



## How does self-care affect diabetic foot outcomes?

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Diabetic foot complications can be very devastating and demanding upon health and social care resources. With the epidemic trend of diabetes, these problems will only increase unless we can become more effective at prevention. I have chosen to highlight four papers, three of which I wish to comment upon. Two of these focus upon patient education and the third on pre-surgical glycaemic control.

One of the greatest weapons we have to fight the war against the devastating army of progressive diabetic foot complications is education. It is something that we all know is essential, but the evidence for successful outcomes is poor. As a clinician and educator, I have my own views about this and some recent papers have now given some very helpful insight.

Natovich and her colleagues in Israel (summarised alongside) looked at the cognitive function of a group of patients with diabetic foot ulcers who were matched by age and sex with a control group without ulcers. The groups were well matched for diabetes type and duration. The investigators examined six cognitive domains: memory, executive function, reaction time, attention, psychomotor abilities (using both a series of computerised and paper-and-pencil tests) and, from these, estimated premorbid cognition values. All values were adjusted for age and education levels. Their results showed that individuals in the diabetic foot group were cognitively impaired, whereas the control showed no cognitive impairment. The results persisted after multivariate analysis for depression and smoking. This gives a clear message as to why current methods of health education appear to have limited success. We need to be mindful of this regarding self-care advice and management goals.

On the same theme, a randomised controlled pilot study by McBride and colleagues investigated whether increased patient shared decision-making ("Decision Navigation") increased decision self-efficacy and foot-treatment adherence in patients with a diabetic foot ulcer. Thirty patients received

Decision Navigation sessions and 26 received usual care as the control group. Primary outcomes included decision self-efficacy, adherence to foot treatment as reported by the participant, and adherence to foot treatment as reported by the clinician. Secondary outcomes included foot ulcer healing rate, health-related quality of life, decision conflict and decision regret. This study found no impact upon primary or secondary outcomes in either group. This is perhaps more understandable given the outcome of the Natovich study.

The final paper to mention is a study by Nayak and Kirketerp-Møller, which will be of interest to those in secondary care. Undertaken in Denmark, it aimed to establish if a high perioperative random blood glucose (RBG) concentration among patients with diabetes with non-traumatic lower-extremity amputation (LEA) is associated with poor post-operative outcomes (re-amputation and mortality) within 3 months. This was a retrospective study over 12 months, reviewing records to gather preoperative and 3-month postoperative surgical, medical and physiological data. Three preoperative RBG readings were taken (before meals), and the values were tested and calibrated by the Department of Clinical Biochemistry.

The median preoperative RBG level was 8.6 mmol/L (range, 4.6–18.7 mmol/L), with tertile (T) ranges as follows: T1, 4.0–7.0 mmol/L; T2, 7.1–11.0 mmol/L; and T3, >11.0 mmol/L. Mortality and re-amputation within 3 months were recorded as 27% and 16%, respectively. In the T3 group, the age-adjusted hazard ratio for re-amputation was 0.77 (95% confidence interval [CI], 0.16–3.62) compared with the Q1 group, and for mortality it was 1.90 (95% CI, 0.50–7.22). Although this study was retrospective with a relatively small sample size of 81 patients, it does show that a high perioperative RBG level does not have a negative effect upon outcome. Thus, valuable time and resources can be saved trying to optimise RBG in elective diabetic LEAs, although, of course, normoglycaemia should be striven for. ■

## Diabetes Care

### Cognitive abilities and self-treatment

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓✓✓

**1** The presence of a diabetic foot ulcer (DFU) increases the self-treatment burden on an individual. It also increases the cognitive demands needed for adherence to medical advice.

**2** In a case-control study, individuals with T2D with DFUs (case group;  $n=99$ ) and without DFUs (control group;  $n=95$ ) were matched for sex and diabetes duration. Extensive cognitive assessment was performed for each participant by a neuropsychologist.

**3** With respect to pre-morbid cognitive abilities, no differences were found between the two groups. However, the DFU group had significantly lower cognitive scores than the control group ( $P=0.001$ ) in all indices of current cognitive function. These differences persisted after adjusting for confounding factors.

**4** The findings demonstrate that people with DFUs face more self-treatment challenges than individuals with T2D without this complication, while possessing significantly fewer cognitive resources.

**5** The ability to draw conclusions about causality is limited owing to the design of the study.

**6** The authors recommend that clinicians screen the cognitive status of individuals regularly and take their cognitive abilities into account when planning treatment and follow-up.

Natovich R, Kushnir T, Harman-Boehm et al (2016) Cognitive dysfunction: part and parcel of the diabetic foot. *Diabetes Care* **39**: 1202–7

\*Neil Baker is guest commentator for this issue.

**Diabet Med**

**Increasing patient involvement in the DF pathway**

Readability ✓✓✓  
 Applicability to practice ✓✓  
 WOW! Factor ✓✓✓

- 1 Recovery from a diabetic foot ulcer (DFU) is largely dependent on foot self-care and treatment adherence.
- 2 This randomised controlled pilot study tested whether the use of an intervention to help shared decision-making between healthcare professional and patient (“Decision Navigation”) increased decision self-efficacy and foot-treatment adherence in people with a diabetic foot ulcer.
- 3 Participants, who did not display the usual healing rates for a DFU, were randomised to receive the Decision Navigation intervention with standard care (*n*=30) or standard care only (*n*=26). Outcome measurements were taken at 12 weeks after the first appointment after recruitment.
- 4 Although participants rated Decision Navigation as helpful, statistical analysis revealed no differences in decisional confidence or adherence to foot treatment between the intervention and control groups.
- 5 UK national guidance recommends increased patient involvement in treatment care pathways in this population. These results, however, suggest that an intervention aimed at helping shared decision-making is not likely to have an impact on patient foot behaviours at this progressed stage in the disease trajectory.
- 6 As decisional confidence in the participants was extremely high at baseline, the authors suggest that this population may benefit more from interventions focused on building motivation to engage with treatment care pathways in the first instance.

McBride E, Hacking B, O’Carroll et al (2016) Increasing patient involvement in the diabetic foot pathway: a pilot randomized controlled trial. *Diabet Med* **33**: 1483–92

**Dan Med J**

**Pre-operative blood glucose and LEA prognosis**

Readability ✓✓  
 Applicability to practice ✓✓  
 WOW! Factor ✓✓✓

- 1 Previous studies have associated hyperglycaemia and dysregulated diabetes with an increased incidence of surgical and non-surgical complications, and an increase in mortality.
- 2 For this retrospective cohort study, 81 individuals with diabetes were identified who had undergone non-traumatic lower-extremity amputation (LEA) over a 2-year period.
- 3 Medical records were reviewed and data collected for three random blood glucose (RBG) values that were collected preoperatively (before breakfast, lunch and dinner).
- 4 In this cohort, the median RBG value was 8.6 mmol/L with tertile (T) ranges as follows: T1, 4.0–7.0 mmol/L; T2, 7.1–11.0 mmol/L; T3, >11 mmol/L. At 3-month follow-up following surgery, 22 individuals (27%) had died and 13 (16%) had undergone re-amputation.
- 5 For T3, the age-adjusted hazard ratio (HR) for re-amputation was 0.77 (95% confidence interval [CI], 0.16–3.62) compared with T1, and for mortality it was 1.90 (95% CI, 0.50–7.22). These results were not statistically significant.
- 6 The data did not support previous findings that high preoperative RBG levels among patients with diabetes with non-traumatic LEA can predict increased mortality or re-amputation rates.
- 7 The authors conclude that the evidence behind routine control of preoperative RBG level remains ambiguous.

Nayak RK, Kirketerp-Møller K (2016) Preoperative blood glucose and prognosis in diabetic patients undergoing lower extremity amputation. *Dan Med J* **63**: A5216

**Foot Ankle Int**

**Safety and efficacy of offloading devices for neuropathic DFUs**

Readability ✓✓✓✓  
 Applicability to practice ✓✓✓  
 WOW! Factor ✓✓

- 1 As part of an integrated approach, offloading is the main therapy for diabetic foot (DF) plantar ulceration. Despite its efficacy, the total contact cast (TCC) is often underused owing to its technical limitations and poor wearer acceptance.
- 2 In this prospective observational study, 60 outpatients with diabetes and a persistent forefoot plantar ulcer larger than 1 cm<sup>2</sup> were followed.
- 3 Following the same initial treatment, the participants were randomised to three different offloading modalities: TCC (group A); an irremovable walking boot irremovable (group B); and a removable walking boot (RWD; group C).
- 4 After application of their device, participants underwent weekly follow-up for 90 days or until complete healing of the lesion. Ulcer survival, healing time and ulcer size reduction (USR) were recorded, and the number of adverse events was recorded.
- 5 In group A, 19 individuals (95%) achieved complete healing, compared to 18 (90%) in group B and 16 (80%) in group C. There was no significant difference between the groups in healing time (*P*=0.5579) or ulcer survival (*P*=0.8270).
- 6 There was significant USR in all three groups (*P*<0.01), without significant difference between the groups. Patient satisfaction was significantly higher in group C than the other groups (*P*<0.05).
- 7 The authors conclude that the RWD is as effective and safe as TCC, while providing the benefit of removability.

Piaggiesi A et al (2016) Comparison of removable and irremovable walking boot to total contact casting in offloading the neuropathic diabetic foot ulceration. *Foot Ankle Int* **37**: 855–61

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