

Improved quality of life metrics after using Real-Time Continuous Glucose Monitoring with remote monitoring in young children with T1D

Burckhardt MA^{1,3}, Roberts A¹, Smith G², Abraham MB^{1,3}, Davis EA¹⁻³, Jones TW¹⁻³

¹ Department of Endocrinology of Diabetes, Princess Margaret Hospital for Children, Perth,

² Children's Diabetes Centre, Telethon Kids Institute, The University of Western Australia, Perth

³ Division of Paediatrics, within the Medical School, The University of Western Australia, Perth

BACKGROUND

- Real-time continuous glucose monitoring (RT CGM) with the added feature of remote monitoring in young children with T1D has recently become available.
- Continuous monitoring of glucose has been shown to improve glycaemic control in the paediatric population. However few trials have studied psychosocial factors as primary outcomes in children, and little is known about patient and caregiver's experience of its use, particularly its impact on FOH and QOL.
- This study explored if the use of RT CGM with remote monitoring can reduce fear of hypoglycaemia and improve quality of life in children with type 1 diabetes and their parents.

METHODS

- 50 RT CGM-naïve children with T1D diagnosed for >1 year, aged 2-12 years along with their parents, participated in a randomized cross-over study.
- They participated in two 3-month periods using conventional blood glucose monitoring (control) or using the Dexcom G5[®] Mobile CGM system and remote monitoring (intervention) in a random order.
- Parents and children (age 8-12 years) completed validated psychosocial questionnaires before and after each 3-month period.
- The primary outcome was parental FOH score assessed by the hypoglycaemia fear survey (HFS). Secondary outcomes included the PedsQL questionnaires, Depression-Anxiety-Stress-Scale (DASS), State and Trait Anxiety and the Pittsburgh Sleep Quality Index (PSQI).

DESIGN

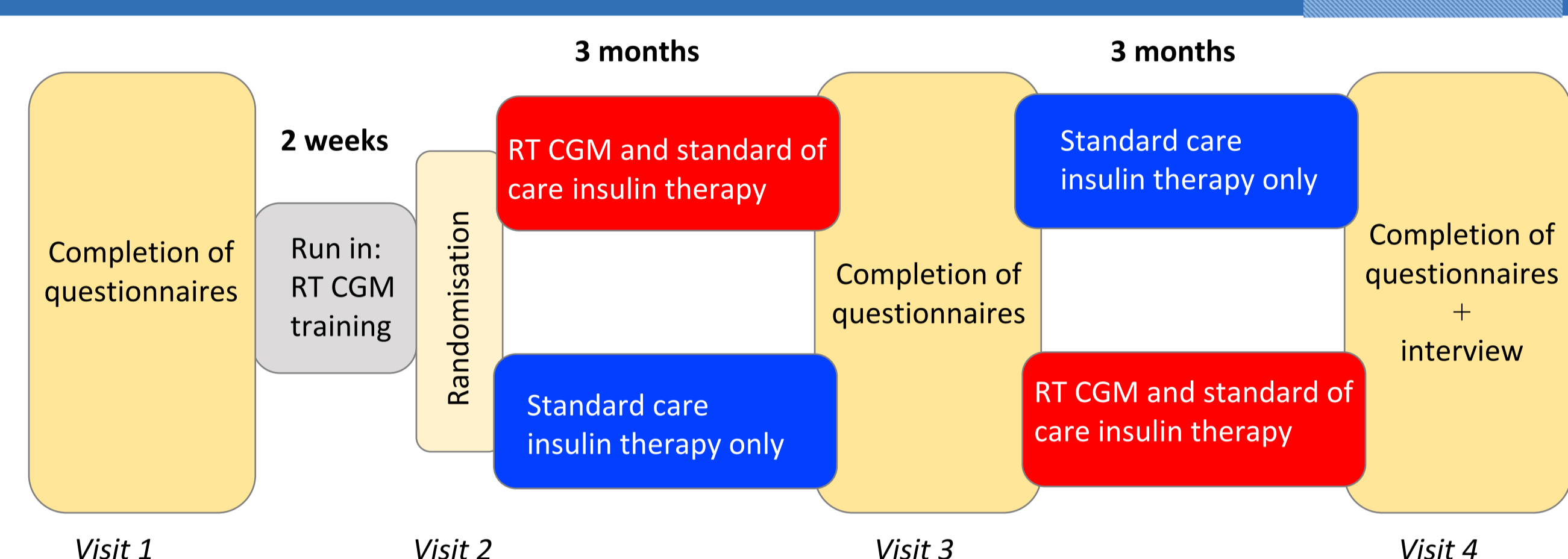


Figure 1: Study design of randomised crossover study.

CONCLUSION

RT CGM and remote monitoring reduces the burden of type 1 diabetes in young children and their families by:

- Reducing fear of hypoglycaemia
- Improving family functioning and parent health-related quality of life
- Improving parental stress, anxiety and sleep
- Reducing the frequency of finger pricks in children

This is the first study that has psychosocial outcomes as primary outcome.

RESULTS

Demographics

Child	
n	50
Age, years (mean ± SD)	9.5 ± 1.9
Duration of diabetes, years (mean ± SD)	4.0 ± 2.5
Female, n (%)	32 (64)
HbA1c (mean ± SD)	7.7 ± 0.7
Insulin pump therapy, n (%)	30 (60)
Insulin dose, U/kg/d	0.75 ± 0.23
BMI z-score	0.41 ± 0.77

Parent	
n	50
Age, years (mean ± SD)	39.3 ± 7.4
Female, n (%)	42 (84)
Marital Status, n (%)	Married 39 (78)
Highest education, n (%)	Year 12 or less 10 (20)
	Certificate/diploma 22 (44)
	Bachelor's degree 18 (36)
Employment, n (%)	full time 12 (24)
	part time 20 (40)
	other 18 (36)

Table 1: Characteristics of the children and their parents taking part in the study.

Glycaemic

	Control	RT CGM	p value
HbA1c, % (mean±SD)	7.8 (± 0.8)	7.8 (± 0.8)	0.368
CGM adherence % (mean±SD)	-	74.8 (± 11.9)	
SMBG, n / 24h	6.2	3.7	< 0.001
n / 10pm-6am	1.4	0.8	< 0.001
Severe hypoglycaemia	0	0	

Table 2: Glycaemic outcomes.

Outcome measures

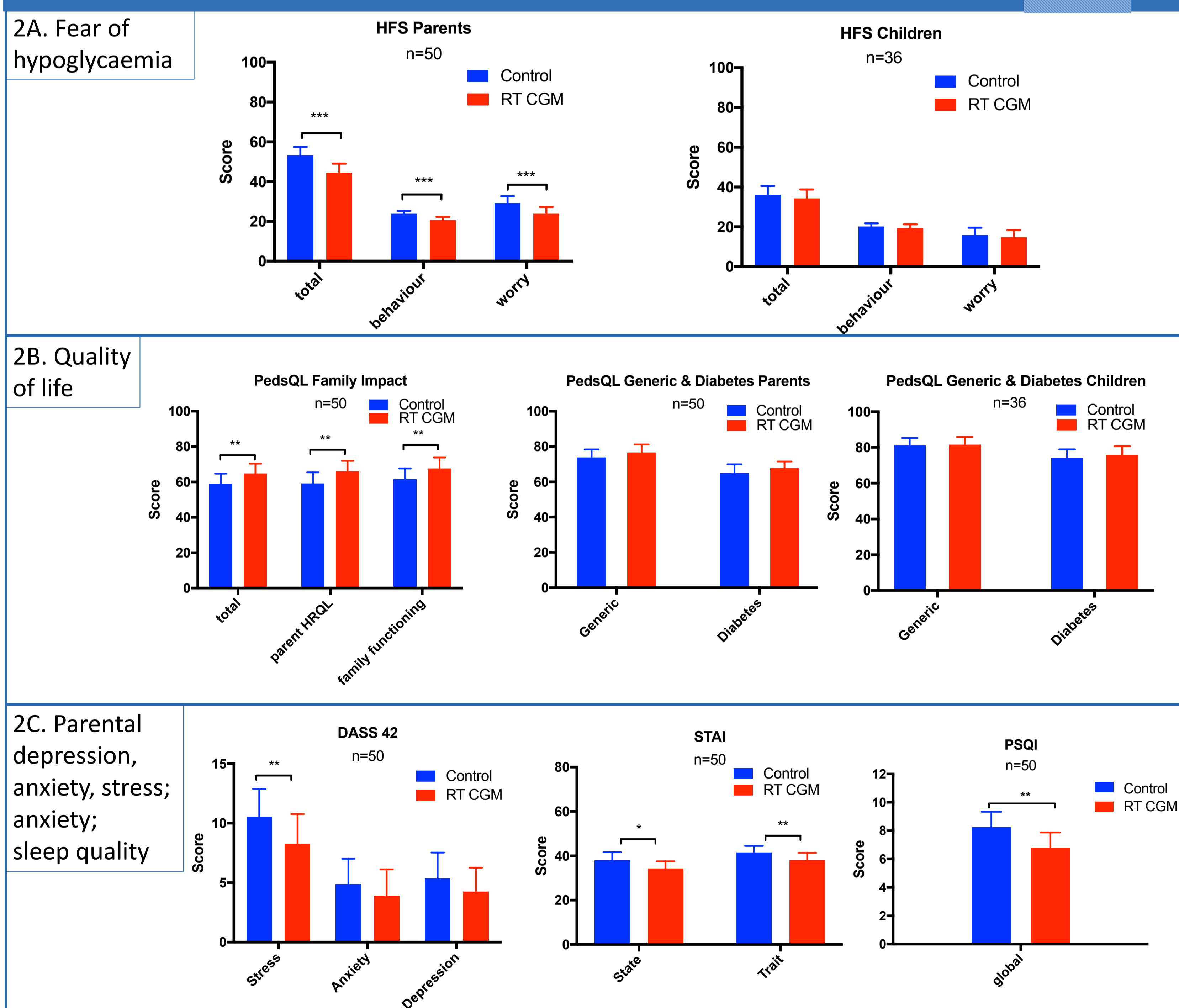


Figure 2:

A: Fear of hypoglycaemia score: total, behaviour and worry. Higher scores = more fear of hypoglycaemia.

B: PedsQL Quality of life: family impact, generic and diabetes. Higher scores indicate better quality of life.

C: Depression, stress, anxiety (DASS), State and trait anxiety (STAI) and Pittsburgh sleep quality index (PSQI) in parents: lower scores indicate less stress, depression, anxiety and better sleep.

*** p < 0.001, ** p < 0.01, * p < 0.05

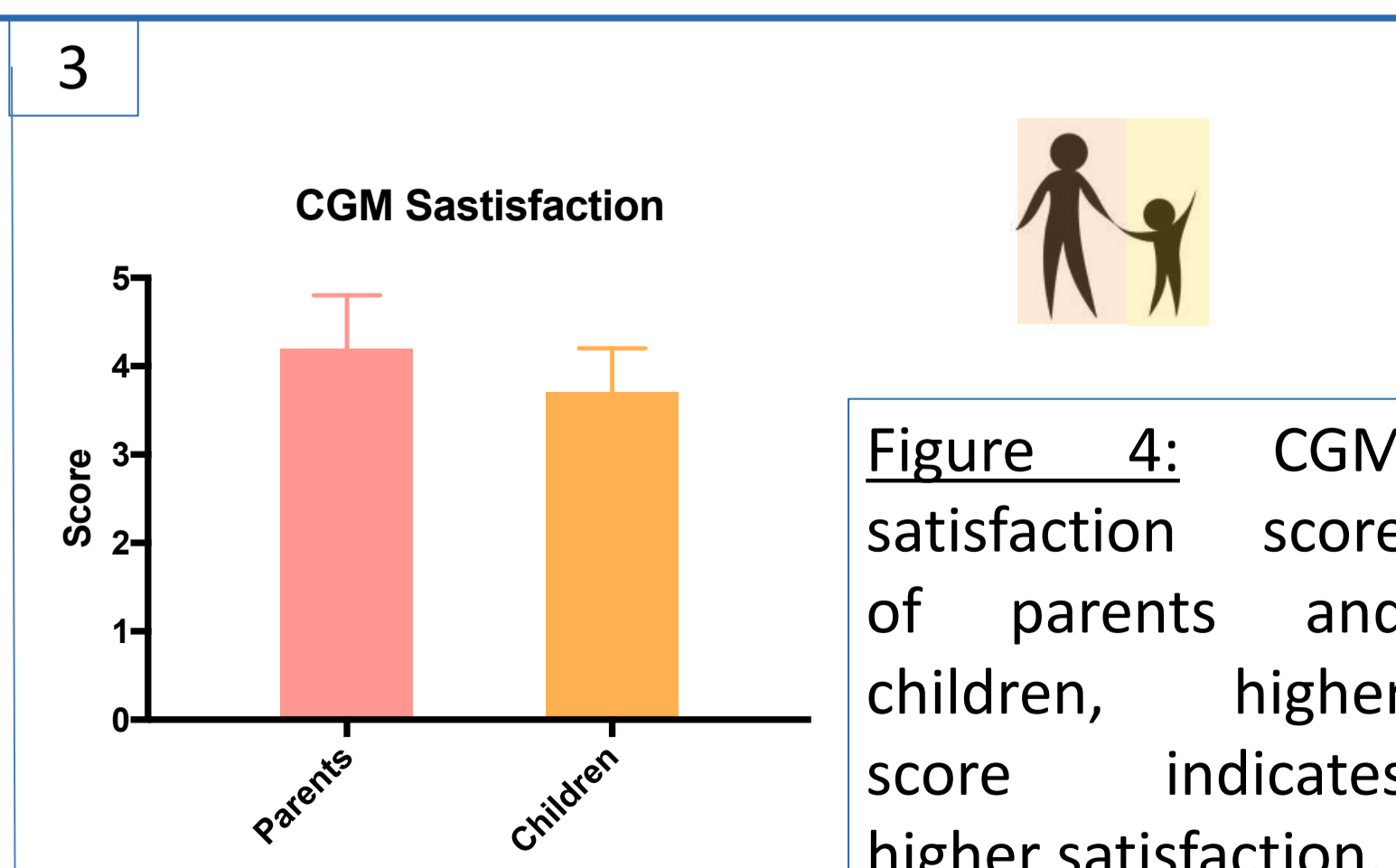


Figure 4: CGM satisfaction score of parents and children, higher score indicates higher satisfaction.