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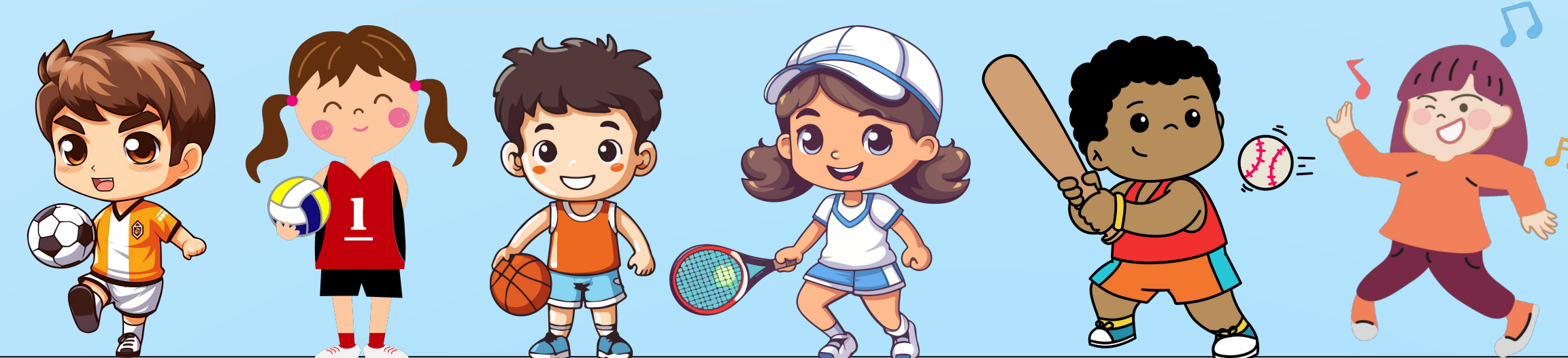
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Enhancing Athletic Participation: Continuous Glucose Monitoring for Pediatric Type 1 Diabetes Athletes

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Introduction

- **Background:** Type 1 diabetes mellitus (T1DM) is a lifelong autoimmune condition requiring exogenous insulin, daily insulin management, and blood glucose monitoring (Kahanovitz et al., 2018). Diagnosis, often in childhood, brings overwhelming challenges for children and parents. While no cure exists, advances in monitoring and insulin delivery enhance blood sugar control and quality of life (Mayo Clinic, 2023)
- **Problem Statement:** It is suspected that children with T1DM develop a fear of hypoglycemia (FOH) that deters exercise. Cockcroft et al. (2023) found that 70% of youth with T1DM do not meet the recommended amount of exercise (Cockcroft et al., 2023). Physical education teachers (PE teachers) and coaches are trained in RICE (rest, ice, compression, elevation) for sprains, CPR and other basic life support, and preventing and treating heat exhaustion, so they may accept being trained to interpret CGM data as well.

Hypothesis

When children and adolescents with T1DM wearing CGM are paired with PE teachers and coaches trained to interpret CGM data and address unsafe blood glucose levels during exercise, their participation in PE classes and after-school sports will increase. This intervention will also lead to fewer exercise-related hypoglycemic events and less FOH compared to their pre-intervention experiences.

Method

- **Pilot Study, Quasi-experimental design**
- **Study Population:** Youth between the ages of 5 and 18 who participate in exercise or sports and are diagnosed with T1DM in Northern California
- **Sample Size:** 30 participants
- **Recruitment:** Convenience sampling = participants will come from endocrinology clinics and summer camps for children with diabetes in the Bay Area
 - Flyers will be posted around the camps and clinics; leveraging digital platforms and support networks for diabetes communities; flyers and digital platforms will have a QR code to complete an eligibility form
- **Independent Variable:** Real-time sharing of CGM data with PE teachers and sports coaches trained to prevent and treat hypoglycemia events connected with exercise.
- **Dependent Variables:** Primary outcome measure = Blood glucose data from CGM immediately before, during, and after exercise. Secondary outcome measures = Hypoglycemic events, FOH levels, and time participating weekly

Procedure

- Study lasts 4 months
- Month 1 = Teacher/Coach training and pre-intervention data collection
- Months 2-4 = Intervention data collection
- Researchers collect baseline data, including age, physical activity level, sports involvement, T1DM duration, blood glucose levels, and FOH assessments
- Intervention group receives CGM devices and training for teachers/coaches, aiming to maintain stable blood glucose levels during activities

Results

- Use descriptive statistics and t-test to compare pre- and post-intervention outcome measures
- Apply Pearson's correlation (r) for quantitative variables at baseline. Correlation value of around 0.7 to 0.8 is strong for this study.
- A Pearson's r of 0.75 suggests a strong positive correlation between real-time data sharing frequency and improved blood glucose stability during physical activities.

Conclusion

This study explores whether training PE teachers and coaches on how to respond safely to real-time CGM data increases the time spent in such structured exercise, reduces hypoglycemia fear, and mitigates any unsafe glucose levels experienced during such exercise or immediately before or after. School nurses and nurse diabetes educators can play a pivotal role in providing the CGM training and ongoing support for the coaches and PE teachers. These nurses are well-positioned to holistically assess each students' response to the CGM monitoring intervention and advocate for care plan changes that help keep them safe, confident, and active.

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