ACHIEVING GLYCAEMIC TARGETS IS ASSOCIATED WITH REDUCED DIABETES DISTRESS IN ADULTS WITH TYPE 1 DIABETES USING HYBRID CLOSED LOOP IN THE UK

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Background and aims:

The NHS England hybrid closed loop (HCL) pilot provided access to HCL for adults with type 1 diabetes (T1D), managed with an insulin pump and intermittently scanned continuous glucose monitoring, with a HbA1c ≥8.5% (69 mmol/mol). We assessed whether the achievement of glycaemic targets was associated with reduced diabetes-related distress (DRD) in HCL users at follow-up.

Materials and methods:

Anonymised data were collected via a secure online tool. We performed Chi-square tests to analyse whether there is a significant difference in DRD (defined as two-item diabetes distress score [DDS2] ≥3) between individuals who achieved glycaemic targets [HbA1c <7.5% or <7.0%, time in range (TIR) (3.9–10.0 mmol/L) >70%, time above range (>10.0 mmol/L) <25%, time below range (<3.9 mmol/L) <4%] at follow-up and those who did not meet such targets. Logistic regression analysis was performed to test associations between glucose outcomes and DRD at follow-up.

Figure 1. The proportion of people with diabetes distress (DDS2 ≥3) at baseline and follow-up

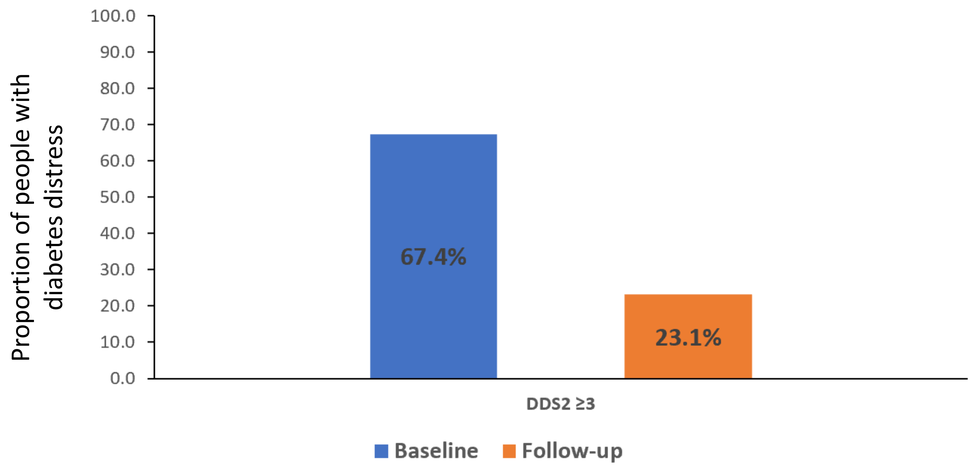

Table 1. The proportion of people with diabetes distress (DDS2 ≥3) across several glycaemic targets

Glycaemic targets	Glycaemic target not achieved	Glycaemic target achieved	p
HbA1c <7.5% (58 mmol/mol), % (n)	24.9 (62/249)	11.8 (11/93)	0.009
HbA1c <7.0% (53 mmol/mol), % (n)	22.7 (70/309)	9.1 (3/33)	0.07
Time in range (3.9–10.0 mmol/L) >70%, % (n)	24.0 (65/271)	12.6 (11/87)	0.02
Time above range (>10.0 mmol/L) <25%, % (n)	22.6 (67/297)	15.8 (9/57)	0.25
Time below range (<3.9 mmol/L) <4%, % (n)	31.4 (11/35)	20.5 (66/322)	0.006
Coefficient of variation ≤36%, % (n)	24.3 (35/144)	18.1 (35/193)	0.005

Results:

- Over a median follow-up of 12 months (IQR 8-28), 420 HCL users, across 30 diabetes centres in the UK, with ≥6-month follow-up data were included.
- Baseline characteristics: 68% female; 87% White; median age 40 [IQR 29-50] years, diabetes duration 21 years (IQR 15–29), baseline HbA1c 9.4 ± 0.9% (79 ± 10 mmol/mol).
- HbA1c decreased by a mean adjusted 1.4% (16 mmol/mol) (95% CI -1.5, -1.3; P < 0.001) and TIR increased by 26.7% (95% CI 25.0, 28.3; P < 0.001).
- The proportion of individuals with DRD reduced from 67.4% at baseline to 23.1% at follow-up (P < 0.001) (*Figure 1*).
- The proportion of people with DRD across several glycaemic targets is shown in *Table 1*.
- In univariate logistic regression analysis:
  - HbA1c was positively associated with DRD (OR 1.29; [95% CI 1.02, 1.62]; P = 0.035).
  - TIR was negatively associated with DRD (OR 0.96; [95% CI 0.95, 0.98]; P <0.001).
  - There was no correlation between time below range (<3.9 mmol/L) and DRD (P = 0.26).
  - Higher glycaemic variability, expressed as percentage coefficient of variation, was associated with higher DRD (OR 1.06; [95% CI 1.01, 1.1]; P = 0.01).

Conclusion:

Achieving glycaemic targets with HCL therapy in adults with T1D is associated with lower levels of diabetes distress. Further research is needed to understand the drivers of DRD in HCL users.

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