Benefits and Barriers of Continuous Glucose Monitoring (CGM) in Children <8 with Type 1 Diabetes (T1D)

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Abstract

Objectives: CGM holds promise to address challenges of T1D management; however, usage rates at this age are low. Little is known about perceptions of CGM use among parents of young children, which could inform intervention approaches to help them manage their child's glycemic expectations and overcome obstacles to starting and sustaining CGM use. Methods: Semi-structured qualitative interviews were conducted with 59 parents of children aged 1-7 years (mean 4.8 ± 2.0 years old) who owned a CGM device for ≥6 months. Transcripts of in-person interviews with 55 current or former CGM users (88% mothers, child age 5.0±1.5y, 87% white, 1% black, 10% other) were coded and analyzed to derive themes about experiences with CGM. Results: Parents described benefits as well as challenges of CGM use. Parents identified worry over extreme glucose excursions; improved parent awareness with overnight CGM use; increased confidence about child's safety with whom they could recognize or express symptoms of hypo- or hyperglycemia; and increased ability of other caregivers to be involved in diabetes care. Challenges included: painful insertions; wearing it 7-12 hours/ day, and that can cause skin damage or allergic reactions; increased daily life; feelings about using management devices; and managing constant flow of diabetes information. Conclusions: CGM may offer more peace of mind and address unique challenges of T1D management in young children (e.g., inability to communicate symptoms of glucose excursions, concerns over night, participation of other caregivers). Yet a variety of challenges affecting children and caregivers may present barriers to initiating or maintaining CGM use. Structured educational and behavioral interventions may equip caregivers with skills to address challenges to CGM use, and ultimately increase uptake and sustained use of CGM at this vulnerable age.

Methods

Participants

• Unique developmental challenges to T1D management in very young children place significant demands on parents.
• Continuous glucose monitoring (CGM) usage rates in young children are relatively low yet increasing.
• 2012: 4% → 2016: 39%* 
• Little is known about parents’ opinions of CGM use, especially in young children. As usage grows, understanding how parents choose to use CGM and factors leading to sustained use could help guide clinical care.
• The aim of this study was to explore parents’ thoughts about and experiences with CGM.

Challenges of CGM Use

• Concerned about painful insertions
• Hard to find space for multiple devices on small children
• Alerts created disruptions
• Frustrated from data gaps due to lost signals
• Skin irritations and adhesions
• Challenges managing constant flow of diabetes related alerts
• Too much information: felt overwhelmed by the amount of information or data were difficult to interpret

Participants were part of a larger study about diabetes management in young children with T1D. Participants included parents of children aged 1-7 years, who were recruited from 4 geographically diverse locations across the United States.

Results

Parent described feelings about CGM use in 2 major themes: benefits and challenges of CGM use.

Benefits of CGM Use

• Felt less worried about their child’s safety
• Allowed parents to sleep more overnight
• Felt more confident about diabetes management
• Helped identify high or low glucose levels in children who cannot recognize or express symptoms
• Allowed other caregivers to be involved in child care
• Allowed caregivers to identify high glucose and hypoglycemia
• Provided feedback to glucose checks, which simplified diabetes management
• Led to more in range glucose levels

Challenging to manage constant flow of diabetes information

Challenging to manage constant flow of diabetes information

Background/Profile

• Unique developmental challenges to T1D management in very young children place significant demands on parents.
• Continuous glucose monitoring (CGM) usage rates in young children are relatively low yet increasing.
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Characteristics of CGM Users

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percent</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td>5.0 ± 1.5</td>
<td></td>
</tr>
<tr>
<td>Parent gender</td>
<td>88%</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity, % white</td>
<td>87%</td>
<td></td>
</tr>
<tr>
<td>Hemoglobin A1c, %</td>
<td>7.9 ± 9%</td>
<td></td>
</tr>
<tr>
<td>Current CGM users</td>
<td>85%</td>
<td></td>
</tr>
</tbody>
</table>

Participants

• Participants were part of a larger study about diabetes management in young children with T1D. Participants included parents of children aged 1-7 years, who were recruited from 4 geographically diverse locations across the United States.
• 79% of children aged 1-7 years. T1D duration ≥5 months, HbA1c <10.5%
• Geographically diverse locations across the United States

Semi-structured interviews assessed:

• Overall diabetes management approach
• Motivations for diabetes related decision making
• Burdens and worries
• Feelings about using management devices
• How diabetes management has impacted daily life
• Parents reported whether they had previously, currently, or never used CGM
• Interviews recorded and transcribed verbatim.

This analysis:

• Subset of 55 interviews with parents who currently or previously or using CGM
• Coded and analyzed for themes related to their experiences with CGM

Background/Purpose

As usage grows, understanding how parents choose to use CGM and factors leading to sustained use could help guide clinical care.

This analysis:

• Subset of 55 interviews with parents who currently or previously or using CGM
• Coded and analyzed for themes related to their experiences with CGM

Less worriedIndex of Perceived Painfulness

It adds that extra sense of security…It definitely helps…you can see what is happening…before we were just hoping everything was ok.

Less worriedIndex of Perceived Painfulness

Allowed for more in range glucose

I feel like I sleep a lot more at night. I remember I fell asleep until I got that…She is in much better control. She is in much better control. She has, in my opinion, better numbers because I can stop a bad high before it gets that bad or I can catch a trend on a day much better than anything I had been doing. She has, in my opinion, better numbers because I can stop a bad high before it gets that bad or I can catch a trend on a day much better than anything I had been doing.

Conclusions

• CGM may offer peace of mind to parents and address unique challenges of T1D management in young children. CGM may help inform parents of rapidly changing glucose trends and offering comfort knowing what their child’s glucose is. CGM may offer peace of mind to parents and address unique challenges of T1D management in young children. CGM may help inform parents of rapidly changing glucose trends and offering comfort knowing what their child’s glucose is.

References

4Miller et al. Continuous Glucose Monitoring (CGM) Use in Type 1 Diabetes: An Update from the T1D Exchange Clinic Resource Center Diabetes, 2016 (1B1452).

Acknowledgements

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*Data from T1D Exchange Clinic Resource Center Diabetes, 2016 (1B1452)