‘Life changing or a failure’? Qualitative experiences of service users from the weight maintenance phase of the NHS Low Calorie Diet Programme pilot for type 2 diabetes

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Abstract

Background: The weight maintenance phase of the NHS Low Calorie Diet (LCD) programme focuses on embedding long-term dietary and physical activity changes. Understanding individual experiences of this phase is crucial to exploring long-term effectiveness and equity of the intervention approach.

Methods: This was a coproduced qualitative study underpinned by a realist informed approach, using interviews and photovoice techniques. Service users (n=25) of the NHS LCD programme were recruited from three delivery models, across 21 sites in England. Data were analysed using a thematic approach.

Results: The experiences reported were largely positive, with many participants reporting changes in their diet and physical activity. Some service users expressed a need for additional support and there appeared variation in their experiences of the service providers and the wider available support network. Fear of weight regain and its glycaemic consequences was expressed by many; various mitigations were employed, including participating in other weight loss services and continuing use of Total Diet Replacement products.

Conclusions: The NHS LCD programme has been life-changing for some people. However, service user insights suggest that a stronger person-centred focus might further improve effectiveness and service user experience.

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Introduction

This is the third and final paper in a series examining qualitative service user experiences of the NHS Low Calorie Diet (LCD) Programme pilot.[1,2] This paper focuses on experiences reported at the end of the weight maintenance (WM) phase, coinciding with the end of the 52-week programme. An overview of the LCD programme (now known as the NHS Type 2 Diabetes Path to Remission Programme) has previously been reported.[3]

The focus of the WM phase of the LCD programme is to support service users to embed long-term dietary and physical activity changes. This phase promotes an individualised approach whereby service users are supported to maintain their weight loss or to undertake further controlled weight loss if appropriate.

Stated aims of the programme include success in driving weight change, glycaemic improvements and diabetes remission.[4] These will be assessed through quantitative evaluation by NHS England and reported elsewhere. However, understanding service user-led measures of success is important for exploring engagement, motivation and other factors which may drive the measured quantitative outcomes.[5,6] The Re:Mission study was underpinned by a realist informed approach,[7] to help provide research-informed theories to determine how and why outcomes may differ for different people. The ability to understand which aspects of the programme work and which do not work, for whom and why is also critical in ensuring ongoing service improvements and equity. A full summary of the methods used in the study is reported in a simultaneously published paper.[3]

Methods

This paper details the methodological approach taken using the COREQ guidelines,[8] which are described in supplementary file 1 – online at www.bjd-abcd.com.

Participants were recruited to interview on either expressing an interest in the participant survey or responding to an invitation sent via their service provider. Maximum variation sampling was used to gain representation from across different

Table 1. Participant characteristics at 52-week interviews

52-week participant characteristics summary		Number of participants (n=25)
Sex	Male	9 (36%)
	Female	16 (64%)
Age in years	30-34	1 (4%)
	35-39	2 (8%)
	40-44	3 (12%)
	45-49	1 (4%)
	50-54	6 (24%)
	55-59	4 (16%)
	60-65	8 (32%)
Provider	SP1	1 (4%)
	SP2	18 (72%)
	SP3	5 (20%)
	SP4	1 (4%)
	SP5	0 (0%)
Delivery model	Face-to-Face 1:1	0 (0%)
	Remote 1:1	2 (8%)
	Remote Group	20 (80%)
	Digital	3 (12%)
Ethnic group†	White British or White mixed British	21 (84%)
	Asian/Asian British	2 (8%)
	Black/African/Caribbean/Black British	1 (4%)
	Mixed or multiple ethnic group	1 (4%)
	Other ethnic group	0 (0%)
	Prefer not to say	0 (0%)
IMD Quintiles§	1 (most deprived)	10 (40%)
	2	4 (16%)
	3	4 (16%)
	4	2 (8%)
	5 (least deprived)	5 (20%)

† The ethnic group classification as used by the Office for National Statistics in the 2021 Census

§ The Index of Multiple Deprivation (IMD) score is an absolute measure of deprivation that allows for Lower Super Output Areas (LSOAs) in England to be ranked and subsequently classified into five quintile bands. Quintile 1 is the 20% most deprived LSOAs in England, while quintile 5 is the 20% least deprived LSOAs

socio-demographic and service delivery models and providers.[9] This sampling took into account the variation in number of contracts different providers held. Full recruitment methods are reported here.[3] Longitudinal interviews were conducted with a sample of 25 participants (83% of the original cohort recruited and interviewed at 12 weeks, and 92% of those interviewed at 18 weeks). Participant characteristics are summarised in Table 1 and supplementary file 2 – online at www.bjd-abcd.com. Those participants lost to follow-up from the 18-week interviews either withdrew from the study for personal reasons, did not complete the LCD programme, or did not respond to follow-up interview invitations. The experiences of service users who withdrew from the programme are reported elsewhere.[10] Of the 25 participants, 12 shared audio recordings, films or images prior to the interview[3] (see supplementary file 3 – online at www.bjd-abcd.com); many of those who did not share reported lack of time before the interview. Two researchers (KD, CH) conducted the interviews, with six interviews supported by members of the Re:Mission patient and public involvement team (supplementary file 2 – online at www.bjd-abcd.com). Interviews were conducted and recorded online (MS Teams) and lasted between 34 and 75 minutes.

Interviews were transcribed verbatim and analysed thematically by KK.[11] The 52-week interviews were coded deductively and inductively using the 12- and 18-week thematic analysis framework, with additional codes from the 52-week data added to the framework. A sample of transcripts were cross-checked by CH, followed by discussion between KK and CH, to inform the final thematic framework used to undertake final coding. Data were stored and organised using NVivo Software (QS International Play Ltd. Version 12.6).

Ethical approval was received from the Health Research Authority (REF 21/WM/0126) and Leeds Beckett University (REF 107887 and 79441).

Results

Participant demographics were largely representative of the overall LCD pilot population sample, according to interim data presented to the advisory group in summer of 2023. Participant characteristics are presented in Table 1.

Five core themes were derived from the data: 1) personally meaningful outcomes; 2) support for behaviour change; 3) relationships with the coach and provider; 4) support networks, and 5) looking forward.

Personally meaningful outcomes (Table 2)

Participants reflected on their weight and glycaemia levels at 52 weeks, and highlighted a mix of experiences related to these outcomes. Many participants self-reported being in diabetes remission and no longer needing medication as they were discharged from the programme and had maintained weight loss throughout the programme, but some still sought further weight loss. Some participants reported regaining weight above their baseline and a return to elevated glycaemia.

In addition to the measures routinely collected by the service providers, participants shared positive experiences across personal measures of success. They included improvements in psychosocial wellbeing, quality of life and day-to-day physical functioning such as being able to put on their own shoes, playing with grandchildren, walking without breathing difficulties or sitting more comfortably in aeroplane seats. The positive experiences also included changes in physical appearance such as fitting into clothes not worn in years, and not being recognised. Weight loss also resulted in improvements to social relationships, as participants were able to be more active with their family and friends. Positive impacts of the programme on the health of family and friends were also discussed, such as family members adopting healthier eating habits and achieving weight loss.

Support for behaviour change (Table 3)

The sessions delivered during the weight maintenance phase

Table 2. Theme one - Personally meaningful outcomes: quotes

Sub theme	Illustrative quote
Clinical outcomes	*"I believe I'm still in remission. I've been this morning for the blood test, so I'll be getting the latest results, the final results on that next week. In terms of the readings I'm doing, they're, they're still lower than what I started at in terms of the weekly readings I'm doing and I'm, I obviously haven't had any medication now for a year." (P40)*
	"So essentially it, I suppose how do you measure the success of the project? I don't know. But for me it's been a failure. If my goal was to lose weight, then that succeeded, but I put it all back on now and then some, so I'm almost as heavy as I've ever been." (P16)
	"I said when I spoke to you last time, what I'd really like to do is lose more weight and I'm taking a serious look at sort of repeating part of the really serious diet part of it to see if I can lose some more weight. 'Cause I'd really like to lose another 20 kilos, if I'm honest. Because I'm still clearly seriously overweight, even though I lost a massive amount of weight." (P51)
Patient-reported improvements to day-to-day living/functioning	*"I can feel that I breathe better, I sit better, I stand better, my posture is better, I sleep better." (P19)*
Improvements in social relationships	*"But there are going to be a lot more fun memories than, than before you know that now they can remember me climbing on, you know, doing a mad dance in the carpark, you know to Frozen. And chasing ducks. You know it's just they're gonna have different memories than, than the [word missing?] that that was at the beginning of that programme." (P17)*
Changes to physical appearance	*"Getting in, getting in a size 12. Looking in the mirror and getting, that is the biggest bonus, you know, just getting into normal sized clothing. And I think the one, the thing that sticks in my mind more than anything else was the, one of the nurses at the local practice, which I know her really well, and I had to make myself known to her in Asda about six months ago. She didn't recognise me. Oh, it's, you know and I'm thinking, really, you know. And I'm like, yeah. So I get that every time I look in the mirror that, if that isn't a boost to say, 'cause I hated the way I looked, you know." (P50)*
Improved health and/or diet of family / friends	*"I mean me husband were brilliant. He managed to lose a stone just by not having a drink, you know, not drinking in the week or not eating crap. Me not buying crap in for anybody to eat. So he lost a stone at that time as well. You know, the kids were really good." (P58)*
Improvements to mental wellbeing	*"It's life changing, I mean I've said this before, it's absolutely it's life giving and it's like life changing at the same time. And it's empowering." (P17)*

focused on encouraging long-term changes in healthy eating and physical activity behaviours, with some providers providing pedometers and encouraging walking challenges that were reported at each session. Some participants talked positively about the ways in which they were more active, whether alone or with family and friends, and many felt this was associated with maintaining their weight loss. There was also increased awareness of the nutritional value of foods and the proportion of different types of foods that make up a balanced meal. Participants said they were making healthier choices because they had a better understanding of the impact of food and drink on their health. This knowledge helped them to change behaviours relating to cooking and shopping.

For some, there were challenges adopting healthy behaviours due to ongoing emotional eating, with a perception that, despite having improved their nutritional knowledge, the programme had not sufficiently addressed the 'mental side' of eating behaviour, resulting in a resumption of using food to help cope with emotionally challenging personal circumstances.

Relationships with the coach and provider (Table 4)

The behaviours and approach of the coach, and of the provider, appeared to influence the participants' motivation and general impressions of the programme. Coaches were generally considered to be supportive, showing empathy, responding to concerns, and tailoring session delivery to the needs of the group or individual participant. However, some participants shared examples of practice which had impacted them negatively: for example, when the coach named individuals in group sessions who had met their goals, those who had not achieved their goals were left feeling shamed. If they encountered different coaches during their programme journey, participants sometimes noted inconsistency in delivery styles and reported an impact on the development of participant-coach relationships, with some sessions being very 'slide-heavy' and thus limiting time for personalised support.

Making contact with the coach outside the sessions was reported to be difficult by some participants; examples were described of making contact with the provider but not being called back. Experiences with call centre staff were often regarded as unsatisfactory, with queries not being addressed effectively and a lack of person-centredness. One example was repeated contact being instigated by the provider to obtain routine monitoring information (such as weight and glucose levels) following a bereavement.

Support networks (Table 5)

Outside the formal sessions, informal support networks with peers, family and friends and healthcare professionals were reported as important. For participants taking part in group sessions, peer support had developed through WhatsApp groups during earlier stages of the programme. This peer-led support via WhatsApp decreased during the weight maintenance phase. Participants discussed the social support that they wanted and received from family, friends and

Table 3. Theme two - Support for behaviour change: quotes

Sub theme	Illustrative quote
Increased exercise and physical activity	*"We're going to go out for a walk and go and get some fresh air, going through things and it's actually yeah 'cause I've got a teenage son who yeah is attached to every device possible, so getting him out as well. To look at the countryside and just, just do something and see something cool is yeah what we've been doing quite a bit more of." (P21)*
	"The one thing that they did get me into was starting to swim a lot, yeah. And using the local gyms, which I'd never done before. And that was literally linked to the course." (P34)
Improved diet, opting for healthier food choices, and reducing alcohol consumption	*"But what I am aware of is a lot of the nutritional values of things, and I do look at those things now when I go and shop. And I didn't have, I don't think I consciously thought about it before. So I've learned a lot. I've learnt a lot about why foods interact with the body's digestive system the way they do, and sort of how it affects me personally. " (P19)*
	"I don't eat the way I used to eat. It means I don't drink some of the things that I would drink. You know, like if I want a fizzy drink now, I'm going to check if it's sugar free. Whereas before I would just be like I wanna fizzy drink, I'll have a fizzy drink. Yeah, it's, it's changed how I look at foods, changed how I look at my relationship to food. And, you know, whether it's nutritious, whether it's not nutritious." (P43)
	"I've not gone back onto drinking as much alcohol by any stretch. I can't now. I just can't physically do it. And how much you actually eat rather than, you know, rather than just making a load of food and making enough for five people and eating it between two. We don't do that. We have enough for two." (P58)
Changes in routines and behaviours	*"I still batch cook, yeah, so it's a good way for me to portion control as well because if I do a big pot I'll eat a big pot. And that's how I deal with it." (P17)*
	"I don't worry about each individual day. I try to plan my shopping for the week and then I find that works for me. And also I've discovered that I really shouldn't keep lots of extra food in the house 'cause that's just one temptation too much. So I don't. I've gone back to what I did was when I was younger, which is buying stuff in basically as I need it or on a weekly basis." (P51)
Lack of support for emotional or disordered eating	*"I think the programme has failed to address the mental side of why I'm a comfort eater. Why when I'm depressed, when I'm miserable, when I'm sad, when I'm anxious, I run to food. It's not addressed that. Yes, it's educated me on if I stop eating rubbish and do exercise, I'm gonna lose weight. Of course it's educated me, it's educated me about proteins and carbohydrates and all that good stuff. It hasn't helped me mentally." (P18)*
	"There have been some ups and downs. Not because of the initial phase. I mean, I got used to the, you know, restricted calories. I got used to having the shakes and the soups. I got used to eating, to, you know, to being on a liquid diet because my body adjusted, my mind adjusted. But the maintenance phase, there's been some ups and downs. As I said, I've had some personal trauma that I've gone through, which has resulted in binge eating if you like, to deal with the emotional fallout." (P43)
	"I think because I relapsed onto the sugar very quickly and got readdicted to it very quickly, 'cause I think I said before didn't I that I was a sugar addict." (P56)

colleagues, which included receiving compliments about changes to their appearance, motivation for exercise, and reduced pressure to eat unhealthy foods. While the support and encouragement of healthcare professionals was reported by participants to be motivating, it was noted that not all had in-depth knowledge of the programme or participants' progress.

Looking forward (Table 6)

Participants' aspirations for the future varied: some aimed to achieve further weight loss, while others sought to attain or sustain their diabetes remission through maintaining lifestyle changes. Fear of regaining weight and hyperglycaemia was expressed, with the potential for improving health acting as a motivating factor for behaviour changes. Some participants reported exploring further options for managing their weight, with many planning to continue using Total Diet Replacement (TDR) products, having had the experience of four weeks of 'rescue' TDR offered in the event of weight regain (termed by some providers a 'reset').

Discussion

Service users were interviewed longitudinally at three time points along their NHS LCD programme journey. The interviews sought to explore the real-time experiences of service users to help understand how the programme works for different people, what barriers and enablers are along the way, and how future services could be improved. This paper shares the experiences of participants at the end of the WM phase (52 weeks), as they were about to complete or had recently completed the LCD programme.

Improvements in psychosocial outcomes and physical functioning appeared as important as clinical outcomes to participants. Whilst clinical measures are an integral part of monitoring efficacy, patient-reported outcomes and goals are known to be key factors for motivation.[12,13]

The importance of increased levels of physical activity observed in participants at 18 weeks continued into the weight maintenance phase.[2] Here, participants positively associated physical activity with maintenance of weight loss and glycaemic improvements. The benefits to functional fitness, overall health and the wider impact on family members were facilitators to ongoing activity.

Several participants reported continued use of TDR products outside the four-week rescue package provided as part of the programme.[4] This prolonged use was said to help regulate energy intake, support continued weight loss or provide a

Table 4. Theme three - Relationships with the coach and provider: quotes

Sub theme	Illustrative quote
Coach delivery style	*"I didn't understand one of them. One of them just read off the slides and literally that was it. Nobody spoke 'cause it wasn't the same. You could tell she just wanted to get the slides out, slides done and say, yeah, we're finished, off you go" (P36)*
	"The lady we ended up with, it was just, it was just a monologue. There was no interaction. She was slagging it, she was slagging the data, she was slagging the detail on the slides off. It was just, it was shocking really. It was so unprofessional. You know, she brings, brings the slide up that says how many calories should you aim for? Oh, she says, that's a load of rubbish isn't it?" (P40)
	"Yeah, I mean they [coaches] was very good. I can honestly say they was very good on the course. (P9)
Impact of session delivery approaches	*"When eventually we had the last meeting..., it was obvious that everybody who'd stuck the programme, had achieved gold or silver or something, great success was being made. And then eventually, which is really not a good practice, is every name was gone through as to who had got gold or not, and mine wasn't even mentioned, you know. And I just thought I felt that, I thought well I'm the only one not mentioned. I kind of knew I'd put on weight anyway, so I wasn't gonna get any kind of mention or anything, but it kind of, the reason for raising it is it underlines that sense of there's something abnormal about me that others don't understand." (P16)*
Consistency of the coaches	*"If they kept the same person all the way through, it would be good. It, you just question why you get so many and then the next week you get somebody out and then the one comes back and then you get another one." (P36)*
Responsiveness of call centre	*"I just said it was along the lines it was, it wasn't, it was along the lines of I'm struggling at the moment, I'm off work with mental health, and I'd appreciate a call back to discuss. I was struggling because I wasn't eating, so it was along them lines. I wasn't, it was can I have some support? Can someone ring me? And they didn't. They rang me three weeks later and I'd sent two emails and I'd tried to ring several times but just couldn't get through. So that was disappointing." (P7)*
Person-centredness outside of sessions	*"Well I phoned a couple of times. Especially after my, my gran died, with me suffering as I was. And they told me somebody would call me back both times. Nobody did. Then a few weeks later somebody started harassing me every day. Which didn't help matters with the way I was. But obviously when you rang up, you don't get the person you really want to talk to. You get the helpdesk or the call centre. So you don't speak to the one you really want to speak to. So you're just telling somebody that probably doesn't know what you're really on about, and that you may need to talk to somebody else, and then you have to wait for the call. But when they're phoning you more than once a day for seven days, I'm sorry but that's a bit out of question" (P36)*

Table 5. Theme four - Support networks: quotes

Sub theme	Illustrative quote
Peer support during and outside group	*"And then people in the group, they put in their own little bits of information and we all kind of talk to each other on the chat on there." (P48)*
	"I have friends on WhatsApp we make, the people that managed to see the pilot to the end we made a WhatsApp group at the very beginning. And so they would fill me in on the kind of things that I missed and I read them up in the book so I didn't feel that I was kind of getting behind with the information that was being given out." (P66)
Lack of peer support during and outside the group session	*"We had a WhatsApp group going. But when it started unravelling, I didn't feel any support within the group for that. I didn't feel any support either in our.... WhatsApp group and certainly didn't have a sense of I could admit to that in the group. So I very quickly learned a habit of staying silent and just nodding and agreeing rather than sharing how difficult...." (P16)*
Support from family, friends, colleagues	*"My sisters were praising saying that you've done really well. That helped and my son used to ask me, mum, how much have you lost now? And I used to tell him and he used to be really happy for me as well." (P35)*
	"And my girlfriend has been great. And family, when I go up to [area], they also completely understand. I mean they're just relieved that I've lost quite a lot of weight. So no I haven't had any problems with people being supportive." (P51)
Support or contact with healthcare professionals	*"When I got the first blood test results back, the nurse called me personally to congratulate me, which I hadn't expected. And she was so, she didn't, she kind of only vaguely knew about the programme, so she was very interested in what was happening. And then when she said that result, she called and congratulated me and was really pleased and wanted to know more about the programme. But no GP's been in touch with me to talk about it, and I suppose that won't happen until I go now for, you know, a revision for the blood pressure. But I didn't expect them to anyway." (P19)*

method to manage periods of weight regain. The intention to use TDR in this way was also reported in the participant survey and previous clinical trials.[14,15] Whilst TDR product use is considered safe and effective in the short term, further research is needed to explore implications associated with longer-term use.

The relationship with their coach was seen as important by participants and was affected by delivery approaches as well as continuity. The relationship between coach and service user can influence levels of trust and information shared.[16] Suboptimal communication between coaches, other staff within the service provider and healthcare professionals in general practice was highlighted by some participants; improving this may support better service user experience.[17]

The provision of personalised support was regarded as being of major importance. Some participants reported needing support after the end of the programme, and were considering

Table 6. Theme four - Looking forward: quotes

Sub theme	Illustrative quote
To engage in more exercise and stay in remission	*"I think it's maintaining that, just maintaining the non-diabetes status. Cause I didn't, I don't know, I didn't think it would happen so quickly I suppose. I didn't, I didn't really think about it. I knew that at the end of the year I'd be fine, but I didn't think it would happen so quickly. So yeah, that that's good. That's my target." (P19)*
	"I hope to lose a lot more weight and stay healthy. And do a lot of walking." (P35)
Utilising or future intentions to use TDR products	*"I've accepted that's the position I've arrived at, and I'm comfortable with the shakes, and I'm comfortable with rotating them, then I'm happy to live with that, because it's no more expensive in terms of feeding myself. And it's, I can't see any identifiable health problems that could result from doing it. And because it's so easy, especially on a working week, not to worry about, because I live by myself, not to worry about cooking a meal or something like that. Actually, it's quite nice. I get an awful lot more done on the days when I'm using products rather than not." (P51)*
Weight regain, blood glucose levels rising	*"Well there's an obvious concern that you'll relapse, but the longer it goes on and the more I stay within that buffer zone, the more convinced I am that I won't completely relapse and go back to 144k or whatever it was. I, the trick for me is, is the increasing that weight loss and getting down even further so I start to get more to what you might consider to be a healthy weight even at 61." (P51)*
	"I feel a bit frightened. Because I'm shocked at how quick just from, you know, I haven't been eating awful things, I've just not been eating properly. So I think that's clearly my problem and not my weight because my weight I'm not, I'm not heavy, I'm eight stone 12. You know, it's not my weight with me, I think it's, it's obviously something else isn't it. It's my food, my diet, the way I eat that's caused me to have diabetes. So I think slipping into old habits, it scared me how quickly it's gone back on. So I've got no choice because I'm not gonna feel like this, and you know, I don't want a stroke, I don't want to have bad health issues in a couple of years time." (P7)
Seeking future weight management support	*"It might be that Weight Watchers is where I go to maintain whatever weight loss I get. But there's an, there's an online community with it. The language that they use, it's not good or bad. It's very simple." (P56)*
	"I've abandoned the diet completely 'cause I was getting to a point where I was controlling too much the food I was eating and I was eating too little. So I've joined another programme that was towards the end of the [provider]. I've been doing it for about 2-3 months and they have got the opposite approach. So don't check what you eat, don't weigh anything, don't count calories. You have to, you know what's good for you and what's not good for you. It has to become ingrained in you, it has to become your life. So it's a lifestyle change in that sense. So the weight loss has, which was kickstarted by the liquid diets, been great." (P57)
	"I've now asked my GP about bariatric treatment and the fat jab, because I put on the weight that I did lose back on. Because obviously with the setbacks I comfort ate again. Even though I did the reset weeks." (P36)

options such as commercial weight management programmes, bariatric surgery and weight loss drugs. While most participants noted positive experiences, not all found the programme to be successful for them, with some reporting weight regain; this was attributed by some to challenges transitioning from TDR to a healthy diet, managing emotional eating and adopting healthier behaviours.

Strengths and limitations

This paper presents unique participant experiences at the end of their NHS LCD programme journey. The longitudinal design of this study facilitated trust and openness between researchers and participants during the interviews, and produced a greater depth of understanding. Due to participant drop-out, the final sample did not include service users from the face-to-face, one-to-one delivery model, and as such this experience is not reflected within the data presented. This study provides experiences of service users interviewed up to the completion of the programme at 12 months but the longer-term outcomes of the LCD programme remain unknown. A follow-up study conducted a year after completion of the programme would provide clearer insight into the longer-term outcomes of the LCD programme.

Recommendations for policy, practice and research

1. Consideration should be given to routinely monitoring additional outcomes which may be meaningful for service users.
2. Providers should aim to support continuity between participants and coaches to support the development of coach-participant relationships.
3. Support outside the sessions should be strengthened, with emphasis on the provision of person-centred care.
4. Increased communication between provider and primary care is required to improve service users' experience throughout the programme.
5. Providers should aim to address the individual needs of participants, including support or signposting to help with emotional eating. This may be facilitated by one-to-one delivery.
6. Consideration should be given towards the provision of peer support.
7. Commissioners, providers and healthcare professionals should consider providing clearer messaging relating to the ongoing use of TDR products.
8. Further research is required on the support needs of service users following completion of the programme and the physiological and psychological impact of prolonged TDR use.

Conclusion

The NHS LCD programme has been life-changing for some participants. This study provides unique insights to help further understand the enablers and barriers to effective

Key messages

- Reliance on Total Diet Replacement products was evident at twelve months to help regulate energy intake, support continued weight loss, or provide a method to manage periods of weight regain.
- The Low Calorie Diet programme is not deemed successful by all, with some people seeking further commercial or NHS funded weight management support as they complete the programme.
- Improvements in psychosocial outcomes and physical functioning are important. Moving the focus from clinical outcomes to patient reported outcomes may support individual motivation on these types of programmes.

programme delivery and outcomes, and it provides several recommendations for ongoing service improvements and research requirements.

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Ethical approval Ethical approval was received from the Health Research Authority (REF 21/WM/0126) and Leeds Beckett University (REF 107887 and 79441). Participants provided informed consent to participate in the Re:Mission study, including consent for publication. All participant data were anonymised and where photos have been used in publications or presentations, permission was sought from each participant.

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Supplementary file 1: Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

No. item	Guide questions/description	Reported on page #
Domain 1: research team and reflexivity		
Personal characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	p3
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Additional File 1
3. Occupation	What was their occupation at the time of the study?	Additional File 1
4. Gender	Was the researcher male or female?	Additional File 1
5. Experience and training	What experience or training did the researcher have?	Additional File 1
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	Reported in Homer C *et al*. The Re:Mission study: Evaluating the NHS Low Calorie Diet pilot - an overview of service user data collection. *British Journal of Diabetes*, In review.[2]
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Reported in Homer C *et al*. The Re:Mission study: Evaluating the NHS Low Calorie Diet pilot - an overview of service user data collection. *British Journal of Diabetes*, In review.[2]
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	n/a
Domain 2: study design		
Theoretical framework		

9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Reported in XXX (2023). The Re:Mission study: Evaluating the NHS Low Calorie Diet pilot - an overview of service user data collection. British Journal of Diabetes, In review.
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Reported in XXX (2023). The Re:Mission study: Evaluating the NHS Low Calorie Diet pilot - an overview of service user data collection. British Journal of Diabetes, In review.
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Longitudinal participanst from week 12 and 18 interviews. Known and consented.
12. Sample size	How many participants were in the study?	pp.3
13. Non-participation	How many people refused to participate or dropped out? Reasons?	pp.3 and reported in XXX (2023). The Re:Mission study: Evaluating the NHS Low Calorie Diet pilot - an overview of service user data collection. British Journal of Diabetes, In review.
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	pp.4
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	pp.3
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	pp.4 additional file 2
Data collection		

17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Reported in XXX (2023). The Re:Mission study: Evaluating the NHS Low Calorie Diet pilot - an overview of service user data collection. British Journal of Diabetes, In review.
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	n/a
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	pp. 4
20. Field notes	Were field notes made during and/or after the interview or focus group?	n/a
21. Duration	What was the duration of the interviews or focus group?	pp.4
22. Data saturation	Was data saturation discussed?	n/a
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	n/a
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	pp. 4
25. Description of the coding tree	Did authors provide a description of the coding tree?	pp. 4
26. Derivation of themes	Were themes identified in advance or derived from the data?	pp.4
27. Software	What software, if applicable, was used to manage the data?	pp.4
28. Participant checking	Did participants provide feedback on the findings?	n/a
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	pp.5-13
30. Data and findings consistent	Was there consistency between the data presented and the findings?	pp.5-14
31. Clarity of major themes	Were major themes clearly presented in the findings?	pp.5-14
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	pp.5-14

Developed from:

Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Personal Characteristics:

Dr Catherine Homer PhD (Female). Associate Professor of Obesity and Public Health with experience working in academia and extensive experience working in public health.

Karina Kinsella MRes (Female). Research Officer for the Re:Mission Study with extensive experience of evaluating interventions.

Dr Tamara Brown PhD (Female). Reader in Obesity, with 5 years' experience of focus groups and research in weight management.

Dr Kevin J Drew PhD (Male). Post-doctoral Research Fellow with 7 years' experience of conducting qualitative evaluations of health-based interventions.

Dr Jordan Marwood PhD (Female) Research Fellow with extensive experience conducting obesity research with particular focus on disordered and emotional eating.

Dr Duncan Radley PhD (Male). Reader with 25 years' experience conducting obesity research, and previously research manager in weight management service providers.

Charlotte Freeman (Female). Project research officer with experience of evaluating interventions in academia and primary care services as well as experience of working in public health.

Dr Abimbola Ojo PhD (Female). Member of the Patient and Public Engagement team for Re:Mission and Local Authority Public Health Specialist.

Dr Jennifer Teke (PhD) (Female) Member of the Patient and Public Engagement team for Re:Mission and Hospital Trust Research Manager.

Ken Clare (Male) Patient and Public Engagement Lead. Director of Bariatric and Metabolic Surgery Support at a national patient advocacy charity.

Dr Chirag Bakhai (Male), General Practitioner, Clinical Lead on the Re:Mission Study Oversight group and Primary Care Advisor to the NHS Diabetes Programme

Dr Louisa Ells (Female). Professor of Obesity with a specialist interest in multi-disciplinary, cross-sector applied obesity research, with extensive experience of leading programme evaluations.

Supplementary file 2: Participant characteristics

Table 1: 52-Week Participant Demographics (n=25)

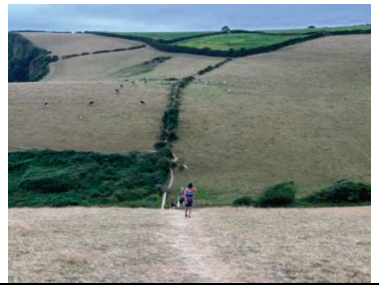
Participant *[1]	Age	Gender	Ethnic Group[2]	Provider	Delivery model	IMD Quintiles[3]	Participated in photo elicitation
P7	50-54	Female	White British or white Mixed British	SP3	Group	5	N
P9	60-65	Male	White British or white Mixed British	SP3	Group	1	Y
P16	50-54	Male	White British or white Mixed British	SP3	Group	1	Y
P17	50-54	Female	White British or white Mixed British	SP3	Group	1	Y
P18	50-54	Female	White British or white Mixed British	SP2	1-to-1	5	Y
P19*	55-59	Female	Any other black background	SP3	Group	1	N
P21	30-34	Female	White British or white Mixed British	SP2	Group	1	Y
P34	60-65	Male	White British or white Mixed British	SP2	Group	1	Y
P35	60-65	Female	Asian or Asian British	SP2	Group	1	Y
P36*	40-44	Female	White British or white Mixed British	SP2	Group	3	N
P40*	60-65	Male	White British or white Mixed British	SP2	Group	3	Y

[1] *Interviews supported by members of the Re:Mission patient and public involvement team.
[2] The ethnic group classification as used by the Office for National Statistics in the 2021 Census
[3] The Index of Multiple Deprivation (IMD) score is as absolute measure of deprivation that allows for Lower Super Output Areas (LSOA's) in England to be ranked and subsequently classified into five quintile bands. Quintile 1 is the 20% most deprived LSOA's in England, while quintile 5 is the 20% least deprived LSOA's.

Supplementary file 2: Participant characteristics - Table 1 continued

P43	45-49	Female	Mixed or Multiple Ethnic Group	SP2	Group	2	Y
P45	40-44	Male	White British or white Mixed British	SP2	Group	1	N
P48*	35-39	Female	White British or white Mixed British	SP2	Group	5	Y
P50	60-65	Female	White British or white Mixed British	SP2	Group	5	Y
P51	60-65	Male	White British or white Mixed British	SP2	Group	2	N
P54	60-65	Male	White British or white Mixed British	SP2	Digital	1	Y
P56	35-39	Female	White British or white Mixed British	SP2	Group	1	N
P57*	55-59	Female	White British or white Mixed British	SP2	Group	3	Y
P58	50-54	Female	White British or white Mixed British	SP2	Group	2	Y
P66*	55-59	Female	White British or white Mixed British	SP2	Group Face-to-Face	4	Y
P70	50-54	Female	White British or white Mixed British	SP4	Digital	5	Y
P71	55-59	Male	Asian or Asian British	SP2	Digital	4	Y
P76	40-44	Female	White British or white Mixed British	SP1	1-to-1	2	Y
P82	60-65	Male	White British or white Mixed British	SP2	Group	3	N

Supplementary file 3: Photovoice pictures and quotes

Sub-themes/Codes	Quotes	PhotoVoice
Improvements to day-to-day living/functioning	One of the pictures is actually showing me. Well I can, I can literally run up the hills. I'm leaving everybody out of breath. Not showing off or anything, but I got up there so I could get a picture of them coming up the big hill, which is one of the pictures I think I may have sent, you know." (P9)	Example of a participant being able to walk up a hill (P9) 
Changes to physical appearance	"Yeah on the plane, so I could fit, 'cause normally like I'd be quite snug in them seats and it was quite nice. I had gaps in between the bit in between the seats, that was nice." (P17)	**An illustrative example of a participant who can now comfortably occupy a plane seat due to significant weight loss.** 

Supplementary file 3: Photovoice pictures and quotes - continued

Increased exercise and physical activity or Intentions to undertake more exercise	"I have been doing it for quite a while actually. I normally mainly use it when I'm out cycling or being on my bike, you know? So I can actually map routes and it's a good idea to refer back to, to think oh we did that, that was a good route, let's go and do that again, you know." (P9)	An example of a participant tracking the distance covered during while cycling
Improved diet, opting for healthier food choices, and reducing alcohol consumption	"The carbs have been cut down even more since, since then. I'll just like have a double or a triple portion of veg with chicken. I've found that I'd rather eat the veg than, than the fruit to be honest, with a bit of protein I've. I went vegetarian, well pescatarian, for Lent. o I'm now having more vegetarian days as well. There are days where I won't have meat as my protein source. It will be Quorn or I'll just sit and eat veg. So it has done good." (P56)	Example of a healthier meal