- Improvement in the % TIR was statistically significant ($p = 0.00972$) over a three month period
- Improvement in % TIR ranged from 7%-50%
- Two participants had substantial improvement in TIR (50%)

IMPLICATIONS FOR ADVANCED PRACTICE NURSING

Advance practice nurses can leverage technology to improve glycemic control in adolescent patients with T1D

- Technology provides another means of engagement for patients to take an active role in their care
- Results support the viability of technology interventions to increase % TIR

Limitations: Small sample size limits statistical power and generalizability of the results

SUSTAINABILITY

Recommend:

- Adapt the data management protocol for use with other CGM devices in other patient age groups
- A larger sample size for future projects with participants who utilize other CGM devices
- A more prominent placement for scheduling follow-up visits within the clinic workflow algorithm
- Future projects to explore engagement of participants in utilizing CGM data as real-time feedback
- Future projects to explore how CGM + insulin pump impacts % TIR

REFERENCES



SCAN ME

Appealing to adolescents with Type 1 Diabetes through technology has the potential to improve the percentage of time spent in range.