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Transferability of the NHS Low Calorie Diet Programme: a qualitative exploration of factors influencing the programme's transfer ahead of wide-scale adoption.

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35 Novelty statement:

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37● Low Calorie Diets (LCD) delivered through total diet replacement can lead to clinically

38 significant weight loss and remission of Type 2 diabetes.

39

40● To optimise transferability, a choice of a delivery models should be considered to promote

41 acceptability and accessibility and equitable referral strategies should be planned to prevent

42 issues of inequity.

43

44● Multidisciplinary working and establishing a multitude of communication strategies could

45 promote engagement from GPs and other health professionals.

46

47● Findings of this study can be considered by new sites of similar programmes to understand

48 the extent to which the intervention is well suited, and how to mitigate implementation

49 barriers.

50

51

Abstract

Introduction: Although behavioural interventions have been found to help control Type 2 Diabetes (T2D), it is important to understand how the delivery context can influence implementation and outcomes. The NHS committed to testing a Low-Calorie Diet (LCD) programme designed to support people living with excess weight and T2D to lose weight and improve diabetes outcomes. Understanding what influenced implementation during the programme pilot is important in optimising roll-out. This study explored the transferability of the NHS LCD Programme prior to wider adoption.

Methods: Twenty-five interviews were undertaken with stakeholders involved in implementing the LCD programme in pilot sites (health service leads, referring health professionals and programme deliverers). Interviews with programme participants (people living with T2D) were undertaken within a larger programme of work, exploring what worked, for whom and why, which is reported separately. The conceptual Population-Intervention-Environment-Transfer Model of Transferability (PIET-T) guided study design and data collection. Constructs of the model were also used as a deductive coding frame during data analysis. Key themes were identified which informed recommendations to optimise programme transfer.

Results: *Population:* Referral strategies in some areas lacked consideration of population characteristics. Many believed that offering a choice of delivery model would promote acceptability and accessibility of the eligible population. *Intervention:* Overall, stakeholders had confidence in the LCD programme due to the robust evidence base along with anecdotal evidence, but some felt the complex referral process hindered engagement from GP practices. *Environment:* Stakeholders described barriers to accessing the programme,

77 including language and learning difficulties. *Transferability:* Multi-disciplinary working and

78 effective communication supported successful implementation

79

80 **Conclusion:** Referral strategies to reach underrepresented groups should be considered

81 during programme transfer, along with timely data from service providers on access and

82 programme benefits. A choice of delivery models may optimise uptake. Knowledge sharing

83 between sites on good working practices is encouraged, including increasing engagement

84 with key stakeholders.

85

86 Keywords: Transferability, type 2 diabetes, low-calorie diet, total diet replacement, diabetes

87 remission, implementation

88

89

90 **1. Introduction**

91

92 Systematic reviews and clinical trials have evidenced that a Low-Calorie Diet (LCD)

93 delivered through a Total Diet Replacement (TDR) programme can lead to clinically

94 significant weight loss and support remission of T2D [1-4]. The NHS committed to testing a

95 LCD programme designed to support people living with excess weight and T2D to lose

96 weight and improve diabetes outcomes [5]. NHS England (NHSE) commissioned

97 independent service providers to deliver programmes, which included 12 weeks of TDR, six

98 weeks phased food re-introduction and a 34-week weight maintenance, with different

99 delivery models according to area, including in-person or remote one-to-one, in-person or

100 remote groups or digital (app-based) one-to-one. This programme was initially piloted in ten

101 geographically diverse areas in 2020, with a further 11 areas included in the second stage of

102 the pilot in 2022, ahead of national roll-out beginning June 2023. Prior research has

103 highlighted the role of the delivery context (e.g. local variations in delivery model and

4

104   challenges to recruiting participants) in influencing implementation and service user

105   outcomes [6, 7]. Therefore, it is important to understand how transfer of the LCD programme

106   from its pilot to the national roll-out can be optimised.

107

108   Understanding transferability of an intervention, means to understand the extent to which

109   successful intervention outcomes observed in a particular context, or contexts can be

110   replicated in a new (target) context [8]. Contextual factors that are considered during a

111   transferability assessment include the characteristics of the target population (e.g. health

112   status and perceived health needs), the organisational environment in which the intervention

113   is delivered (e.g. readiness and awareness) and the intervention itself (e.g. robustness of

114   evidence base), along with exploring the interactions between them [1, 2]. Undertaking a

115   transferability assessment of an intervention prior to wider roll-out helps commissioners to

116   understand the extent to which adaptations or improvements may be needed, and how to

117   mitigate barriers to implementation.

118

119   A theoretical model, PIET-T (Population, Intervention, Environment, Transfer), to assess

120   transferability was developed by Schloemer et al., (2018) [8]. *Population* is concerned with

121   an understanding of the service user characteristics and their needs, perceptions and

122   attitudes. *Intervention* content is considered, along with exploring how to balance useful

123   adaptations with maintaining the fidelity of the intervention. An understanding of the

124   *Environmen*t, or setting, in which the intervention is delivered includes consideration of the

125   skills, knowledge, attitudes and resources of the health care delivery team, and the

126   organisational and policy structure. The criteria for the *Transfer* process considers

127   knowledge transfer and communication between actors, strategies for optimum adoption and

128   implementation, evaluation requirements and intervention operational sustainability.

129

130   As part of the wider programme of evaluation (ReMission study [9]), we used the constructs

131   of the conceptual Population-Intervention-Environment-Transfer Model of Transferability

5

132   (PIET-T) to explore transferability of the LCD programme during of its national roll-out. This

133   transferability assessment was undertaken across 11 Integrated Care Systems (local

134   partnerships between NHS bodies, local authorities, and other local organisations) across

135   England (referred to hereon in as 'localities') who delivered the LCD programme during the

136   second stage of the pilot. The aim was to gain a broad understanding of factors that may

137   influence its transferability when delivered nationally. We sought the perspectives of three

138   stakeholder groups involved in the programme's implementation: health service leads

139   (referred to hereon in as 'locality leads') with responsibility for coordinating local mobilisation

140   of the programme; health care staff involved in referring individuals to the programme

141   (referred to heron in as 'referrers'), and representatives of the commercial service providers

142   that were responsible for delivering the programme (programme deliverers). The

143   perspectives of programme participants (people living with T2D) were explored within the

144   wider programme of work [10-12] and were considered in the development of this study. This

145   paper presents findings of the LCD programme transferability assessment and provides

146   recommendations of how other contexts may optimise delivery of the LCD or similar

147   programmes.

148

149   **2. Methods**

150   **2.1 Study Design**

151   We used the STAR-LITE survey [13], a standardised tool to report behavioural weight

152   management programmes, to understand how the programme was delivered across the 11

153   localities. Stakeholders across the 11 localities were recruited to take part in a semi-

154   structured interview. This study received ethical approval from University of York Department

155   of Health Sciences Research and Ethics committee (HSRGC/2022/537/A) and is reported

156   using COREQ guidelines (see Additional File 1).

157   **2.3 Participants and sampling**

6

Survey participants

The survey was distributed via email (Qualtrics software) to one representative from each of the five commercial service providers who delivered the programme across the localities (three of which had also delivered the programme in stage one of the pilot). Where the survey had already been completed as part of the wider ReMission study, providers were asked to provide an update on any changes to their previous response. New providers were asked to complete the survey in full. Specific questions relevant to assessing transferability were: method of delivery, profession of programme deliverer, referral route, TDR product range, nature of dietary and physical activity advice, and how programmes were tailored according to population group.

Interview participants

Participants included: locality leads, referrers and programme deliverers. A purposive sampling framework was used to ensure representation of the range of delivery models, socio-economic status (informed by index of multiple deprivation score) and participant job roles. Locality leads from all 11 localities were approached about taking part via email from one of the researchers explaining the purpose of the research and to highlight their independence from the programme, but four did not respond or declined. Locality leads were asked to nominate health professionals that referred individuals to the programme to be contacted about taking part. Programme deliverers from all five service providers were represented. All interviews (n = 25) were undertaken between April and June 2023. (Table 1)

2.4 Interview procedure

Interviews took place and were recorded via the Zoom platform and lasted between 30 and 60 minutes. Interview topic guides (Additional file 2) were guided by PIET-T constructs and the sub-constructs within them (see Table 2 for example). Emerging findings from the wider ReMission evaluation also guided specific areas of interest to explore within the PIET-T

183   constructs (including patient experiences of the programme during stage one the pilot).

184   Three members of the research team undertook the interviews (WN, LP, NN), one with a

185   PhD in public health and two with a master's degree in a relevant discipline (clinical nutrition

186   and health research).

187

188   **2.6 Analysis**

189   Survey responses were analysed descriptively and summarised to provide a brief description

190   of programme characteristics across providers.

191   A deductive thematic analysis, using constructs of the PIET-T model as an *a priori* coding

192   frame was conducted on the interview data. Each interview transcript was coded by one

193   researcher (LP, WB or NN) before codes were organised into tables (MS Word) to present

194   data summaries according to PIET-T constructs, sub-constructs and stakeholder type.

195   Researchers (LP, WB & NN) familiarised themselves with each other's data summaries and

196   convened to discuss coding discrepancies and uncertainties, along with initial interpretations

197   of the data. The lead author (WB) further reviewed data coded to each construct and sub-

198   construct to explore characteristics of the data according to stakeholder type and delivery

199   model. Connections and relationships between sub-constructs were then considered to

200   identify themes within each of the broader PIET-T constructs. Themes were reviewed

201   against the constructs, sub-constructs and data summaries to ensure they were an accurate

202   representation of the data. Proposed themes were sent to the other team members (LP, NN)

203   for review before finalising.

204

205   **3. Results**

206

207   Between January and March 2023 survey responses were received from five service

208   providers (Table 3). One provider delivered the programme via one-to-one in-person

8

209   appointments, one via in-person group programmes, one used remote delivery of group

210   programmes and two offered a range of models dependent on area, both including a digital

211   (app-based) version of the programme.

212

213   Upon completion of the qualitative analysis, seven themes were constructed. The following

214   section presents these themes, along with exemplar quotes.

215

216   **3.1 Population**

217

218   ***3.1.1 Consideration of population characteristics***

219   Within all stakeholder groups (locality lead, referrer, and programme deliverer) and across all

220   delivery models there was variance in knowledge around local population characteristics.

221   Some described a diverse range of sociodemographic and cultural characteristics, or a lack

222   of diversity, but others (across all stakeholder groups) were less aware, suggesting this

223   information was not utilised within their day-to-day roles.

224

225   *Off the top of my head, I absolutely can't (describe characteristics of the population).*

226   *(Locality lead, one-to-one)*

227

228   Characteristics of the eligible population did not often appear to be considered within

229   strategies to engage individuals with the programme. A common referral strategy included

230   'searches' undertaken by personnel in GP practices to identify all eligible people within the

231   locality to invite them to take part.

232

233   *We sent a hundred SMS messages out from a practice two weeks ago to eligible*

234   *patients, and so far only eight have come forward (Locality lead, one-to-one)*

235

9

236 Two locality leads (group and one-to-one) did describe a more targeted approach to ensure

237 that particular target groups were represented, including populations living in areas of high

238 deprivation.

239

240 *What we're trying to encourage is that the programme lead tries to actively engage*

241 *with deep-end practices, the ones in really deprived areas. (Locality lead, group)*

242

243 But there was agreement across all locality leads and referrers that their recruitment strategy

244 was to engage the highest number of people as possible, as opposed to a targeted

245 approach to fill the programmes. For example, one locality lead, (one-to-one) described how

246 they tried to instil some urgency in GP practices, by suggesting there was a cap on the

247 number of spaces available.

248

249 *We opened up the gates right at the beginning and said, "We've got 600 places;*

250 *first come first served" (Locality lead, one-to-one)*

251

252 ***3.1.2 Stakeholder perceptions of service user's attitudes towards the intervention:***

253

254 *Acceptability of programme delivery models*

255 All interviewees perceived that acceptability of the programme's delivery model was

256 influenced by a person's individual circumstances One locality lead (group) explained that

257 digital access was a problem in rural areas and within the older population, and two

258 programme deliverers (delivering a range of delivery models) felt that digital delivery was

259 more suitable for people in full-time employment. All stakeholders described the pros and

260 cons of each delivery model and said that personal preferences of the participants was also

261 likely to influence acceptability.

262

10

263   *I think in my opinion I would like a bit of a choice for people. Some people are shy;*

264   *they don't want to go in groups. They would rather be maybe one-to-one or even a*

265   *Teams, something over Teams. Some of these people have chaotic lifestyles*

266   *anyway and trying to get to the church hall on a Wednesday night at six o'clock might*

267   *not be possible (Locality lead, group).*

268

269 *Acceptability of TDR products*

270 Views of the TDR products were positive amongst all stakeholder groups, although some

271 locality leads and referrers acknowledged a limited choice of products, unfavourable taste or

272 lack of a vegan option. One referrer explained that people know what to expect from a liquid

273 diet:

274

275   *It's just a liquid diet really which doesn't sound appealing, even if you're engaged. It*

276   *looked pretty good to me, and most people are aware of meal replacement kind of*

277   *regimes, for better or for worse (referrer, one-to-one).*

278

279 The majority of locality leads, referrers and programme deliverers perceived that once

280 people were signed up to the LCD programme, compliance with TDR was high, as it negated

281 the need to plan and prepare cooked meals. One locality lead (group) and two referrers

282 (one-to-one and group) remarked on the perceived cost savings to patients as the TDR

283 products were provided free of charge.

284

285   *I think the fact that the soups and shakes are provided free of charge is definitely*

286   *a bonus (Locality lead, group)*

287

288 *Barriers to sustaining motivation*

11

289 Interviewees across all stakeholder groups raised concerns about sustaining motivation on

290 the programme beyond the TDR phase. Programme deliverers (one-to-one) expressed that

291 they felt unable to meet the needs of individuals who requested more support around meal

292 planning due to a lack of time. Many referrers and programme deliverers described how

293 service users could feel disheartened after gaining weight, or felt anxious about

294 reintroducing food, leading them to drop out.

295

296 *There is an extra anxiety about [re-]introducing food, because people have seen*

297 *the results from the TDR shakes, and even if they were to introduce 900*

298 *calories of actual food, they still feel quite anxious (Programme deliverer, one-*

299 *to-one)*

300

301 A person's personal circumstances was also perceived by referrers and programme

302 deliverers to be influential on sustaining motivation, for example, some described that

303 maintained engagement was more likely if service users had family support and high

304 psychological wellbeing.

305

306 *I've sometimes got clients that live on their own or they maybe are on*

307 *antidepressant tablets, things like this, they find it a bit more difficult.*

308 *(Programme deliverer, one to one)*

309

310 **3.2 Intervention content**

311

312 ***3.2.1 Stakeholder perceptions of supporting evidence base***

313

314 Interviewees across all stakeholder groups and delivery models perceived there to be a

315 strong supporting evidence base for the LCD programme. During interviews, locality leads,

316 referrers and programme deliverers described the randomised controlled trials that had

12

317   taken place to measure effectiveness. However, it was expressed by locality leads (one-to-

318   one), referrers (one-to-one, group) and a programme deliverer (one-to-one) that long term

319   outcome data was currently lacking.

320

321   *I thought the DiRECT trial was astonishing [...] but we can't 100% hand on heart*

322   *say we know that it's going to actually save your life because we haven't got the*

323   *data yet (Referrer, one-to-one)*

324

325   Locality leads and referrers also described how they needed to rely on anecdotal evidence

326   to understand programme impact, as participant level outcome data (and data on who

327   attended and completed the programme) was not consistently reported back to them.

328

329   *It would be nice to get more collated feedback from [service provider] about the*

330   *people we've referred because it's been sporadic (Referrer, one-to-one)*

331

332   **3.2.2 Character of intervention**

333

334   *Complexity of the referral process*

335

336   The referral process was described as complex by almost all interviewees, involving the

337   completion of a multiple-page form and, in some cases, undertaking a de-prescribing

338   process for patients (if on medication) before they could start. This complexity was perceived

339   to cause 'bottlenecks' in the process, resulting in delays to programme start dates and

340   disengagement of some referrers.

341

342   *It has been a challenge, getting referrals in, you know, a referral takes at least*

343   *20 minutes for a GP. (Programme deliverer, delivering range of delivery*

344   *models)*

    13

345

Core elements and key functions

347

348 All interviewees agreed that the core element of the LCD Programme was the 12-week TDR

349 phase. Locality leads, programme deliverers and referrers described that as service users

350 tended to be compliant with this phase, weight loss and the possibility for remission of T2D

351 usually followed. Some programme deliverers (one-to-one and digital) mentioned other

352 elements of the programme, such as behavioural elements that were proposed to support

353 long term behaviour change (e.g., goal setting). But one referrer believed the programme

354 offered only a short-term fix.

355

356 *It is a short-term fix, it's a tool to get you somewhere. It's not a long-term*

357 *lifestyle view (Referrer, one-to-one)*

358

359 Programme deliverers implementing the one-to-one model described flexibility in its

360 structure, which was mostly led by the service user who would attend the session with

361 issues or questions that formed the basis of the session. This was in contrast to group

362 sessions which was described by one locality lead (group) as being more prescriptive.

363

364 **3.3 Environment**

365

366 **3.3.1 Characteristics of local and organisational setting**

367

368 Locality leads and referrers involved in implementing all delivery models expressed

369 frustrations around T2D care. For example, one described a fragmented way of working, and

370 a lack of joined up thinking. Wider issues were also described including being overworked, a

371 large turnover of staff and underfunding.

372

14

373   *Certain surgeries have their own problems with staffing or engagement,*

374   *particularly with diabetes and things like that. But it is just a national issue*

375   *when it comes to primary care. (Referrer, one-to-one)*

376

377 However, these issues were not universally voiced and, in general, locality leads and

378 referrers felt optimistic about the programme and described successful ways of working to

379 reduce pressures on GPs, including the involvement of clinical pharmacists and specialist

380 nurses in the referral process.

381

382   *I suggested we get the pharmacists on board because the pharmacists*

383   *probably had a bit more time available [...] and usually that worked well*

384   *(Referrer, one-to-one)*

385

386 **3.3.2 Stakeholder's perception of accessibility**

387

388 The upper age restriction within the eligibility criteria was described by one referrer as

389 limiting access which they felt was disappointing.

390

391   *I referred one person who I was really keen on referring, and they were outside*

392   *the age band and that was a bit of a disappointment because they were 66 or*

393   *67. (Referrer, one-to-one)*

394

395 Locality leads, referrers and programme deliverers across all delivery models gave

396 examples of population groups that were perceived as being unable to access the

397 programme including individuals who did not speak English or with learning disabilities:

398

399   *We have asked if the materials for the course are suitable for people with*

400   *learning disabilities […] and what they have said is they don't have any*

401   *videos. People can come along and join the programme, however, there is a*

402   *level needed as to whether they retain, understand all of the information*

403   *(Locality lead, group)*

404

405   Some programme deliverers (group) described how they had attempted to make the

406   programme more accessible for their local population by scheduling programme start dates

407   to fit around religious holidays and adding spices to products. One also described how they

408   had been able to run a group in Urdu and developed culturally appropriate resources.

409

410   **3.4 Transferability**

411

412   **3.4.1 Methods to promote GP engagement**

413

414   From a locality lead and referrer perspective, the main barrier to implementation of the

415   programme was securing engagement from GP practices. Some described how they

416   convened multidisciplinary groups to agree strategies on how to secure engagement. Some

417   locality leads described using a multitude of communication methods to promote interest and

418   knowledge, such as webinars, bulletins and training.

419

420   *We decided to do three group sessions for patients who were eligible [...] then*

421   *as part of the session we offered to refer anybody who then wanted to be*

422   *referred and almost everybody took it up, which is brilliant (Referrer, digital).*

423

424   **4. Discussion**

425

426   This study describes factors that could influence transferability of the LCD programme from

427   its pilot to the national roll-out Although many interviewees understood some characteristics

428   of their local populations, few described how this influenced their referral approach. Instead,

     16

429   efforts often focused on filling referral places by using "cold", non-targeted methods that

430   were less resource-heavy [14]. These referral approaches were also reported by localities

431   implementing the programme in stage one of the pilot [15], reflecting the widely

432   acknowledged challenge to balance quantity over quality of referrals [16] Prior research in

433   the wider Remission evaluation also found that some commercial providers preferred

434   referrals from those more likely to succeed to demonstrate the programme's effect [17].

435   However, ensuring uptake from target populations or subgroups which are identified as

436   having the greatest need promotes effectiveness of the programme overall, precisely

437   because it promotes the equitability of the programme [18, 19]. Efforts to address equity

438   during the planning and organisation of programme mobilisation or transfer can be taken by

439   using tools, such as the equity impact assessment tool. Doing so ensures that an equity

440   perspective is adopted from the start, which can be subsequently managed throughout

441   programme delivery [20]. However, in order to refine a targeted referral approach, a precise

442   understanding of the local population is needed, along with agreement among stakeholders

443   on where inequities exist, through the provision of good quality and timely data. The need for

444   routine data to monitor referrals in real time was also highlighted in the national evaluation of

445   the NHS Diabetes Prevention Programme delivered in England [6].

446

447   Offering participants a choice of delivery model was perceived by interviewees in this study

448   as promoting acceptability and accessibility of the programme. Factors such as age,

449   employment status, and digital access were described as influencing whether service users

450   found the programme acceptable. Although this element of the study did not explore

451   experiences of service users directly, these findings are in line with previously reported

452   factors influencing participation in similar programmes [21-23]. Going forward, digital

453   methods are likely to be favoured in the delivery of health interventions, particularly in T2D

454   and obesity care [24]. It is planned that service users will be offered the choice of digital or

455   one-to one in the national roll-out of the LCD programme. One to one delivery of the LCD

456   programme was valued amongst programme deliverers in this study, due to the intensive

17

457   support they were able to provide to individuals. Previous research has also demonstrated

458   that service users value one-to-one delivery [25]. However, the benefits of group delivery of

459   TDR interventions are also accepted, including opportunities for peer support, greater

460   potential for scalability and reduced dropouts [26].

461

462   Our findings highlighted differences in the way the programme was delivered in respect to

463   the delivery model. The one-to-one model was reported to be service user led, and more

464   aligned to a person-centred approach which has been found to help service users address

465   specific barriers to weight management within their own life circumstances [27, 28]. In a

466   previous study exploring participant's experiences of a TDR intervention delivered one-to-

467   one, participants explained that the counsellor who delivered the programme was the most

468   important aspect of taking part, including their knowledge of dealing with common difficulties

469   and ways to improve the flavour of TDR products [29]. A study undertaken as part of the

470   wider ReMission evaluation reported that person-centred delivery was also more successful

471   in one-to-one sessions [30].

472

473   Some programme deliverers described ways in which they had been sensitive to their

474   service user's cultural context during delivery of the programme, such as consideration of

475   religious holidays and ensuring meals were culturally appropriate. Previous research

476   explored the experiences of individuals from a South Asian ethnicity undertaking the LCD

477   programme which found that participants valued ethnically matched peer support, language

478   specific groups and cultural tailoring in the delivery of the programme, again highlighting the

479   importance of person centred, culturally appropriate delivery of the programme [31]

480

481   The core element of the LCD programme was mainly described as the 12-week TDR phase.

482   The theoretical basis of the wider programme was described less by interviewees. This

483   could be due to interviewees understanding less about the impact of behaviour change

484   components. An earlier study reported a lack of underpinning theory and fidelity to BCTs

485   within the pilot of the LCD programme [32]. But, unless programme theory is explicitly used

486   and understood, evaluation of a programme's impact is challenging, along with

487   understanding a programme's suitability to a new context during transfer.

488

489   The referral process for the LCD programme was perceived as being complex. Previous

490   studies have reported worries around the volume of work and disturbed workflow introduced

491   by new and existing programmes as influencing engagement from primary care practitioners

492   [33]. In this study, some described engaging a wider pool of health professionals to support

493   programme referrals, such as enlisting clinical pharmacists to undertake de-prescribing of

494   medications. Indeed, the potential role of pharmacists in the management of T2D is

495   increasingly being recognised [34].

496

497   **4.1 Strengths and limitations**

498   This study used a theoretical approach to understand transferability of the LCD programme

499   by understanding its implementation across 11 pilot sites. The PIET-T model, developed

500   using a rigorous approach and informed by the literature provided structure to the study and

501   prompted consideration of pertinent factors that could influence transferability:

502   characteristics of the population, intervention, environment and the transfer process. The

503   model itself suggests that these factors should be explored within individual contexts where

504   an intervention has been known to be effective, before considering the intervention's

505   suitability to a new 'target' context. Here, we have explored PIET-T constructs across 11

506   sites to draw broad conclusions about optimising its transfer. Our sampling strategy sought

507   to explore the perspectives of three stakeholder groups (locality leads, referrers and

508   programme deliverers) involved in delivering the programme, ensuring representation from

509   all delivery models. Our results did not highlight a contrast in experiences between

510   stakeholder groups or delivery models, suggesting the findings were consistent between

511   sites. We suggest commissioners and / or service leads from target contexts undertake their

512   own assessment of comparability to inform the development of strategies to mitigate

19

513 challenges or consider potential adaptations. Our transferability assessment did not capture

514 the perspectives of service users directly to consider transferability of the programme.

515 However, exploration of service user experiences was undertaken at length within the wider

516 ReMission study to explore what works for whom and why, and so interviews with this

517 population group were not repeated for this study. Emerging findings from these interviews

518 were considered when developing our topic guides (e.g. preferences for delivery models and

519 accessibility of the programme) and the full findings are reported separately [10-12]. We

520 suggest perspectives of service users should be considered by those within target contexts

521 to understand how their own population might interact with the programme.

522

523 **4.2 Recommendations**

524 Based on our transferability assessment we provide the following recommendations on how

525 to optimise transfer of the LCD or similar programmes.

526 • Ensure that all involved in programme planning and delivery are aware of local

527 characteristics of the population so that strategies to reach underserved groups can

528 be developed. Utilise population data as available to refine referral approach.

529 • Undertake local Equality Impact Assessments at the start of programme planning to

530 consider how to prevent issues of inequity, and ensure that these assessments are

531 actively reviewed on a regular basis.

532 • Ensure timely reporting and collation of good quality data on service user referrals

533 and outcomes, to enable local teams (including referrers) and patients to understand

534 who is enrolled on the programme locally and their progress/outcomes. Reviewing

535 national health audit data (e.g., National Diabetes Audit data) to highlight how

536 programmes supports service users after the programme has ended should also be

537 considered.

538 • Consider offering a range of delivery models to optimise both acceptability and

539 accessibility of the programme.

20

540 • Ensure referrers have a good understanding of cultural implications of the

541 programme across a wide range of communities.

542 • Ensure person-centred support is offered, including adequate support during food re-

543 introduction, signposting for anyone with ongoing mental health complications and

544 tailoring programmes to meet the needs of individuals, particularly those with learning

545 difficulties or who do not have English as their first language.

546 • Ensure programme deliverers receive appropriate training on behaviour change

547 delivery and underpinning theory of change.

548 • Work with health professionals to consider how referral processes can be

549 streamlined to ensure minimal burden on GPs.

550 • Ensure eligibility criteria are regularly reviewed to ensure people are not excluded

551 from programmes who could benefit.

552

553 5. **Conclusions**

554

555 Stakeholders in this study had confidence in the LCD programme and were happy to refer

556 people, suggesting new localities may also view the LCD programme favourably. A greater

557 understanding of long-term outcomes could further increase confidence. Population demand

558 and accessibility of the programme is likely influenced by the delivery model on offer,

559 suggesting that a range of delivery methods could be offered to optimise transferability.

560 Referral strategies to reach underrepresented groups should be considered from the start of

561 programme planning to ensure equity in uptake and impact, based on a precise

562 understanding of the local population. Good quality and timely data is needed to inform

563 localities of who in their area is accessing and benefiting from the programme.

564

565 **Funding**

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569 **Table 1** Interview participant characteristics

570

Stakeholder type	n	Delivery model	Population deprivation levels within the participant's locality	Gender (M/F)
Locality lead	7	3 Group 3 One-to-one 1 Digital	3 working in locality with lower than average deprivation 4 working in locality with higher than average deprivation*	7 Female
Referrer	9	3 Group 4 One-to-one 2 Digital	4 working in locality with lower than average deprivation 5 working in locality with higher than average deprivation*	7 Female 2 Male
Programme deliverer	9	1 Group 4 One-to-one 1 Digital 3 Deliver all three models	1 working in locality with lower than average deprivation 5 working in locality with higher than average deprivation* 3 work across multiple localities	8 Female 1 Male

571 * With the exception of some unique districts that have lower than average deprivation levels

22

572   **Table 2** Example questions within each PIET-T construct

573

Population	The population characteristics in the primary context	Can you explain how you consider the characteristics of your local population when making referrals?
Intervention	Characteristics of the evidence base in terms of utility / usefulness and quality	Can you explain what you understand to be the evidence base surrounding the programme?
Environment	Characteristics of the health care system and service provision	How has the roll out and delivery of the programme been influenced by wider system priorities?
Transfer	Characteristics of adoption and implementation	What has been important to facilitate rollout of the programme in your local area?

574

575 **Table 3** Summary of programme characteristics by each service provider
576

Service provider	How is programme delivered	Profession of programme deliverer	Product range available during TDR phase	What kind of dietary advice is issued during programme	Physical activity component	Tailoring
1	One to one in person appointments	Registered nutritionist x 2	Soups and shakes	Healthy eating principles, personalised meal plan, low carbohydrate diet	Included in weight maintenance phase (no further details provided)	No
2	In person group programme accessed by maximum of 15 individuals	Trained non-specialists (although mainly registered dietician and nutritionists)	Soups, shakes, bars, pre-prepared meals	Healthy eating principles	Physical activity advice, Signposting to local programmes and provided Physical activity app	Coaches available who can facilitate women only groups and Urdu-speaking groups. Workbooks enable individuals to follow-up after session if needed due to language difficulties or learning disabilities
3	Remote group programme accessed by maximum of 15	Health coaches - Dieticians and nutritionists	Soups and shakes	Healthy eating principles, personalised meal plan	Physical advice only, signposting to local services	No
4	Dependent on area - in person 1:1, digital (app	Diabetes practitioners	Soups and shakes	Healthy eating principles	Physical activity explored with service users including how	Gender specific groups if required.

1

	based with live chats or app texts), remote group				to overcome barriers. Information on local leisure activities also provided.	Language specific groups Additional resources to meet differing learning styles Tailoring also available to meet other needs including, visually and hearing impaired and anthropophobia
5	Dependent on area - in person 1:1, digital (app based with live chats or telephone calls), remote group	Dietitians and health coaches with varying professional backgrounds (including nutritionist, dietetics assistants)	Soups and shakes	Healthy eating principles (5-a-day, Eatwell Guide), Personalised meal plan Intermittent fasting Low fat diet Low-carbohydrate diet Prescribed energy deficit	Physical activity advice only	The dietitian delivering the programme ensures tailoring to the individual patient need, e.g. of content or access requirements

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