

Real-world evaluation of the DESMOND type 2 diabetes education and self-management programme

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Abstract

Diabetes education and self-management programmes are associated with improved biomedical, psychosocial and behavioural outcomes according to a number of randomised controlled trials (RCT) and systematic reviews. Observational studies are necessary to determine whether delivery of this education translates to improved outcomes in the real world. In 2008, the results of an RCT evaluating Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND) in a multi-ethnic population were published confirming the benefits of participating in this programme with sustained improvements at three years along with confirmed cost-effectiveness. DESMOND has therefore been recommended by NICE as a robust and validated national diabetes structured education programme.

DESMOND courses have been offered by the Leicester City, Leicestershire and Rutland (LLR) clinical commissioning groups for people newly diagnosed or with pre-existing type 2 diabetes since 2008, and we reviewed the outcomes of participants who attended a course between January 2014 and March 2015. During this period, 1678 (53%) participants attended one of 244 courses in LLR compared with 5.3% attending any validated structured education programme nationally. Notably, there was a statistically significant reduction in HbA_{1c} of 0.96% at six months and 0.70% at 12 months (both $p < 0.005$). Qualitative evaluation from surveys completed by 302/1678 (18%) respondents immediately after attending DESMOND found that the programme was well received by participants who noted improvements in their ability to self-manage diabetes.

This 15-month evaluation of DESMOND confirms the benefits of attending the programme in the real world. Copyright © 2018 John Wiley & Sons.

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Key words

diabetes education; self-management; DESMOND

Introduction

Biomedical, psychosocial and behavioural outcomes are improved when people with diabetes are empowered and skilled to self-manage their condition.¹ Robust diabetes self-management education (DSME) programmes should be developed using the Medical Research Council framework for complex interventions² and comprise an evidence-based structured curriculum which is delivered by trained educators and is regularly assessed and audited. National and international guidelines recommend that all people who are newly diagnosed with diabetes should be offered DSME with regular refresher courses either face-to-face or online thereafter.^{3,4} DSME is considered a vital component of optimal diabetes care along with glucose-lowering medication and psychological support. Despite its importance, national UK diabetes audits have demonstrated

that referral to programmes varies in different clinical commissioning groups (CCGs) and uptake by patients is low; for example in the UK National Diabetes Audit of 2014–15 for England and Wales, 78% were offered self-management education but there was only a 5.3% uptake.⁵

The Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND) programme has been recommended by the National Institute for Health and Care Excellence (NICE) as a validated education programme for people with type 2 diabetes in the UK since 2008. The programme consists of a 6-hour face-to-face education session delivered by two trained educators over one day or two half-days to a group of 8–12 people with newly-diagnosed or ongoing type 2 diabetes. The initial improvements in biomedical, lifestyle and psychosocial outcomes observed at 12 months in

| Variable (n=1678) | Value (% population) |
|------------------------|----------------------|
| Age (years) | 59.5 |
| Sex (% male) | 895 (53.3%) |
| White or other | 1207 (72%) |
| South Asian | 471 (28%) |
| HbA _{1c} (%)* | 8.0 |
| *n=1642 | |

Table 1. Baseline characteristics of participants attending DESMOND courses between January 2014 and March 2015

the DESMOND cluster randomised controlled trial (RCT)⁶ were maintained at three years with continuing improvement in positive health beliefs and smoking cessation.⁷ Health economic analysis of DESMOND has also confirmed that the programme was highly cost-effective.⁸ DESMOND has been delivered by the Leicester City, Leicestershire and Rutland (LLR) CCGs since 2008.

We present the results of data collected from participants who attended DESMOND courses in LLR between 2014 and 2015 and compare the results with the national diabetes audit findings from the same period.

Methods and statistical analysis

The DESMOND coordinating office is based at Leicester Diabetes Centre, Leicester, UK. Every patient referred by primary or secondary care physicians or nurses for DESMOND education must have had their HbA_{1c} recorded on the form in order for that referral to be considered. Data were then entered into the database at the coordinating office and the patients were contacted to book a place on the next available course convenient for the patient. Diabetes nurses in primary and secondary care were provided with DESMOND resources and materials to give to patients, and were trained in how to communicate this message effectively. The venues for delivery of DESMOND were GP surgeries, local churches, community centres and the Leicester Diabetes Centre. Information on DESMOND courses was also available in other languages including Gujarati, Punjabi and

| Time | Mean HbA _{1c} (SD) | Mean HbA _{1c} difference from baseline |
|--|-----------------------------|---|
| Baseline HbA _{1c} n=1642 (97.9%) | 8.06% (64mmol/mol) (1.93) | – |
| HbA _{1c} at 6 months n=969 (57.7%) | 7.09% (54mmol/mol) (1.30) | 0.96%* |
| HbA _{1c} at 12 months n=1161 (69.2%) | 7.19% (55mmol/mol) (1.39) | 0.70%* |
| *p<0.005 | | |

Table 2. Change in HbA_{1c} at 6 and 12 months

Bengali. Some courses were also culturally adapted for delivery to South Asian ethnic populations using translated materials and culturally-specific food models. An external translator supported the two educators and sessions were therefore delivered over two days. Course bookings were made by DESMOND coordinators with the necessary language skills for each community.

Data collection related to time points (baseline, 6 and 12 months) were obtained by DESMOND coordinators who contacted GP surgeries for HbA_{1c} results before the baseline visit (± 2 weeks), 6 months (± 2 weeks), and up to 12 months (± 2 weeks) after DESMOND course attendance. A survey was also conducted to obtain participants' views on attending the course and other aspects pertaining to its accessibility, delivery and content. All participants in the group were invited to complete the optional survey immediately on completion of the education session, with help to complete the questions provided by educators, and the information was collected anonymously with only the date and venue being recorded.

Data analysis was conducted using SPSS version 22. All data were given as means and standard deviations, and paired student's t-test was used to compare between means with statistical significance assumed when $p < 0.05$.

Results

In the 15-month period beginning January 2014 to end of March 2015, 3109 patients with type 2 diabetes were referred of whom 1678 (53%) attended at 244 education courses across LLR. The

baseline characteristics of the participants are shown in Table 1. The mean age of participants was 59.5 years with an almost equal ratio of men to women. The 2011 census reported that South Asian people make up 28.3% of the overall population of Leicestershire and in this study they accounted for 28% of attendances during this period. Mean baseline HbA_{1c} was 8.0% (64mmol/mol). At 6 and 12 months after education, there were 0.96% and 0.70% reductions in HbA_{1c}, respectively. (Table 2.)

The programme was qualitatively evaluated between April and June 2014 with participants being asked a number of questions regarding their experience of attending DESMOND; these are shown in Table 3. Of the overall number of DESMOND participants during this period, 302/1678 (18%) completed the survey immediately after completing the course. Notably, 97% of the respondents were able to access the programme easily, 96% were able to express freely how they felt about diabetes, and 99% reported being clear about the messages being given and identifying the skills/knowledge necessary to help them manage their diabetes. The only low-scoring domain (45%) related to the ability of the respondent to recognise depression or mental upset and be provided with support and information to take the next steps.

Feedback on the course was generally positive with the following statements from participants:

'Really useful day. Thought provoking and will definitely lead to changes so that I better manage my diabetes.'

| | Yes | No | Unsure | Not relevant | Total |
|--|--------------|-------------|------------|--------------|-------|
| I was able to get to the DESMOND programme easily | 293 (97.01%) | 5 (1.65%) | 4 (1.32%) | 0 (0%) | 302 |
| I was given an opportunity to share my feelings about my diabetes | 294 (98%) | 2 (0.66%) | 2 (0.66%) | 2 (0.66%) | 300 |
| I was able to freely express how I feel about my diabetes | 288 (96.32%) | 6 (2%) | 4 (1.33%) | 1 (0.33%) | 299 |
| I felt I was able to keep up with all the information that was given | 291 (96.35%) | 1 (0.33%) | 10 (3.31%) | 0 (0%) | 302 |
| I was clear about the key messages that were given | 298 (99%) | 0 (0%) | 3 (0.99%) | 0 (0%) | 301 |
| I was able to identify what skills/knowledge I need to help me manage my diabetes | 299 (99%) | 1 (0.33%) | 2 (0.66%) | 0 (0%) | 302 |
| I felt able to discuss any difficulties that I have with my diabetes | 282 (94%) | 8 (2.66%) | 7 (2.33%) | 3 (1%) | 300 |
| I was given information about my personal risk of developing diabetes-related complications | 272 (91.89%) | 8 (2.70%) | 13 (4.39%) | 3 (1.01%) | 296 |
| I have completed a personal Health Profile that lists the details of my blood pressure, HbA _{1c} , blood sugar level, cholesterol etc | 286 (95.01%) | 12 (3.98%) | 1 (0.33%) | 2 (0.66%) | 301 |
| I recognised that I was depressed/upset and was provided with support/information to help me take the next steps to deal with that | 128 (44.59%) | 46 (16.02%) | 11 (3.83%) | 102 (35.54%) | 287 |
| I was provided with time to discuss my personal action plan | 265 (89.22%) | 10 (3.36%) | 5 (1.68%) | 17 (5.72%) | 297 |
| The group has encouraged me to feel more able to achieve my new goal(s) | 276 (91.69%) | 6 (1.99%) | 11 (3.65%) | 8 (2.65%) | 301 |

Table 3. Participant evaluation of DESMOND programme (302/1678 respondents)

I had a really interesting and informative time. I learned a lot about type 2 diabetes. The staff were clear and very helpful. DESMOND has made it more clear and less stressful about type 2 diabetes. Thanks.'

'The course benefited me and I am more aware now of the danger of not doing anything about my diabetes. I would recommend the course – it's very educational.'

'Fantastic delivery; very relaxed; group exercises informative; not blinded by science which was great; very well planned out and thoughtful day. Thanks.'

'The DESMOND programme was made enjoyable by the relaxed way it was presented. It was put over with no jargon but in a way that made it understandable to all who attended. I shall take away from DESMOND information and be aware of better managing my diabetes.'

Other views expressed were:

'I would have liked to see/discuss Asian cuisine during the course as I believe Asian food is much more common than before.'

'Informative. Good to revisit to refocus. Little bit long.'

Discussion

This real-world evaluation of the DESMOND education programme delivered by the LLR CCGs demonstrates good uptake by patients to an established self-management programme when compared with national figures. The UK National Diabetes Audit 2014–15 for England and Wales reported that, even though 78% of patients with type 2 diabetes were offered self-management education, only 5.3% attended the session.⁵ In LLR CCGs at this time, uptake was 53% and may have reflected greater awareness of local health care professionals of the need for self-management education and encouragement of patients to attend local courses following exposure to the original RCT for DESMOND conducted locally.⁶ Furthermore, the availability of recruitment materials in a diverse range of South Asian languages and training of health care professionals to invite patients to attend may have increased local uptake. Positive feedback from patients who had previously attended the course can also increase the

motivation to refer further patients within the same service, especially as DESMOND is a NICE approved structured education programme. The National Diabetes Audit for 2015–16 showed that, while 90% of people with type 2 diabetes are offered structured education within two years of diagnosis, the number attending is still less than 10% although there is some suggestion that this is associated with incomplete records of attendance.⁹

In the DESMOND RCT, at 12 months, HbA_{1c} was reduced by 1.49% which was not statistically significant ($p=0.052$), whereas there was a significant reduction in weight of 2.98kg ($p=0.027$), smoking cessation ($p=0.033$), positive change in illness beliefs ($p<0.001$), and reduced depression score ($p=0.032$).⁶ This real-world study demonstrates that statistically-significant ($p<0.005$) HbA_{1c} reductions are achievable at 6 months and 12 months in people with newly-diagnosed or ongoing type 2 diabetes, although not of the magnitude observed in the RCT. However, the baseline HbA_{1c} was lower in the

real world, reflecting opportunistic screening leading to earlier identification of type 2 diabetes. Unfortunately, data were not collected on the duration of diabetes in DESMOND participants throughout this time period. The observed reduction in the HbA_{1c} indicates that DESMOND is likely to be cost-effective in the real world. Another strength of the programme is the quality assurance process of educators who deliver the intervention. One limitation is that HbA_{1c} data were available in only ~60% of participants at 6 months and ~70% of participants at 12 months. These missing data reflect the fact that either HbA_{1c} values were not recorded by the GP or that not all patients attended for follow-up blood tests at their GP surgery, but the reasons for non-attendance have not been recorded and need further exploration.

Generally, qualitative evaluation indicates that the DESMOND programme was well received by participants who felt empowered and upskilled to manage their diabetes more effectively. Since it has been estimated that a person with diabetes only spends 3 hours per year with their health care professional and the rest of the time in managing their own condition, the need for the patient to have adequate knowledge, skills and confidence in diabetes self-management cannot be underestimated. It is difficult to make meaningful conclusions from the low-scoring survey domain on self-recognition of depression/upset and provision of support as the question did not differentiate between symptoms and feelings and access to support. Symptoms of depression are persistent in people with type 2 diabetes, especially in younger people, women and those with a history of major depression.¹⁰ Reduction in self-care, medication adherence and glycaemic control as well as risk of complications are all associated with lack of psychological well-being, including depression.^{11,12} Access to psychological support is therefore a key determinant of outcomes, but a recent Diabetes UK survey found that only 24% of people with diabetes had been offered emotional or psychological support when required.¹³ A limitation of this present review is that insufficient data on other biomedical, lifestyle and

Key points

- DESMOND is a NICE approved programme for type 2 diabetes (T2DM) and our real-world audit shows that clinically significant reductions in HbA_{1c} can be achieved 6 and 12 months after attending the programme, with overall participant satisfaction
- Diabetes education and self-management programmes are an essential component of optimal diabetes care, but UK national audits show that local attendance is <10% despite being offered to >70% of people with diabetes. In this real-world evaluation of DESMOND we have shown that local uptake by people with T2DM can be increased to 53% by training health care professionals to advocate benefits of attending an education programme
- Qualitative evaluation of the DESMOND programme has identified that it is generally well-received by participants, although it highlighted the need for greater understanding of psychological issues affecting people with T2DM and signposting to available forms of support

psychosocial outcomes are available. It is essential that information on these outcomes is collected in future as a further means of assessing impact. Cost-effectiveness in the real world also needs further evaluation. It has been previously estimated that, over five years, approximately 0.5% of the annual NHS expenditure of £7 billion on managing diabetes complications is needed to provide self-management education.¹⁴

Further long-term evaluation is also necessary to determine the impact of DESMOND on cardiovascular outcomes and mortality in the real world, especially in conjunction with newer glucose-lowering agents such as GLP-1 receptor agonists and SGLT2 inhibitors associated with improved cardiovascular outcomes, although this would require very large multi-centre studies powered to identify an independent effect of structured education.^{15–17} Further refresher sessions and online or mobile phone support in addition to DESMOND face-to-face programmes may help to maintain positive outcomes. The impact of DESMOND education on ethnic minority groups needs to be evaluated and community champions can help to raise awareness and uptake of programmes.

The numbers of people diagnosed with type 2 diabetes in the UK continue to rise steadily and unremittingly; a key goal therefore for all stakeholders is to maximise the uptake and attendance of people with diabetes to validated self-management education programmes in order to improve outcomes.

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Mrs Stribling is National Director of the DESMOND programme.

Prof Azhar Farooqi has no conflicts of interest to declare.

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References

References are available online at www.practicaldiabetes.com.

References

1. Chatterjee S, et al. Diabetes structured self-management education programmes: a narrative review and current innovations. *Lancet Diabetes Endocrinol* Sep 29 2017. doi: 10.1016/S2213-8587(17)30239-5.
2. Craig P, et al. Developing and evaluating complex interventions: the new Medical Research Council guidance. *BMJ* 2008;337:a1655.
3. NICE. Type 2 diabetes in adults: management. NICE, 2015.
4. Powers MA, et al. Diabetes self-management education and support in type 2 diabetes: A joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. *Clin Diabetes* 2016;34(2):70–80.
5. HSCIC. National Diabetes Audit – 2013–2014 and 2014–2015: Report 1, Care Processes and Treatment Targets. HSCIC, 2016.
6. Davies MJ, et al. Effectiveness of the diabetes education and self management for ongoing and newly diagnosed (DESMOND) programme for people with newly diagnosed type 2 diabetes: cluster randomised controlled trial. *BMJ (Clin Res Ed)* 2008;336(7642):491–5.
7. Khunti K, et al. Effectiveness of a diabetes education and self management programme (DESMOND) for people with newly diagnosed type 2 diabetes mellitus: three year follow-up of a cluster randomised controlled trial in primary care. *BMJ (Clin Res Ed)* 2012;344:e2333.
8. Gillett M, et al. Delivering the diabetes education and self management for ongoing and newly diagnosed (DESMOND) programme for people with newly diagnosed type 2 diabetes: cost effectiveness analysis. *BMJ (Clin Res Ed)* 2010;341:c4093.
9. NHS Digital. National Diabetes Audit 2015–16. Report 1: Care processes and treatment targets. London: NHS Digital, 2017.
10. Whitworth SR, et al. Depression symptoms are persistent in type 2 diabetes: risk factors and outcomes of 5-year depression trajectories using latent class growth analysis. *Diabet Med* 2017;34(8):1108–15.
11. Martinez K, et al. Diabetes distress, illness perceptions and glycaemic control in adults with type 2 diabetes. *Psychol Health Med* doi: 10.1080/13548506.2017.1339892. Epub 2017 Jun 14.
12. Ogbera A, Adeyemi-Doro A. Emotional distress is associated with poor self care in type 2 diabetes mellitus. *J Diabetes* 2011;3(4):348–52.
13. Diabetes UK. Position statement: Emotional and psychological support for people with diabetes. London: Diabetes UK, 2016.
14. Hex N, et al. Estimating the current and future costs of type 1 and type 2 diabetes in the UK, including direct health costs and indirect societal and productivity costs. *Diabet Med* 2012;29(7):855–62.
15. Marso SP, et al. Semaglutide and cardiovascular outcomes in patients with type 2 diabetes. *N Engl J Med* 2016;376(9):891–2.
16. Marso SP, et al. Liraglutide and cardiovascular outcomes in type 2 diabetes. *N Engl J Med* 2016;375(4):311–22.
17. Zinman B, et al. Empagliflozin, cardiovascular outcomes, and mortality in type 2 diabetes. *N Engl J Med* 2015;373(22):2117–28.