Type 1 Diabetes: Factors that Affect Youth/Parent Dyads’ Health-Related Quality of Life and Youth Metabolic Control

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• There is no sponsorship/commercial support of this presentation/program.

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• Learners must have signed the attendance roster at registration this morning and will need to complete the on-line evaluation after the conference to successfully complete this program and receive the contact hours certificate.
Background

- Type 1 Diabetes (T1D): 1 in 400 to 600 youth
- 80% of youth do not meet goals for metabolic control (A1c)\(^1\)
- Increased technology has not improved A1c outcomes\(^2\)
Significance

• Results of poor metabolic control (A1c) of T1D include
  • blindness, nephropathy, neuropathy, amputations, and heart disease\(^3\)
• Health-related quality of life (HRQOL)
  – Decreased youth and parent HRQOL can impact and be impacted by youth health outcomes\(^4\)
Purpose

Explore associations between:

• Health-related quality of life of youth and their parents and and metabolic control of youth with T1D.

• Age, gender, ethnicity, socioeconomic status (SES), and use of technology with both HRQOL and the A1c of youth with T1D.
Research Design: Cross-sectional Secondary Analysis

Baseline data of a PCORI funded longitudinal interventional study:

- 210 youth with T1D and their parents.
- Two pediatric diabetes centers in the Midwest (rural and urban)
- Age, gender, ethnicity, SES, technology use.
- HRQOL data of youth/parent dyads
- Metabolic control data of youth (A1c)

Family-Centered Tailoring of Pediatric Diabetes Self-Management Resources (IH-1304-6279)
Research Hypotheses

There will be an association between:

• Treatment complexity and HRQOL/A1c
• Gender, age, ethnicity and SES and HRQOL and A1c
• Youth HRQOL and parent HRQOL
• Youth A1c and Parent HRQOL
• Youth HRQOL and A1c
### Categorical Variables

<table>
<thead>
<tr>
<th>Category</th>
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<tr>
<td>Age:</td>
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<tr>
<td>Predoadolescent</td>
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<tr>
<td>Adolescent</td>
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<td>55.7</td>
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<tr>
<td>Gender:</td>
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<td>50.5</td>
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<tr>
<td>Female</td>
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<td>49.5</td>
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<td>Ethnicity:</td>
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<tr>
<td>Non-white</td>
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<td>Socioeconomic Status (SES)</td>
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<td>Public insurance</td>
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<tr>
<td>Treatment Complexity</td>
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<tr>
<td>Technology use (+/- pump/CGM)</td>
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<td>66.7</td>
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<tr>
<td>No Technology</td>
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<td>33.3</td>
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<td>A1c Control Groups</td>
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<tr>
<td>Within Goal (&lt; 7.5%)</td>
<td>39</td>
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<tr>
<td>Moderate control (7.5-8.5%)</td>
<td>70</td>
<td>33.3</td>
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<tr>
<td>Poor control (&gt; 8.5%)</td>
<td>101</td>
<td>48.1</td>
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Variables/Measurement Tools

- Youth HRQOL: The PedsQL™ Diabetes module\(^5\)
- Parent HRQOL: Family Impact Module of the PedsQL™ \(^6\)
- Metabolic control: A1c test (POC)
- SES: represented by insurance
- Treatment complexity: Use of insulin pump/continuous monitor or syringe and meters
Data Analysis

• Correlations conducted for all youth between independent variables of age, gender, ethnicity, SES and technology and dependent outcome variables HRQOL and A1c (continuous) and A1c Control Group.

• Age then separated into two categories to look at differences between preadolescents and adolescents.
Data Analysis

• Associations between total scores of youth and parent HRQOL and A1c outcomes of youth were tested.

• Regression analysis was completed with all independent variables, now including HRQOL of youth/parent dyads, to test any significance in prediction of outcomes of the dependent variable of A1c.
Findings of the Hypotheses

There were no associations between:

• Treatment complexity, Age, Gender and youth A1c
• Treatment complexity, Age, Gender, SES and youth HRQOL
• Youth A1c and parent HRQOL (total score)
Findings of the Hypotheses (cont’d)

There were associations between:

• Higher A1c of youth and Parent Emotional Functioning, Family functioning subscales.
• Higher Youth HRQOL and lower youth A1c (better).
• Higher Youth A1c and non-white ethnicity
• When Youth A1c reflected poor control (> 8.5%) youth HRQOL was worse (lower).
Findings

- A1c for youth with T1D is predicted in part by the youth’s HRQOL and ethnicity.
- A1c of greater than 8.5% was associated with lower HRQOL of youth with T1D.
Findings for preadolescents

There were no associations between
• Ethnicity and HRQOL of preadolescents
• A1c and parent HRQOL
• HRQOL (total score) and A1c

There were associations between:
• Non-white ethnicity, lower SES and higher A1c
• HRQOL and parent HRQOL (moderate positive)
• Lower HRQOL (subscale only) and higher A1c
Findings of regression analysis

• SES was predictive in part of A1c in preadolescents only when ethnicity was eliminated. All non-white preadolescents were outliers.

• The A1c of preadolescents was associated with Child HRQOL Treatment-II subscale only.

  Child HRQOL Treatment-II subscale
  • It is hard for me to take blood glucose tests.
  • It is hard for me to take insulin shots.
  • It is hard for me to exercise or do sports.
  • It is hard for me to keep track of carbohydrates.
  • It is hard for me to carry a fast-acting carbohydrate.
  • It is hard for me to snack when I go low.
Findings for Adolescents

No associations between:
• SES and adolescent HRQOL or A1c

Associations between:
• Non-white ethnicity, lower HRQOL, and poor metabolic control.
• HRQOL and parent HRQOL (small)
• A1c and parent HRQOL (Subscales only Emotional Functioning and Social Functioning)
• HRQOL and A1c (medium negative)
Findings of regression analysis

Teen HRQOL Treatment-I

• It hurts to get my finger pricked.
• It hurts to get insulin shots.
• I am embarrassed by my diabetes treatment.
• My parents and I argue about my diabetes cares.
• It is hard for me to do everything I need to do to care for my diabetes.

Parent HRQOL Social Functioning

• I feel isolated from others.
• I have trouble getting support from others.
• It is hard to find time for social activities.
• I do not have enough energy for social activities.
Strengths of the study

• Secondary analysis of a PCORI funded study.
• Access to data, analysis tools and research team of the primary study
• Size of the data set exceeded the number indicated by the power analysis.
• HRQOL was gathered from both youth and parents
• Used a diabetes specific tool to collect data from youth
Limitations of the study

• Secondary analysis included measures chosen to answer questions of the primary study
• Cross-sectional design - correlations do not equal causation.
• Limited ethnic diversity in pre-adolescent youth
• Limited age range of youth with T1D
• Study conducted in one state in the Midwest, therefore may not be generalizable.
**Recommendations for Practice**

- A1c > 8.5% is an indicator of decreased HRQOL of youth with T1D.
- Screen youth/parent HRQOL using the subscales that were associated with poor metabolic control.
Recommendations for Research

Test interventions to support:

• social functioning of parents of adolescents with T1D and its impact on adolescent A1c.

• smaller age ranges of youth, 8-10, 11-13, 14-16 to refine the results for different developmental groups.
More research needed to explore

• Why was the quality of life lower for non-white pre-adolescents?
• Why was the metabolic control lower for non-white pre-adolescents?
• What do we need learn from outcome disparities?
Conclusion

• A1c of > 8.5% poor control of T1D based on decreased HRQOL.
• Factors associated with HRQOL and A1c differ by age and interventions should be developmentally based.
• Policy should support advocacy of non-white youth with T1D and research related to ethnic disparity and implicit bias in healthcare.
• Psychosocial health and HRQOL of youth with T1D and their parents must be supported to improve outcomes of care.
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References