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The impact of sedentary time and breaks in sedentary time on 24 hour hypoglycaemia, euglycaemia and hyperglycaemia in type 2 diabetes.

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Introduction

- The detrimental association of sedentary time with 2-h postprandial glucose and time in hyperglycaemia was previously reported.
- However, research undertaken within a habitual living setting investigating the impact of sedentary time and breaks in sedentary time on 24 hour hypoglycaemia, euglycaemia and hyperglycaemia in Type 2 diabetes is not available.

Aims

- To investigate the associations of objectively measured sedentary time and breaks in sedentary time with 24 h our events and duration of hypoglycaemia, euglycaemia and hyperglycaemia in Type 2 diabetes.

Methods

- A total of 37 participants with Type 2 diabetes managed by diet modifications or metformin ± sulfonylurea ± gliptin (mean age 62.8±10.5 years) participated.
- Participants wore the activPAL3 and CGM (Abbot FreeStyle Libre) for up to 14 days.
- Average total sedentary time and number of breaks in sedentary time per day were calculated.
- Events and time in euglycaemia (3.9-7.8mmol/l), hyperglycaemia (>7.8mmol/l), above target (>9mmol/l) and hypoglycaemia (<3.9mmol/l) per day were computed.
- Linear regression analyses and normalisation method for missing glucose values were used.

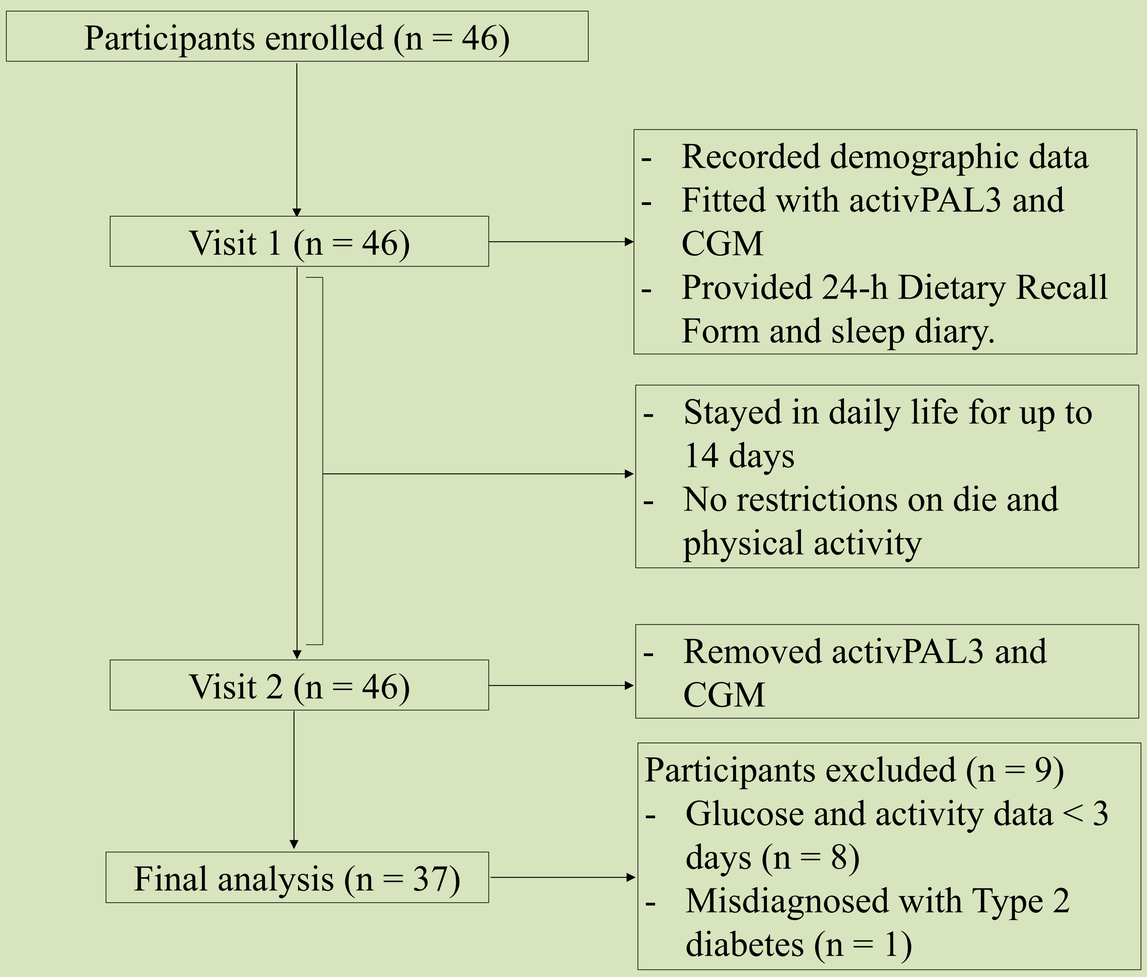

Figure 1. Study protocol.

Results

Table 1. Standardised regression of total sedentary time with glycaemic control measures

Glycaemic control measures	β (95% CI)	*p* value	Adjusted R^2
Time in euglycaemia (% of recording h/day)	-0.44 (-0.1, -0.00)	0.04	0.14
Time in hyperglycaemia (% of recording h/day)	0.36 (-0.01, 0.1)	0.08	0.14
Time above target (% of recording h/day)	0.33 (-0.01, 0.1)	0.11	0.15
Time in hypoglycaemia (% of recording h/day)	0.09 (-0.01, 0.02)	0.68	0.03
Euglycaemic events (*n*/day)	-0.07 (-0.3, 0.2)	0.72	0.05
Hyperglycaemic events (*n*/day)	0.08 (-0.3, 0.4)	0.72	0.05
Events above target (*n*/day)	0.29 (-0.1, 0.5)	0.17	0.12
Hypoglycaemic events (*n*/day)	-0.05 (-0.3, 0.2)	0.81	-0.05
HbA_{1c} (mmol/mol)	0.87 (-0.3, 12.0)	0.06	-0.003
HbA_{1c} (%)	0.89 (-0.02, 1.1)	0.056	-0.02

Adjusted for age, sex, BMI, carbohydrate intake, energy expenditure and medication.

Table 2. Standardised regression of breaks in sedentary time with glycaemic control measures

Glycaemic control measures	β (95% CI)	*p* value	Adjusted R^2
Time in euglycaemia (% of recording h/day)	0.38 (0.00, 0.01)	0.04	0.07
Time in hyperglycaemia (% of recording h/day)	-0.30 (-0.01, 0.001)	0.11	-0.001
Time above target (% of recording h/day)	-0.30 (-0.01, 0.001)	0.11	-0.03
Time in hypoglycaemia (% of recording h/day)	-0.15 (-0.003, 0.001)	0.39	0.02
Euglycaemic events (*n*/day)	-0.12 (-0.04, 0.02)	0.52	-0.09
Hyperglycaemic events (*n*/day)	-0.15 (-0.05, 0.02)	0.39	0.07
Events above target (*n*/day)	-0.25 (-0.06, 0.01)	0.16	0.09
Hypoglycaemic events (*n*/day)	-0.16 (-0.04, 0.02)	0.39	-0.06
HbA_{1c} (mmol/mol)	-0.42 (-0.7, 0.09)	0.13	0.18
HbA_{1c} (%)	-0.38 (-0.06, 0.01)	0.17	0.16

Adjusted for age, sex, energy expenditure, medication and total sedentary time.

Conclusions

- Greater total sedentary time was associated with less time in euglycaemia.
- More breaks in sedentary time were associated with greater time spent in euglycaemia.
- A trend towards the detrimental association of total sedentary time with time in hyperglycaemia and HbA1c was observed.
- A reduction of total sedentary time and frequent break in sedentary time should be recommended for better glycaemic control in people with Type 2 diabetes.

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