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RESEARCH ARTICLE

Participants' experiences of attending a structured education course (DAFNEplus) informed by behavioural science

Julia Lawton¹  | Paul M. Chadwick² | Nicole de Zoysa³ | Stephanie Stanton-Fay²  |
Simon R. Heller^{4,5}  | David Rankin¹  | on behalf of the DAFNEplus Study Group

¹Usher Institute, Medical School, University of Edinburgh, Edinburgh, UK

²UCL Centre for Behaviour Change, University College London, London, UK

³Diabetes Centre, King's College Hospital, London, UK

⁴Department of Diabetes and Endocrinology, Sheffield Teaching Hospitals NHS FT, Sheffield, UK

⁵Department of Oncology and Metabolism, The University of Sheffield, Sheffield, UK

Correspondence

Julia Lawton, Usher Institute, Medical School, University of Edinburgh, Edinburgh, UK.
Email: j.lawton@ed.ac.uk

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Abstract

Aims: As part of a broader process evaluation, we explored participants' experiences of, and engagement with, the DAFNEplus programme's group-based structured education course. This course, which was informed by behavioural science, provided participants with education and instruction to use flexible intensive insulin therapy (FIIT) together with techniques to identify and address unhelpful cognitive and emotional influences on their type 1 diabetes self-management.

Methods: We interviewed $n = 28$ DAFNEplus participants. Data were analysed thematically and took account of previous work exploring individuals' experiences of standard DAFNE courses.

Results: As well as benefitting from the DAFNEplus course's skills-based training and educational curriculum, participants' accounts suggested they had experienced cognitive and emotional changes that had positively influenced their confidence and motivation to adopt and sustain the use of FIIT. These benefits were most keenly felt by those who reported negative emotional states and mindsets pre-course which had made their diabetes self-management challenging. Participants' cognitive and emotional changes were enabled through techniques used during the course to normalise setbacks and imperfect diabetes self-management, capitalise upon group synergies and encourage the use of social support, including from healthcare professionals. Participants also highlighted motivational gains arising from being reassured that diabetes complications are not common or inevitable if a FIIT regimen is followed.

Conclusions: Our findings suggest that offering training in FIIT, in conjunction with behaviour change techniques that target unhelpful mindsets and emotional resilience, may be more effective in promoting diabetes self-management than offering education and skills training alone.

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KEYWORDS

behaviour change, qualitative research, self-management, structured education, type 1 diabetes, user experience

1 | INTRODUCTION

Structured education courses for people with diabetes, such as the five-day Dose Adjustment for Normal Eating (DAFNE) program, have been widely adopted across the UK and elsewhere. Using experiential, group-based formats, DAFNE and other structured education programmes have been shown to be more efficacious in promoting learning than didactic approaches.^{1,2} However, while graduates of DAFNE and similar education programmes experience initial improvements in HbA1c, these are not typically sustained after 6–12 months.^{3,4} A programme of research was undertaken to help understand this glycaemic drift. Findings from this and related studies,^{1,5–14} together with inputs from behaviour change^{15–17} and technology experts^{18–21} led to the development of the DAFNEplus program. This programme includes: (a) a revised 5-day course curriculum (delivered 1 day a week over 5 weeks) informed by clinical and health psychology theories and which has specific behaviour change techniques embedded throughout, (b) structured individual follow-up support which reinforces and tailors course content and (c) enhanced information technology (Glucollector) to promote empowerment and support self-management.^{15,16,22} A key feature of the DAFNEplus programme is the emphasis placed on helping participants identify, and make, realistic and sustainable behaviour changes to support the use of flexible intensive insulin therapy (FIIT) rather than focusing on glucose outcomes. This is achieved in part by providing participants with the tools and support to identify and modify unhelpful cognitive and emotional influences on their diabetes self-management.

A cluster randomised controlled trial is comparing the effects of DAFNEplus to standard DAFNE on HbA1c and diabetes-specific quality-of-life.²² In line with MRC guidance^{23,24} an embedded mixed-methods process evaluation was undertaken to determine whether the DAFNEplus intervention worked as intended (i.e., in line with DAFNEplus' programme theory)¹⁷ and inform decision-making about its rollout in 'real-world' settings. As part of this mixed-methods evaluation, we conducted interviews with participants randomized to the DAFNEplus intervention. In this article, we report interview findings pertaining to participants' experiences of the revised DAFNEplus course, wherein we pay particular attention to the impact and influence of DAFNEplus' novel components on

What's new?

- The DAFNEplus programme incorporates techniques from behavioural science to promote sustained improvements in diabetes self-management.
- As part of a broader process evaluation, we explored participants' experiences of, and engagement with, the DAFNEplus group-based course, with particular attention paid to its novel components.
- Course attendance appeared to promote cognitive and emotional changes that positively influenced participants' confidence and motivation to undertake type 1 diabetes self-management.
- Our findings suggest that offering education and skills training in conjunction with behaviour change techniques is likely to be more effective in supporting diabetes self-management than offering education and skills training alone.

participants' mindsets, emotional states and subsequent self-management behaviours so that our work aligned with the programme theory.¹⁷ Participants' engagement with the individual support and Glucollector technology will be reported separately. Further information about the revised course and its intended effects (i.e., mechanisms of impact) are provided below (Table 1).

2 | METHODS

2.1 | Overview

We initially employed a longitudinal design in which we interviewed participants randomized to the DAFNEplus intervention at four time points: 1–2 weeks before their course, within a week of completing their course and three and 12 months later. In March 2020, trial recruitment was suspended due to the SARS-CoV-2 pandemic; however, existing trial recruits were able to complete the 12-month intervention remotely. This meant that we were able to complete longitudinal interviews with individuals who were already taking part in the qualitative

TABLE 1 The revised DAFNE_{plus} course.

While the DAFNE_{plus} course curriculum retained many of the educational components contained within the standard DAFNE curriculum (e.g., modules on carbohydrate counting, insulin dose adjustment and managing hypoglycaemia), it was subject to substantial revisions, in line with DAFNE_{plus}' programme theory.¹⁷ Throughout, a variety of techniques were used to help increase participants' confidence, autonomy and sense of empowerment to use FIIT within their everyday lives. Specifically, the participants were:

- Praised for their achievements (however small) to enhance confidence and motivation.
- Encouraged to develop realistic expectations and goals that took account of broader life commitments, to help promote achievable and sustainable behaviour changes.
- Encouraged to: focus on enablers rather than barriers to behaviour change; be curious about results of experimentation with diabetes self-management rather than avoid experimentation due to fear of failure; be self-compassionate; and, view challenges to self-management as learning opportunities rather than signs of failure.
- Supported to see lapses as a normal part of the process of changing any behaviour, to mitigate the risk of setbacks and resultant neglect of key self-management practices.

To achieve the above: (1) Facilitators were trained to use non-judgmental, person-centred and solution-focused communication. (2) Updated action planning and individual review (IR) sessions were employed to help participants try out new, clinically relevant behaviours within a supportive, non-judgmental environment. In the IRs, emphasis was placed on reviewing participants' behaviours/plans (rather than their blood glucose and other data) and considering what went well rather than focusing only on challenges. (3) Novel components were introduced and existing course modules adapted using principles from cognitive-behavioural long-term conditions self-management programmes, to support participants in overcoming emotional and cognitive barriers to diabetes self-management. Novel/heavily adapted modules included:

1. **Emotional influences and well-being** which equipped participants with skills to identify negative emotional states that may interfere with diabetes self-management by helping them to understand and address thinking patterns (e.g., catastrophizing, all-or-nothing, perfectionism) which may lead to hopelessness, anger, guilt and/or avoidance of situations where they feel at risk of failure.
2. **Lapse/relapse management and maintenance plans** where participants were provided with information on relapse prevention to help them sustain behaviour change and address barriers to applying FIIT. Participants were supported to develop action plans which identified actions/behaviours they could use to help address diabetes management setbacks (e.g. 'rainy day plans') or to help counter unhelpful thoughts (e.g. 'cheerleader' statements).
3. **Social Support – who's there for you?** that provided participants with information about the role of social support, and psychosocial education in how to identify and access better types of support from individuals, including family, friends, course attendees and healthcare professionals.
4. **Monitoring long-term health** that provided up-to-date information on the relatively low risk of developing serious diabetes complications if a FIIT regimen is followed, to help reduce negative cognitive and emotional states (e.g., catastrophic thinking around complications) which might drive avoidant behaviours and burnout. A key aim was to promote proactive screening behaviours (e.g., attending annual checks/screening appointments) and early intervention.

research. However, to ensure the qualitative process evaluation was completed in the event that trial recruitment did not restart, we moved to a cross-sectional design, wherein we interviewed additional individuals already taking part in the trial (but not in the longitudinal qualitative study) at 12 months only. (It was not possible to include these individuals in longitudinal interviews as, by the time we secured the necessary approvals (e.g., from the funder), they were already close to completing the trial.) Cross-sectional interviews covered the same areas as longitudinal interviews. Research ethics (18/SW/0100) and governance approvals were obtained as part of the main trial.

2.2 | Recruitment

Participants opted-in to the qualitative research when they were consented to the trial by trial staff. Purposive sampling was used to attain a diverse sample with respect

to age, gender, socio-economic status and diabetes duration. We recruited participants from five sites delivering DAFNE_{plus} to allow for the possibility that site-specific factors might affect course delivery/receipt.²⁵ Recruitment continued until data saturation was achieved; that is, until the point where no new findings or themes were identified in new data collected.

2.3 | Data collection

Interviews were informed by topic guides developed in light of earlier qualitative work with DAFNE graduates,^{1,5-13} work undertaken during the trial's pilot phase²⁵ and input from individuals involved in developing the programme theory and revised programme/course curriculum. This was done to help ensure the areas explored captured data and insights needed to establish whether the DAFNE_{plus} intervention worked as intended, i.e., in line with the programme theory.¹⁷ To do this, pre-course

interviews (or 12-month cross-sectional interviews) explored participants' self-management practices and associated cognitive and emotional influences before attending DAFNE_{plus}; this included exploration of how they had managed challenges and setbacks to their diabetes management pre-course. In their post-course (or 12-month cross-sectional) interviews, participants were asked to offer their general reflections on the course, together with more detailed reflections on new/revised content. Participants were also encouraged to consider (any) ways in which their thoughts and feelings about, and approaches to managing, their diabetes had changed as a result of course attendance. As well as being asked questions which were informed by the programme theory, participants were given opportunities to raise and discuss issues they considered salient, including those unforeseen at the study outset. This latter approach is recommended in process evaluations to allow for the possibility that intervention receipt may give rise to unintended consequences (positive and negative), which also need to be captured and explored to inform decision-making about intervention rollout post-trial.^{23,24}

Further information about relevant areas explored in the interviews is provided in Table 2. All interviews (typically lasting 1–2 h) were conducted by DR by telephone between January 2019 and March 2021. These were audio-recorded and transcribed in full by a professional transcription agency who signed a confidentiality agreement.

2.4 | Data analysis

Data were analysed by two highly experienced postdoctoral qualitative researchers (JL and DR). All interviews were read through repeatedly (data immersion) and then cross-compared to identify cross-cutting themes. Both deductive and inductive²⁶ approaches were used to allow us to: (a) establish whether, how, and why, participants experienced changes to their mindsets, emotional resilience and diabetes self-management practices, in line with the programme's objectives and underlying theory;¹⁷ and, (b) determine whether any (positive/negative) unanticipated consequences arose from intervention receipt. We also paid attention to whether there were any differences in participant experience according to the site/course attended in line with recommendations for evaluating complex interventions.^{23,24} To maximise rigour and minimise the risk of bias, both researchers undertook separate analyses of all interviews and wrote separate analytical reports before meeting to discuss their interpretations and reach agreement on a coding frame that captured key themes; these themes were found to be the same for cross-sectional

and longitudinal interviews. As there was minimal disagreement between the two researchers, there was no need for third-party arbitration. Nvivo software was then used to support data coding and retrieval and coded datasets were subject to further analyses to allow more nuanced interpretations to be developed. Our final analysis also took account of work reporting participants' experiences of attending standard DAFNE courses^{1,12,27} to enable the identification of findings/benefits specific to attending a DAFNE_{plus} course.

3 | RESULTS

Of 29 individuals approached, 28 took part in the interviews. The final sample comprised seven participants interviewed at four time points and 21 interviewed at 12 months only. All participants used a multiple daily injection regimen; for further information about the sample, see Table 3. For additional quotations, see Table 4. To safeguard confidentiality, unique respondent identifiers are used below.

In keeping with qualitative evaluations of existing DAFNE programmes,^{1,12,27} participants described coming out of their DAFNE_{plus} courses with better knowledge, skills (e.g., how to count carbohydrates accurately) and understanding (e.g., of different insulin profiles and actions) to support diabetes self-management (Table 4). As these benefits are well established,^{1,12,27} our reporting focuses on participants' experiences of, and engagement with, the adapted and novel features of the DAFNE_{plus} course.

3.1 | Participants' mindsets and emotional resilience pre-course

All participants reported struggling to keep glucose within clinically recommended targets pre-course due to having inadequate knowledge, understanding and skills to undertake effective diabetes self-management (Table 4). However, the ways in which they felt about, and dealt with, these kinds of difficulties varied with participants broadly falling into three overlapping groups, with the majority sitting in Groups 1 or 3 and those in Group 2 also tending to belong to Groups 1 or 3. Below, we begin by describing cognitions and emotional states which affected participants' diabetes self-management pre-course, before considering how, and why, these changed as a result of course attendance. As our findings did not differ according to the course/site attended, we have not included site-specific issues in our reporting.

TABLE 2 Topics explored in interviews of relevance to this analysis.

Pre-course experiences
<ul style="list-style-type: none"> • Background information: age, occupation, living arrangements, caring responsibilities, hobbies/interests, diabetes duration. • Experiences of self-management prior to DAFNEplus, including views about: <ul style="list-style-type: none"> • Regimen used; dietary choices and counting carbohydrate; physical activity; timing and frequency of blood glucose (BG) monitoring; BG target range; calculation of insulin doses and timing; approach (if any) to reviewing data, pattern spotting and dose adjustment. • Out-of-range BG; what BG readings are deemed satisfactory, which ones cause concern and why; experiences of hypo- and/or hyper-glycaemia; feelings about and responses to out-of-range readings (e.g., seeking healthcare professional/other support). • Making changes to self-management to optimise glycaemia (with examples); ability to maintain these changes – why/why not? • Support sought/received from healthcare professionals over time; whether participant would have liked more support from healthcare professionals. • Support roles of other people (e.g., family, friends, colleagues); whether participants would prefer more support from their network. • Impact of and feelings about having diabetes, including: <ul style="list-style-type: none"> • Whether/how diabetes has affected the participant's life (e.g., employment, relationships, hobbies/interests). • Dealing with situations where the participant found managing diabetes to be challenging (seek examples); how the participant has coped/managed during these times; what (if any) support did they seek. • Thinking patterns and mindsets when self-managing diabetes. • Reactions to and approaches to dealing with setbacks and challenging situations when self-managing diabetes. • Views about how diabetes has affected or might impact the participant's future health (i.e., diabetes-related complications).
Experiences of the course
<ul style="list-style-type: none"> • What were the most memorable or stand-out aspects of the course and why? • Views about teaching/sessions on: <ul style="list-style-type: none"> • Use of action plans during the course to inform changes in self-management behaviours. • Thinking patterns introduced during the course and whether these were helpful/unhelpful and why; whether/how these thinking patterns influenced how the participant manages diabetes • Managing lapses/relapses (including use of 'rainy-day' action plans and/or 'cheerleading' statements). Has DAFNEplus made any difference to how the participant feels about and responds to setbacks? • Seeking support from healthcare professionals, family members, friends, and colleagues after attending the course • Monitoring long-term health and perceptions about the likelihood of developing long-term complications. • Views about DAFNEplus' Facilitators' non-judgemental approach and focus on the positives/successes of diabetes management. • What (if anything) has changed about how the participant manages diabetes as a result of attending the course? (Probe: changes to routines, behaviours, insulin doses or ICR.) What aspects of the course prompted these changes?
Post-course experiences
<ul style="list-style-type: none"> • Day-to-day management of diabetes, including: diet, BG monitoring, calculation of insulin doses, target range, reactions/response to out-of-range readings and dealing with hypo- and/or hyper-glycaemia. • Recording and reviewing BG and other data; views about: BG target range, time-in-range information (e.g., achieving 70% of readings in range), what range is the participant aiming for and why, percentage of BG readings in range? • Approaches to data review, pattern spotting and dose adjustment; whether and how data review informed (changes to) self-management practices (e.g., counting carbohydrate, timing/administration of insulin doses, treatment of hypos, approaches to physical activity); whether, when and how data review prompted participants to contact DAFNEplus Facilitators for support. • (Any) changes in how the participant feels or thinks about having diabetes, participant's role and ability to manage diabetes post-course and if/how this has changed over time; changes in behaviour, confidence or attitude towards managing diabetes post-course • (Any) changes in approach when managing diabetes during challenging situations; how the participant feels about and approaches a setback after DAFNEplus (e.g. unexpected readings out-of-range, life events derailing diabetes management; unforeseen issues)? • Views about the support received from healthcare professionals post-course; whether participant would like more support from healthcare professionals. • Views about the support received from other people (e.g., family, friends, colleagues) post-course and whether this has changed as a result of DAFNEplus. • Views about the long-term implications of having diabetes and likelihood of these impacting participant's future health.

3.1.1 | Group 1: pessimists

These participants typically identified themselves as being prone to pessimistic thinking and self-criticism both with regards to their diabetes self-management

and life more generally: “it doesn't matter what I'm doing, I'm very self-critical” (006); “I'm not a perfectionist, but I am a very negative person” (020). These individuals noted how their struggles to attain clinically recommended glucose targets pre-course, such as when

TABLE 3 Sample characteristics, $n=28$ people with type 1 diabetes.

Characteristic	n (%) ^a	Mean, SD (range)
Female	12 (42.9)	
Married/co-habiting	18 (64.3)	
Occupational classification ^b		
Managers, directors and senior officials	3 (10.7)	
Professional occupations	6 (21.4)	
Associate professional occupations	4 (14.3)	
Administrative and secretarial occupations	2 (7.1)	
Skilled trades occupations	1 (3.6)	
Caring, leisure and other service occupations	3 (10.7)	
Sales and customer service occupations	2 (7.1)	
Process, plant and machine operatives	– (–)	
Elementary occupations	3 (10.7)	
Retired	3 (10.7)	
Student	1 (3.6)	
Educational attainment ^c		
Below upper secondary (GCSEs)	8 (28.6)	
Upper secondary (A levels)	7 (25.0)	
Tertiary (Undergraduate degree)	9 (32.1)	
Tertiary (Postgraduate degree)	4 (14.3)	
Ethnicity		
White, British	24 (85.7)	
White, other nationality	2 (7.1)	
Other	2 (7.1)	
Age at time of (first) interview; years		44.2 ± 13.5 (18–67)
Diabetes duration; years since diagnosis		14.4 ± 10.2 (1–41)
Baseline HbA1c		
mmol/mol		64 ± 12 (40–82)
%		8.0 ± 11 (5.8–9.7)
Previous attendance at a DAFNE course	4 (14.3)	

^aPercentages may not equal 100% due to rounding.

^bCompiled using the Office for National Statistics Standard Occupational Classification (SOC) 2020.

^cCompiled using the International Standard Classification of Education (ISCED).

“I think I've been doing good and I've been watching what I've been doing, and then I take a reading and I'm miles out” (001) had led to unhelpful and sometimes catastrophic thinking, wherein: “I'm not winning, it's getting the better of me” (001); “I'm not in control of this, it's beaten me” (006). This kind of unhelpful thinking, as these participants further noted, was sometimes compounded by the perceived inevitability of, and resultant feelings of hopelessness about, developing diabetes complications: “I felt like no matter what I did... I was just failing and I was actually starting to see some effects... I had to go for some laser surgery at some point and that also contributed to just general panic I think” (015); “it's always at the back of your mind that you're going to lose your legs or you're going to go blind” (009).

Participants further noted how their pessimistic/catastrophic thinking and resultant feelings of resentment, anger and hopelessness had led to them neglecting diabetes management tasks due to perceived futility: “you're like, oh nothing is working, nothing's going as it should [and] you lose motivation because you're like: oh what's the point in trying” (004). Others reflected on how their feelings that they were “struggling and just floundering” (013), had led to them losing confidence and putting their diabetes “in a box and clos[ing] the lid” (013), which in 015's case meant that: “I didn't want to acknowledge it... I had real bad anxiety about actually talking about it and the eas[iest] thing to do was just pretend it didn't exist” (015).

3.1.2 | Group 2: perfectionists

These participants described themselves as being prone to perfectionist thinking wherein: “if somebody tells me a target, I'm a bit of a perfectionist, and I really want to be hitting that target” (030). Such cognitions, as these participants further noted, had led to them undertaking what they recognised, sometimes in hindsight (and in light of the self-understandings gained from attending the module on **Emotional influences and well-being**), to be excessive glucose monitoring: “all the time, I was obsessed with it... I was testing too many times” (016), and adopting premature and inappropriate actions to address high/low glucose (e.g., over-treating a hypo, administering a corrective dose straight after a meal) because: “that's me as a person, it's just like, right, that's bad, I need to get it good as quickly as possible” (017). Indeed, Group 2 participants often described getting trapped into cycles of over correcting high and low blood glucose with subsequent rebound/yo-yo effects, or how frustrations about not attaining readings within target ranges had led to them “throwing my dollies out of the pram” (030).

TABLE 4 Participant quotations.

Themes	Participant quotations
Changes arising from course attendance	“Something I’ve really noticed was... the healthcare professionals that were involved in the delivery of the face-to-face learning, each of them... made their position very clear, which was: you all have Type 1 diabetes. You’re all doing a great job... which is really powerful... really motivational.” (014)
Better knowledge and understanding to support self-management	“A standout moment was probably the carb counting... I’d never done it, it was a big eye-opener to me... And it’s helped me manage my diabetes a lot better.” (016) “it’s helping me to be actually less reactive, and a bit more in control ... I think every part of that is the understanding of timings and how long insulin’s been in your body for, and how quickly background insulins can react and then what type of insulin you use. Em, cause I know the Levemir is- I find is quite reactive like em, for day to day, it- depending on what type of em activity I’m doing, I will change my background insulin on a daily basis.” (015)
Participants’ mindsets and emotional resilience pre-course	“All of my injections for the past 20-odd years have been a guess. I’d never heard of carb counting... I’d never heard of ratios.” (016). “I think exercise was a large pain point... not knowing what to do, not knowing that I probably adjust my basal dose by so much when I’m doing sort of long, persistent exercise.” (022)
Normalizing setbacks and ‘imperfect’ self-management	“Something I’ve really noticed was ... the healthcare professionals that were involved in the delivery of the face-to-face learning, each of them... made their position very clear, which was: you all have Type 1 diabetes. You’re all doing a great job... which is really powerful... really motivational.” (014)
Rethinking the risk of complications	“it was like, from a distance, progress was like a straight line. But when you actually zoom in on it, there’s a lot of like ups and downs - so like a down doesn’t necessarily mean: oh you’re doing really bad - it’s not as disheartening and: oh I’m doing rubbish. It’s a bit more like positive... It’s stuff like that that’s helped my attitude to diabetes quite a lot.” (004)

3.1.3 | Group 3: optimists

These participants described themselves as having positive and resilient outlooks wherein: “I think I am quite naturally very positive” (014); “I’ve always been pretty laid-back about things” (024). Most reported “feeling a bit annoyed” (002) when, for example, they experienced high/low glucose which they could not explain. However, they also noted how these kinds of negative reactions had been very easy to put to one side: “it doesn’t spoil my day” (026); “I’d just have a moment and move on” (020). While some Group 3 participants reported high levels of engagement with their diabetes self-management pre-course (albeit with an inadequate toolkit to attain optimal glucose management), others noted how their positive mindsets had resulted in them not always taking their diabetes management sufficiently seriously: “it’s never really bothered me, having it, I’m probably too laid-back with it if I’m being honest, I haven’t given it enough attention” (026).

3.2 | Changes arising from course attendance

While participants in all three groups highlighted the motivational benefits arising from facilitators focusing on achievements and personal successes in action planning and IR sessions (Table 4), they varied quite substantially

in terms of whether they saw other novel components of the course as being personally salient. While Group 3 participants noted limited/no personal gains, those belonging to Groups 1 and 2 reported multiple positive changes and benefits.

3.2.1 | Novel course content has limited personal salience (Group 3)

Notably, whilst recognising the potential value to others, Group 3 participants observed that positive messages cascaded during the course and bespoke modules developed specifically for the DAFNEplus programme had had little personal relevance/resonance due to their existing optimistic and/or laid-back attitudes and mindsets:

“Some things don’t- apply to all people... if you’re the kind of person that would normally pick yourself up and dust yourself off... then I don’t think it’s as applicable.” (010)

“My mindset is the same as it’s always been, so you know, I agreed with what they were saying, but I don’t feel that’s a problem for me sort of thing.” (022)

Indeed, whilst valuing opportunities to attend a DAFNE*plus* course, these participants emphasised that the main benefits for them had cohered around the course's skills-based training and educational elements:

“The main takeaways for me were the stricter set of rules around things like calculating doses, doing the checks, making sure that the background insulin is correct... Everything else was slightly superfluous.”

(022)

3.2.2 | Perceived changes arising from engagement with novel course content (Groups 1 and 2)

By contrast, Group 1 and Group 2 participants highlighted multiple ways in which they felt engagement with the course's novel content/modules had led to meaningful changes in their mindsets which were supportive of diabetes self-management. These changes are considered below.

Normalizing setbacks and ‘imperfect’ self-management

Group 2 participants described how key information cascaded during the course, such as 70% being a clinically acceptable time-in-range to mitigate the risk of complications, in conjunction with messages, such as lapses being a normal part of diabetes self-management (introduced during the **Lapse/relapse management and maintenance plans** module), had helped them modify hitherto unhelpful mind-sets and accompanying unhelpful behaviours. Specifically, these participants described how learning that “you can't have perfect results every time, you know, even people without diabetes haven't got it in range all the time” (010), had helped them break cycles of over-testing and over-correcting high/low glucose because: “you're not panicking over every tiny little bit because you don't need to” (012).

Group 1 participants also described benefiting from perceiving/understanding setbacks, lapses and ‘imperfect’ glucose management to be normal parts of living with, and managing, diabetes. Indeed, these participants described experiencing increased self-compassion and being less vulnerable to demotivation when setbacks/lapses occurred by virtue of being encouraged (e.g., during the **Lapse/relapse management and maintenance plan** module) to step back and see these as “little wobbles” (006) rather than significant, negative events that would have (previously) undermined their motivation to use FIIT (Table 4).

Group 1 participants also described benefiting from being encouraged to see lapses and setbacks as positive,

learning opportunities, wherein: “it's okay sometimes to have a bad week, as long as you can think: right okay. What can I- cliché pish, take away from this? What can I do better?” (001). Indeed, some described how thinking about setbacks in this way had reduced their vulnerability to catastrophizing because they felt better able to: “take the emotional element out of it... Just look more objectively and be able to say: it's one bad day, you know, just learn from it” (031). Some of these participants also described feeling more empowered and open to trying new self-management approaches (such as independently adjusting an insulin-to-carbohydrate ratio (ICR) or background insulin dose to address high/low glucose readings recorded at particular times of day) by virtue of now seeing experimentation as presenting opportunities to learn from mistakes rather than exposing them to risk of failure:

“the course made you realise it's okay to learn something doesn't work by like trying it, whereas before you were probably scared to try it in case it didn't work – it sounds a bit backwards, but maybe like doing stuff... you learn from mistakes as much as you learn from like getting stuff right. And I think maybe that's brought the confidence of it on quite a lot as well.”

(009)

3.2.3 | Cognitive and emotional gains: Added value of group-based delivery

Group 1 and 2 participants also noted how opportunities to interact with other course attendees and share experiences had helped to promote the aforementioned cognitive and emotional changes. 030 (Group 2), for instance, described having “shaken that pressure off myself” after observing “that nobody was getting it a hundred per cent... it's ok to be over”. 001 (Group 1), likewise, described how the course's group-based format had presented valuable opportunities to observe how other people “were dealing with it, and some people have good days, some people have bad days” and how this had helped him realise that “it's okay sometimes to have a bad day.”

Increased help-seeking

Group 1 participants, in particular, reported emotional and behaviour changes resulting from the module **Social support, who's there for you?** Some, for instance, noted how as a result of “feel[ing] like the healthcare system was much more accessible for me”, and being “more comfortable contacting the nurses and doctors now” (001) they had been better placed to break unhelpful behaviours,

such as “cocoon[ing] myself because I thought there's nobody out there to help me” (006). Some further noted how seeking and receiving emotional support from family, friends and fellow course attendees in light of the encouragement received on the course had helped them feel less isolated and vulnerable to “pretend[ing] it didn't bother me, when actually it did” (004). Consequently, as these participants further noted, they had been more likely to seek timely help from healthcare professionals “rather than just putting things off and burying my head in the sand” (015).

Rethinking the risk of complications

The module on **Monitoring long-term health**, delivered on the last day of the course, was often raised spontaneously as being a pivotal and memorable moment by those in Groups 1 and 2. Participants reported finding key “myth-busting” (015) messages “really reassuring” (015), such as, “getting clarification on the fact that it is possible really to live, to not have any problems” (015); and, “it's not inevitable that your eyesight's going to go, or your leg's going to drop off” (009).

As well as lessening their worry and distress about the threat of future complications, participants described finding this module highly motivational and empowering: “it was quite a good boost, you know, if you control it, you cannot get any of these” (006). Indeed, some participants' accounts suggested that this session had been particularly effective by virtue of coming after the delivery of all of the course's educational modules, as it had helped to reinforce their perception and understanding that, by following course teaching, their own behaviours and actions could have a meaningful impact on their future health:

“I always anticipated at some point I would have complications...maybe it'd be my kidneys, or my vision... you know, just horrible life-impacting complications. And now I think: well actually if I continue to put all of these principles into practice, why do I need to make that assumption, because I don't... It really drove home that I have the ability to prevent other things happening by continuing to manage things in this way.”

(014)

4 | DISCUSSION

Through adaptations made to the DAFNE course curriculum, developers/stakeholders sought to address barriers to using FIIT by identifying and addressing unhelpful cognitive and emotional influences on

diabetes self-management. Our qualitative evaluation, reporting participants' experiences of, and engagement with, a DAFNE*plus* course, suggests these objectives have been broadly met. Many participants' accounts not only revealed important cognitive and emotional changes resulting from course attendance but also that these changes had had a positive influence on their confidence and motivation to use FIIT, in line with the programme's theory.¹⁷

It is important to note, however, that some of the key benefits DAFNE*plus* participants identified overlapped with those reported by graduates of standard DAFNE courses. Like the latter,^{1,12,27} DAFNE*plus* participants emphasised that gaining a better understanding of diabetes (regimens) and a better toolkit with which to undertake diabetes self-management had been critical to their use of FIIT. In addition, attendees of both types of courses highlighted how their (experiential) learning had been enhanced by having opportunities to share and compare experiences with fellow course attendees. These kinds of observations are unsurprising given that, during the development of the revised DAFNE*plus* course, work was undertaken to identify (and retain) aspects of the standard DAFNE curriculum which already promoted the use of FIIT. Key (existing) enablers identified during this developmental work included having clear guidelines (educational elements) to follow and using group experiences to add credibility to DAFNE teaching/principles.¹⁵ While some benefits to using group-based formats have already been established,^{1,27} we have shown how a group-based approach can also help facilitate the kinds of cognitive and emotional changes that the DAFNE*plus* programme sought to promote; for example, by helping participants normalise setbacks, exercise increased self-compassion when they encountered difficulties with self-management; and, develop realistic expectations and goals. This observation suggests that individuals wishing to develop similar kinds of structured education programmes and/or behaviour change interventions should consider the potential advantages of using group rather than individual-based formats.

It is notable that participants who reported pessimistic and perfectionist mindsets pre-course appeared to gain a greater array of benefits to attending a DAFNE*plus* course than those describing more optimistic and resilient outlooks. Indeed, some of the latter indicated that, for them, the course's skills-based training and educational components had been the critical/only ingredients that had helped support the use of FIIT. However, it is important to consider that participants were only able to offer reflections on overt curriculum content; hence, they may have experienced benefits to DAFNE*plus* course attendance that they were unable to articulate. Such benefits potentially include the use of a layered approach to facilitate

retention and recall (and reduce feelings of being overwhelmed), by dividing modules into smaller, layered topics and practising new behaviours in graded steps.²⁸ The idea of ‘inoculation’ may also be relevant here; specifically, that some participants (i.e., optimists) might benefit retrospectively from sessions addressing unhelpful cognitive and emotional states, if they experience future disruptive life events (e.g., bereavement) which, as previously shown,⁸ can cause trauma and undermine individuals’ ability to sustain the use of FIIT.

Research has highlighted benefits to social support when given and used in appropriate ways¹¹ and that not wanting to ‘bother’ busy healthcare professionals can act as a barrier to optimal diabetes management.¹⁰ Studies also suggest that people may struggle to identify what they need and how to ask for it and feel shame when talking openly about diabetes concerns.²⁹ By adding a specific psychoeducation session which encouraged individuals to ask for help and advised them how to best elicit it, our findings suggest that participants were more open to asking for timely emotional and practical support, thus, potentially, preventing temporary setbacks from turning into bigger problems. While there are likely to be long-term health benefits to this kind of approach, the (short-term) impact on healthcare resources needs to be considered, including the availability of staff to offer ‘on demand’ support.

Attending the ‘Monitoring long-term health’ session was a pivotal moment for many participants. While it has been suggested that fear of diabetes complications may help motivate preventative behaviours,³⁰ many DAFNEplus participants highlighted the motivational gains arising from being reassured that, with modern (e.g., FIIT) approaches, diabetes complications are not common or inevitable. Interestingly, while the principal purpose of this session was to encourage regular attendance at annual check/screening appointments, we captured much wider (albeit unintended) benefits; namely, participants feeling more motivated to adopt and sustain the use of FIIT due to increased confidence in the long-term efficacy of adopting diabetes self-management behaviours. This important finding warrants immediate consideration with regards to reconfiguring the content of existing DAFNE courses and other similar structured education programmes to promote the cultivation of more constructive mindsets and associated motivational benefits. Our findings further suggest potential benefits to this kind of session coming after education and training in diabetes self-management; albeit this is an area where further research may be needed.

Our analysis found no apparent differences in participants’ experiences across different courses/sites. This finding, which is likely due to the use of scripts to help standardise DAFNEplus course delivery,²⁸ offers reassurance about the potential replicability and efficacy of the

course element of the DAFNEplus intervention if rolled out in ‘real world’ settings. It should, however, be noted that all participants received the DAFNEplus intervention during a clinical trial and, hence, course delivery and receipt may have been influenced by Facilitators and participants knowing they were taking part in research.

4.1 | Strengths and limitations

The shift from a longitudinal to cross-sectional design midway through the study meant we lost some depth of data, as some participants offered reflections on a course they had attended 12 months previously; hence their accounts may have been vulnerable to limited recall and/or recall bias. Reassuringly, however, our analysis did not reveal any substantive differences in findings between cross-sectional and longitudinal interviews. While we had good representation across different occupational/educational groups, in line with the ethnic composition of the wider trial, we had limited representation of non-White participants in our sample. Hence, in the event that the DAFNEplus programme is rolled out, it is important that further research be undertaken to help ensure equitable access to this kind of programme. In this article, we restricted our reporting to participants’ engagement with the DAFNEplus course rather than the programme as a whole. This decision permitted a higher level of granularity in our reporting than would have been possible if we had done the latter. However, it is vital that findings from other components of the process evaluation, in conjunction with main trial results, be taken into consideration when making decisions about the potential rollout of this kind of complex intervention in routine clinical care.

4.2 | Conclusion

Our qualitative evaluation of the DAFNEplus course suggests that offering training in FIIT, in conjunction with behaviour change techniques that target unhelpful mindsets and emotional resilience, is likely to be more effective in supporting behaviour change than offering education and skills training alone. This observation is not only relevant to decision-making about the rollout of the DAFNEplus intervention but also to the design of future structured education programmes seeking to promote behaviour change.

AUTHOR CONTRIBUTIONS

Julia Lawton conceived and designed the interview study. David Rankin collected the data, which was then analysed by Julia Lawton and David Rankin. Julia Lawton conceived the concept for this article and produced the first

draft. All authors reviewed, edited and approved the final version of the manuscript.

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CONFLICT OF INTEREST STATEMENT

PMC has received speaker fees from Roche. SRH has served on Advisory Boards and Consulted with Eli Lilly, Zealand Pharma, Zucara Pharma and served on speaker panels for NovoNordisk. JL, NdZ, SSF and DR have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The datasets generated and analysed in the course of this study are not publicly available due to risks to individual privacy. However, they are available, via the corresponding author, on reasonable request.

CONSENT TO PARTICIPATE AND FOR PUBLICATION

All research participants provided written informed consent including for anonymized information to be published in this article.

ORCID

Julia Lawton  <https://orcid.org/0000-0002-8016-7374>

Stephanie Stanton-Fay  <https://orcid.org/0000-0001-5003-8072>

Simon R. Heller  <https://orcid.org/0000-0002-2425-9565>

David Rankin  <https://orcid.org/0000-0002-5835-3402>

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