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Assessing Continuous Glucose Monitor Alarm Use By Families Of Children With Diabetes

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Conclusions: The wide variability of alarm settings used by patients indicates likely educational gaps in CGM onboarding and use. Ensuring CGM alarm best practices will help children with diabetes and their caregivers get needed real-time glycemic data while minimizing alarm fatigue.

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Background: Continuous glucose monitors (CGM) offer customizable alarms which alert persons with diabetes and their caregivers of current or pending glycemic changes. However, there has been little work studying real-world CGM alert setting use in large clinical populations. We sought to understand CGM alarm use through report analyses. **Methods:** After IRB approval we analyzed data from two-week CGM reports obtained clinically to determine common settings and compared those to target guidelines. **Results:** CGM download data from 150 children using a Dexcom® G6 were analyzed (median age 14y, (range: 1-19), 89% white, 9.5% black, and 1.5% Asian, 47% female, 51% pump users). Median A1c was 7.8% (range: 5.4-15). Median CGM glucose was 190 (range: 56-374). Average time in range was 47.7% (range: 3.4-99.1). A Low Alarm alert was set for 131 participants (87%) with a median sensor glucose alert threshold of 74 mg/dL (range: 60-100). The High Alarm was used by 109 children (73%) with a median threshold of 272 mg/dL (range: 120-400). The Signal Loss alarm was used by 103 (69%) participants with a median time until notification of 20 min (range: 20-240). Low Repeat and High Repeat alarms were used by only 50 (33%) and 36 (24%) of children, respectively. Rise Rate and Fall Rate alarms were used by 18 (12%) and 34 (23%). There was a significant difference between the median High alarm cutoff of 272 mg/dL and a recommended standard (e.g. PantherProgram.org) of 250 mg/dL ($p=0.0016$). The same was true with the median Low alarm cutoff of 74 mg/dL and a recommended 70 mg/dL ($p<0.0001$). There was significant difference between the median High Repeat notification time of 1 hour and the recommended 2 hours ($p<0.0001$). Pump users were 2.2x more likely to use High Repeat alarms compared to injection users (95% CI: 1.18-4.15, $p<0.01$). The same was true with the Low Repeat alarm being 1.8x more likely to be used by pumpers compared to injection users (95% CI: 1.12-2.99, $p=0.01$). There were no significant differences in Low, High, Rise Rate, Fall Rate, Urgent Low Soon, Urgent Low Soon Repeat, or Signal Loss alarms. When the group was divided based on age, above 12 and ≤ 12 , younger CGM users were 1.2 times more likely to use the Low alarm compared to older users (95% CI: 1.03-1.30). Also, younger CGM users were more likely to use the Rise Rate (RR=3.6, 95% CI: 1.37-9.67), Low Repeat (RR=1.7, 95% CI: 1.09-2.71), Signal Loss (RR=1.3, 95% CI: 1.04-1.60), Urgent Low Soon (RR=1.2, 95% CI: 1.07-1.41), and Urgent Low Soon Repeat (RR=1.2, 95% CI: 1.05-1.38) alarms. There were no significant differences in High, High Repeat, or Fall Rate alarm settings.