

Physical activity and exercise in T2D: Evidence supports clinical utility in routine care



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“Most of my patients with T2D are overweight and the majority of them say they can’t or won’t increase the amount of exercise they do. Even if they did, I don’t suppose it would improve their glycaemic control greatly.” Have you heard views like this from fellow healthcare professionals? Are you

someone who is very pessimistic about the benefits of physical activity (PA) in people with diabetes? Avery et al (summarised alongside) present some evidence to consider.

In a systematic review and meta-analysis, Avery and colleagues looked at 17 RCTs that comprised 1975 adults with T2D who increased their levels of PA and exercise. The authors defined PA as regular movement such as walking, and defined exercise as structured activities such as running or cycling. The subjects in the intervention groups, when compared with standard care, showed statistically significant increases in objective and self-reported PA and exercise, with concomitant significant improvements in HbA_{1c} (weighted mean difference [WMD] -0.32%; 95% confidence interval [CI], -0.44% to -0.21%) and BMI (WMD -1.05 Kg; 95% CI, -1.31 to -0.8).

The intervention features that were associated with significant improvements in HbA_{1c} included: underpinning interventions with behaviour change theory/models (although no one model appeared to hold benefit over the others); utilising 10 or more behaviour change techniques (a median of 10 techniques were used in each RCT [ranging from minimum of two to a maximum of 14 techniques]); and Intervention duration of 6 months or more.

Five of the papers included in the analysis contained a statement about the training of the individuals who delivered the intervention, but only two papers provided information on the mode of delivery, content, and utilisation of strategies for monitoring and improving the delivery of training. The authors stated that professional training is a crucial component of behavioural interventions because it improves treatment fidelity and enhances reproducibility in routine practice. Both the mode of delivery of the interventions and the provider training have a significant impact on the cost of delivering the intervention and the likelihood of implementation in routine care.

This systematic review and meta-analysis presents encouraging results that go a good way to counter scepticism about the utility of targeted PA and exercise in diabetes care. Further research is needed to understand how the interventions described by Avery and colleagues can be optimised and implemented into routine diabetes care.

DIABETES AND METABOLISM

DPP-4 inhibitors versus OADs for T2D

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 In a cohort of elderly people (aged ≥65 years; *n*=1188) whose T2D was not optimally controlled with metformin alone, the authors compared dipeptidyl peptidase-4 (DPP-4) inhibitors (*n*=971) with conventional oral antidiabetes drugs (COADs; *n*=257).

2 Hypoglycaemic episode incidence and efficacy were assessed after 6 months’ follow-up.

3 At 6 months, significantly more people reported at least one hypoglycaemic

episode in the COAD group compared with the DPP-4 inhibitor group (20.1% versus 6.4%, respectively; *P*<0.001). Severe events were rare in both groups but significantly more frequent with COADs versus DPP-4 inhibitors (2.4% versus 0.1%; respectively; *P*=0.001).

4 Significantly more people on DPP-4 inhibitors than on COADs reached target 53 mmol/mol (7%) HbA_{1c} without hypoglycaemia at 6 months (59.7% versus 45.5%, respectively; *P*<0.001).

5 The authors concluded that both treatments resulted in satisfactory glycaemic control but COADs were associated with three times more hypoglycaemic episodes than DPP-4 inhibitors.

Penforis A, Bourdel-Marchasson I, Quere S et al (2012) Real-life comparison of DPP4-inhibitors with conventional oral antidiabetics as add-on therapy to metformin in elderly patients with type 2 diabetes: The HYPOCRAS study. *Diabetes Metab* 38: 550–7

DIABETES CARE

Targeted “free-living” physical activity and exercise in T2D

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓✓

1 The authors investigated the effect of behavioural interventions (compared with usual care) on “free-living” physical activity (PA) and exercise, HbA_{1c} and BMI in adults with T2D in clinical or community healthcare settings.

2 Electronic database searches and manual reference searching yielded a total of 17 RCTs of behavioural interventions targeting “free-living” PA and exercise with a minimum of 1 month of follow-up in a combined total sample of 1975 adults.

3 Levels of self-reported PA and exercise significantly increased with the use of behavioural interventions compared with usual care (standardised mean difference [SMD], 0.45; 95% confidence interval [CI], 0.21–0.68).

4 The use of behavioural techniques (compared with usual care) was associated with significant improvements in HbA_{1c} (weighted mean difference [WMD], -0.32%; 95% CI, -0.44% to -0.21%) and BMI (WMD, -1.05 kg/m²; 95% CI, -1.31 to -0.80).

5 The RCTs used a combined total of 25 intervention techniques (a minimum of two and a maximum of 14 techniques were used in the studies). The effectiveness of interventions was moderated by intervention features and by the use of at least 10 techniques.

6 It was concluded that there is significant clinical utility in behavioural interventions targeting increased PA and exercise in clinical and community care settings.

Avery L, Flynn D, van Versch A et al (2012) Changing physical activity behavior in type 2 diabetes: A systematic review and meta-analysis of behavioral interventions. *Diabetes Care* 35: 2681–9

“The risk of urinary tract infections (UTIs) in T2D increased with age (>60 years), a recent history of UTI, previous T2D diagnosis, and poorer levels of diabetes control.”

DIABETES CARE

Validity of medication adherence self-reports in T2D

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

- The authors assessed the validity of six self-reported measures of medication adherence in 170 people with T2D, and how this was affected by depression in a subgroup of people with baseline-diagnosed depression.
- All self-report measures of medication adherence were significantly

associated with lower HbA_{1c} ($r=-0.18$ to -0.28 ; $P<0.03$) and, in the subsample of people with depression, significantly associated with Medication Event Monitoring System-measured adherence ($r=0.35$ to 0.55 ; $P\leq 0.001$).

3 The relationship between three of the six self-reports and HbA_{1c} was significantly moderated by depression, but at high levels of depression this relationship became insignificant.

4 The authors concluded that the results support the validity of easily administered self-reports for diabetes medication adherence.

Gonzalez JS, Schneider HE, Wexler DJ et al (2012) The validity of medication adherence self-reports in adults with type 2 diabetes. *Diabetes Care* 30 Nov [Epub ahead of print]

DIABETES COMPLICATIONS

UTI incidence in T2D

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

- The authors quantified the incidence of urinary tract infections (UTIs) in adults with T2D identified from the General Practice Research Database ($n=135\,920$), and an age- and sex-matched control sample without T2D, over 1 year.
- The incidence of UTIs was higher for people with T2D than for those

without T2D (46.9 cases per 1000 person-years; 95% confidence interval [CI], 45.8–48.1 versus 29.9 cases per 1000 person-years; 95% CI, 28.9–30.8).

3 Compared with controls, the relative risk of UTI in all people with T2D was 1.53 (95% CI, 1.46–1.59) and 2.08 (95% CI 1.93–2.24) for newly diagnosed T2D.

4 The risk of UTI in T2D increased with age (>60 years), a recent history of UTIs, previous T2D diagnosis and poorer levels of diabetes control.

Hirji I, Guo Z, Andersson SW et al (2012) Incidence of urinary tract infection among patients with type 2 diabetes in the UK General Practice Research Database (GPRD). *J Diabetes Complications* Nov 26: 513–6

DIABETES CARE

Age-specific barrier assessment in the elderly with diabetes

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

- In adults with type 1 or 2 diabetes ($n=100$) the authors compared the effect on HbA_{1c} and other outcome measures of strategies targeting identified barriers to self-care (intervention arm; $n=70$) versus usual care plus attention over the phone (control arm; $n=30$).
- The intervention arm were randomised 2-to-1 to receive either regular between-clinic phone calls

about diabetes management or home visits for 6 months. This was followed by a 6-month “no-contact” period. The control arm received the same amount of attention over the phone, but did not discuss diabetes-related advice.

3 At 1 year, people in the intervention arm had significantly lower HbA_{1c} ($P<0.03$), and additional benefits in scores of self-care, gait and balance, and endurance compared with controls. Both groups showed improvement in diabetes-related distress.

4 The authors concluded that the study results highlight the importance of age-specific barrier assessment in managing elderly people with diabetes.

Munshi MN, Segal AR, Suh E et al (2012) assessment of barriers to improve diabetes management in older adults: A randomized controlled study. *Diabetes Care* 27 Nov [Epub ahead of print]

DIABETES, OBESITY AND METABOLISM

Adjustable gastric bypass surgery and T2D remission

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 The authors investigated the effect of adjustable gastric band (AGB) surgery on remission of long-standing T2D.

2 Cases ($n=89$; 29 males and 60 females) had T2D ≥ 2 years, were aged ≥ 18 years and had a BMI of ≥ 35 kg/m². Age- and BMI-matched controls received intensive medical therapy.

3 At the end of follow-up (median 105 weeks), T2D resolution was defined as HbA_{1c} < 48 mmol/mol (6.5%) and not taking glucose-control medication.

4 Compared with controls, cases had a longer duration of T2D (99 ± 53 versus 80 ± 59 months, respectively; $P<0.05$) and lower HbA_{1c} ($P<0.05$).

5 At follow-up, cases had lost significantly more weight than controls (16.8 ± 13.5 kg versus 1.7 ± 8.9 kg; $P<0.001$). HbA_{1c} decreased significantly by 0.6–0.8% for both groups ($P<0.001$) with no between-group differences. BMI and weight decreased in cases but remained unchanged in controls ($P<0.001$ for time-by-group interaction).

6 Diabetes resolution occurred in 14 cases (16%) and two controls (2.2%; $P<0.01$). In cases, diabetes resolution was associated with fewer medications ($P=0.003$), lower baseline and follow-up HbA_{1c} ($P=0.006$), and greater weight loss ($P=0.002$).

7 The authors concluded that there is a need for further randomised studies of the effect of AGB surgery in people with long-standing T2D. They also advised earlier operation in people with T2D considered for AGB surgery.

Keogh JB, Turner KM, McDonald F et al (2012) Remission of diabetes in patients with long-standing type 2 diabetes following placement of adjustable gastric band: a retrospective case control study. *Diabetes Obes Metab* 8 Nov [Epub ahead of print]