BMJ Open

# Implementation of the Diabetes Community Exercise and Education Programme (DCEP) for the management of type 2 diabetes: qualitative process evaluation



| | |
|---|---|
| Journal: | *BMJ Open* |
| Manuscript ID | bmjopen-2021-059853 |
| Article Type: | Original research |
| Date Submitted by the Author: | 03-Dec-2021 |
| Complete List of Authors: | Stokes, Tim; University of Otago Dunedin School of Medicine, Department of General Practice & Rural Health<br>Wilkinson, Amanda; University of Otago Division of Health Sciences, School of Physiotherapy<br>Jayakaran, Prasath; University of Otago Division of Health Sciences, School of Physiotherapy<br>Higgs, Chris; University of Otago Division of Health Sciences, School of Physiotherapy<br>Keen, Donna; University of Otago Division of Health Sciences, School of Physiotherapy<br>Mani, Ramakrishnan; University of Otago Division of Health Sciences, School of Physiotherapy<br>Sullivan, Trudy; University of Otago Dunedin School of Medicine, Department of Preventive and Social Medicine<br>Gray, Andrew; University of Otago Division of Health Sciences, Biostatistics Centre<br>Doolan-Noble, F; University of Otago Dunedin School of Medicine, Department of General Practice and Rural Health<br>Mann, Jim; University of Otago, Department of Human Nutrition<br>Hale, Leigh; University of Otago Division of Health Sciences, School of Physiotherapy |
| Keywords: | DIABETES & ENDOCRINOLOGY, PRIMARY CARE, QUALITATIVE RESEARCH |
| | |

*I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.*

*The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.*

*Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.*

# Implementation of the Diabetes Community Exercise and Education Programme (DCEP) for the management of type 2 diabetes: qualitative process evaluation

Tim Stokes,[1*] Amanda Wilkinson,[2] Prasath Jayakaran,[2] Christopher Higgs,[2] Donna Keen,[2] Ramakrishnan Mani,[2] Trudy Sullivan,[3] Andrew R Gray,[4] Fiona Doolan-Noble,[1] Jim Mann,[5] Leigh Hale.[2]

[1]Department of General Practice and Rural Health, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

[2]School of Physiotherapy, University of Otago, Dunedin, New Zealand

[3]Department of Preventive and Social Medicine, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

[4]Biostatistics Centre, University of Otago, Dunedin, New Zealand

[5]Department of Human Nutrition, University of Otago, Dunedin, New Zealand

**Corresponding author**

Professor Tim Stokes: tim.stokes@otago.ac.nz

Department of General Practice and Rural Health, Dunedin School of Medicine, University of Otago, PO Box 56, Dunedin 9054, New Zealand

## ABSTRACT

**Objectives:** To examine context-specific delivery factors, facilitators and barriers to implementation of the Diabetes Community Exercise and Education Programme (DCEP) for adults with type 2 diabetes (T2D) using the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) Framework.

**Design:** A qualitative evaluation embedded within the DCEP pragmatic randomised controlled trial. Data collected via focus groups and interviews and analysed thematically.

**Setting:** Community-based in two cities (Dunedin and Invercargill) in the lower south island of New Zealand.

**Participants:** Seventeen adults diagnosed with T2D attending DCEP and 14 healthcare professionals involved in DCEP delivery.

**Intervention:** DCEP is a twice weekly session of exercise and education over 12 weeks, followed by a twice weekly on-going exercise class.

**Results:** Whilst we met our reach target (sample size, ethnic representation), the randomisation process potentially deterred Māori and Pasifika from participating. Promoting self-referral, primary healthcare organisation ownership and community champions could extend reach. DCEP was considered effective based on perceived benefit. The social and welcoming environment created relationships and connections. People felt comfortable attending and empowered to learn. Key to implementation and adoption was the building of trusting relationships with local health providers and communities. This takes time and care and cannot be rushed. Training of staff and optimising communication needed further attention. To maintain

DCEP, delivery close to where people live and a generic approach catering for people with multiple chronic conditions may be required.

**Conclusions:** For success, lifestyle programmes such as DCEP, need time and diligence to build and maintain networks and trust. Relationships extend beyond frontline delivery staff and target populations, to local healthcare organisations and communities. Access and ongoing attendance are enabled by health care professionals practicing in a nuanced person-centred manner; this, plus high staff turnover, necessitates on-going training.

*Abstract word count: 292*

## Strengths and limitations of this study

| |
|---|
| • Data were collected from both DCEP attendees and healthcare professionals involved in DCEP, delivery, enabling capture of wide and diverse opinions.<br>• |
| • The initial focussing analysis to identify key topics may have missed smaller and possibly important issues that merited consideration.<br>• |
| • Although our RCT met ethnic representation, this qualitative evaluation had low Māori or Pasifika representation.<br>• |
| • Whilst the interviewers were ethnically diverse, the three researchers who analysed the data were Pākehā (non-Māori) negating a Māori or Pasifika lens to the analysis. |

## INTRODUCTION

Type 2 diabetes (T2D) is a substantial health issue. Globally, 8.5% of adults aged 18 years and older are estimated to have T2D.[1] In Aotearoa/New Zealand (NZ) over 250,000 people are estimated to have T2D (self-reported prevalence 5.9%), with high prevalence among Māori (7.9%), Pasifika (13.6%), and people living in low socioeconomic areas (10.4%).[2] Alongside blood glucose control via medication, diet control and being physically active are the key evidence-based components of management.[1] In NZ, diabetes primary healthcare is provided by general practitioners (GPS) and nurses focussing on screening and diagnosis, education and pharmacological management.[3 4] The educational component is largely achieved via referral to the Diabetes Education Self-Management Newly Diagnosed and Ongoing Diabetes (DESMOND) programme, a one-day group-delivered educational programme.[5] There are very few exercise or physical activity programmes delivered by healthcare professionals (HCPs). To address this challenge in the southern region of NZ, we developed the Diabetes Community Exercise and Education Programme (DCEP), which has now been in existence for over 10 years.

DCEP is a group exercise and educational programme, tailored to individual needs, and specifically designed to enable access for Māori, Pasifika, and people living in low socioeconomic areas. The aim of DCEP is to support adults living with T2D to take control of their health and to live well with their long-term condition. There are two parts to DCEP. Participants attend a twice weekly exercise and education session for 12 weeks, followed by a twice weekly maintenance exercise class. The programme has previously been described in detail.[6] The potential benefits of DCEP highlighted in a

feasibility study,[7] justified a pragmatic randomised controlled trial (RCT) to evaluate the effects of DCEP (plus usual care) on the glycated haemoglobin (HbA1c) levels, physical health outcomes and health-related quality of life of individuals living with T2D, compared to usual care alone.[6] The target sample size for the primary outcome (glycaemic control) was 220 individuals with T2D which included a 40% dropout rate. We recruited and analysed data from 169 and 165 participants, respectively. Although the results of the RCT showed no statistically significant between-group differences for both the primary outcome (blood glucose control - HbA1c) and secondary outcomes (Incremental Shuttle Walk Test, body weight, waist circumference, blood pressure, quality of life measures) at one-year follow-up, the trial was successful in engaging its target population and there was good attendance in the first 12 weeks (as described below).

Reflective of the ethnicity in the lower South Island of NZ, 14% of the cohort were Māori and 6% Pasifika, with 27% of participants living in areas considered by the NZ Deprivation Index to be in the most deprived deciles (deciles 9 and 10).[8] Adherence to the 12-week DCEP intervention was 41% for ≥20/24 sessions, 15% for 15-19/24 sessions, 21% for 2-15/24 sessions and 23% for no attendance or one session. Attendance at the subsequent maintenance classes was however poor (23% attending >50% and 35% attending 10-40% of available sessions, with 42% attending no sessions).

Given the success in targeting the populations of interest and initial attendance at DCEP and NZ's current health inequities, and associated poorer outcomes for Māori,[9] [10] an in-depth explorative evaluation of DCEP is warranted to inform future practice.

This paper reports a qualitative process evaluation to identify practical ways to improve DCEP delivery and inform its future development. This evaluation, embedded within the RCT, aimed to examine the context-specific delivery factors, facilitators and barriers to implementation of the DCEP using the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) Framework.[11]

## METHODS

### Study Setting

This community-based study took place in in two separate urban centres in the lower South Island of NZ: Dunedin (Otago Region) and Invercargill (Southland Region) in community exercise venues.

### Design

A qualitative process evaluation of DCEP was undertaken as part of a two-arm parallel, open label RCT (ACTRN12617001624370). The trial protocol has previously been published.[6] The trial recruited adults (age ≥35 years) with a diagnosis of T2D via general practices and public advertisements. DCEP was introduced sequentially, starting in Dunedin and then three months later in Invercargill. Following baseline evaluation, participants were randomly allocated to either DCEP (plus usual care) or usual care. Participants randomised to DCEP attended the 12-week programme and then continued in the maintenance programme for a further 12 months.

### Data collection

Interviews and focus groups were held at both study sites following the 12-week programme and at the end of the trial until data saturation occurred. Semi-structured interviews were used with DCEP attendees and any attending whānau (family). Guided by their availability or for logistical reasons, we used either interviews or focus groups for the HCPs involved in DCEP. The interview topic guide was informed by The Consolidated Framework for Implementation Research (CFIR).[12] (Table 1). All interviews and focus groups occurred at a mutually arranged time and place, were audio-recorded with permission and were about one hour long. Research assistants, with bachelor's degrees and from a variety of backgrounds (nursing, psychology, social science) and ethnicities (Māori, Pākehā (non-Māori)) and known to the attendees, undertook the interviews. All audio recordings were transcribed verbatim by a professional transcription company.

**Table 1: Interview topic guide**

| |
|---|
| **Questions for both DCEP attendees and healthcare professionals:** |
| Tell me about your experience of DCEP? |
| How could we improve DCEP? |
| How suitable / appropriate / acceptable is DCEP for your community? |
| How can we make DCEP continue in your community beyond the trial? |
| |
| **Additional healthcare professional questions:** |
| What are the important aspects of DCEP? Why? |
| In order to deliver DCEP, what are important attributes / training do healthcare professionals require? |
| How did DCEP influence your practice? |

## Data analysis

Data were first thematically analysed using the General Inductive Approach, a pragmatic approach specifically designed for evaluative health research.[13 14] Three

researchers (AW, LH, TSt) read the transcripts multiple times to gain an understanding of the key topics of interest, coded them accordingly and identified illustrative quotes. To assist defining these key topics, a short precis was written by AW for each transcript summarising the main points of the interview. The transcripts of HCPs were analysed first. The key topics were then further analysed over two stages using both the CFIR and RE-AIM frameworks.[15] The rationale for using both frameworks is that CFIR enables the understanding of the "why" of success (or not) of implementation while the RE-AIM describes the practicalities of the outcomes (the who, what, where, how, and when).[15 16] In the first stage, the relevant constructs and domains from the CFIR were used to deductively explore and organise data. To further categorise the organised data, in the second stage, the five RE-AIM domains were applied by AW and LH. Multiple discussions between the research team members (AW, LH, TSt) finalised the analysis by consensus. The consolidated criteria for reporting qualitative research (COREQ)[17] were used to inform reporting of the study findings (Supplementary File 1).

### Patient and public involvement

Patients or members of the general public were not involved in the design or conduct of this study.

## RESULTS

Seventeen DCEP participants, adults (female=11,male 3, age range 39-76, mean age 61 years; non-Māori=13, Māori=3, Cook Island Māori=1) diagnosed with T2D and randomised to DCEP, consented to interview. Fourteen HCPs (female=10, male 4, Māori=1) were interviewed, these included two physiotherapists, four nurses, the

clinical DCEP lead, a pharmacist, a podiatrist, a dietitian, an administrator, a Primary Care Liaison Coordinator for Arthritis NZ, a General Practitioner (GP) and a counsellor. Table 2 presents a summary of the key CFIR domains identified. Supplementary file 2 presents the detailed CFIR findings along with illustrative quotes. Below we present the findings relative to the RE-AIM framework domains (namely, Reach, Effectiveness, Adoption, Implementation, and Maintenance).

**Table 2: Summary of the key CFIR domains**

| Domains | Summary |
|---|---|
| Individual | Training and good communication of HCPs was crucial – they had to buy into the philosophies of DCEP and person-centred care and be trained into the nuances of delivering individualised care and attendee driven education within a group setting. Further, HCPs had to have, or develop, the ability to create trusting and caring relationships with attendees thus enabling a social and welcoming atmosphere and encouraging attendance. In turn, the supportive social environment enhanced the relationships and interactions of attendees, so they derived benefit from each other. Additionally, the correct venues had to be found (for example, in terms of location, safety, access both to and into, temperature, culturally acceptability, inexpensive to hire); the time in the day for the class was crucial (for example, not impacting on work); and the correct equipment purchased (for example, durable, practical, easily transportable and stored). |
| Inner setting | The most prominent findings were securing appropriate HCPs and their ongoing training. |
| Outer setting | The outer setting both assisted and offered challenges to implementation. Whilst we had long standing and strong relationships with many HCPs, for the trial we needed to work with new healthcare providers. We found that we rushed the process with some new healthcare providers or did not quite understand the local political environment for others. As we were not merging DCEP into an existing healthcare practice but rather setting up an independent community-based class, we learnt the necessity of taking time, and focused energy, as well as having local champions, to build such relationships and good communication strategies. Further, the navigation of relationships was ongoing as HCPs changed – both those that delivered DCEP and the managers of the services involved. Ongoing funding was another major challenge to the sustainability of DCEP. |
| Characteristics of individuals | Attendees talked about their increasing self-efficacy to manage their health, undertaking self-management activities and growing more comfortable to attend DCEP. |

**Reach**

As described above, the RCT attained its targeted sample size, and its ethnic composition was reflective of that of the study setting. HCP participants suggested however that the RCT randomization process challenged recruitment as it was considered culturally unacceptable for Māori and Pasifika. For these populations, whānau (family) support is important and potential participants would have been more comfortable if they could attend together; the possibility of being randomised to different groups as individuals was undesirable.

> *[Our] community feel more comfortable coming in groups. [I] recommend they be randomised together. [I] can then go along with them to whatever programme they get randomised to [to facilitate introductions and help create relationships]. [If] this could be the case, I am happy to promote the research on my marae and to the general practice.* [Nurse]

Referral into the trial was assisted by community champions of DCEP.

> *We just got a few champions [to work with us]. We got this big practice and got a nurse onboard. She just worked with a lot people with diabetes and just referred them*. [Clinical Lead]

However, there was a need for improved communication channels, beyond GPs, for getting information about DCEP out and how people could self-refer to it.

> *I do the [name of clinic] at the hospital as well, and I give it [information about the programme] out to people who come in to see me. As soon as I said, 'You need to see your GP [to get a referral],' some said, 'I don't know about it.' They didn't want to contact their GP 'cos they thought of that as an extra expense [paying to see the GP to get a referral to the programme]. … It was a big barrier.* [Podiatrist]

*You can self-refer into the study.* [Interviewer]

It was thought that having a primary healthcare organisation (PHO) endorse, fund and run DCEP would increase general practice referral; thus, mitigating the observed resistance from some general practices about referring patients into DCEP.

*We had some resistance from general practices about referring ['their' patients]. … So, I think if the PHO owned it, they would promote it around their respective practices. They would target their practices that they identified as having high-needs patients [who would benefit from participating in DCEP].* [Clinical Lead]

**Effectiveness**

Both attendees and HCPs expressed a range of positive beliefs about DCEP. The group approach of DCEP facilitated relationship development amongst the whole group, both between HCPs and attendees, and amongst attendees themselves.

*I try and engage with everyone to start with … when people are doing their thing, I'll walk around and chat and I'll do that connecting. I am working on a kind of personal connection, not just a 'I'm your physio' kind of connection but actually finding out a bit about them, [like asking] 'What do you do?' I'll [also] share a little bit about myself and so I sort of engage them from there. When the bikes are together, you end up having a conversation with two people at the same time and [then] they end up talking.* [Physio]

The group nature of DCEP intervention also encouraged inclusion of family/whānau (important in Māori culture). Family came along to support and joined in with the education and exercise sessions.

*I really like the idea of [the approach of DCEP]. Instead of just being [targeted at] one person with diabetes, it's actually engaging for whānau to come and do this [join in]. So, it's been wonderful to see husbands and wives coming in and talking and walking that journey together.* [Nurse]

Attendees (A) stated meeting people, connecting and enjoying each other's company was key to their continued attendance.

*I guess that was one of the reasons why we kept going back, because we had some laughs and because we were comfortable.* [A639]

Others suggested that DCEP was an integral, positive and supportive part of their lives.

*It's been a tough couple of years, but for us, DCEP has been an important part, a positive part [of our lives]. It's been a real support [from] both a health and physical fitness point of view.* [A577].

One participant stated that attending DCEP had changed her health care behavior.

*Something the programme has encouraged me to do [my blood sugar levels] and I do it almost every day. Before I have my cup of tea, or first thing in the morning before I have anything [to eat].* [A324]

Attendees also found the HCPs welcoming and appreciated the individual attention that provided exercise tailored to their needs.

*[physiotherapist] was prepared to work with us all individually if we required it, and if we had any specific issues that she could help with.* [A373]

Attendees considered the format of DCEP, while different from others they had attended, was good and thought provoking. They seemed to enjoy the group

discussions that were facilitated by educators and occurred organically between participants.

> *We have had more discussion from the people within the group during and afterwards. When you are discussing that [new information] among group of people, there are things that come out that you didn't know about.* [A373]

One participant summed up impact of DCEP by stating:

> *I feel better just for meeting the people that I met, doing the stuff that I did, learning what I did.* [A639]

HCPs considered that DCEP had several advantages over the other two usual healthcare options, namely, DESMOND or advice given through routine consultations with members of the primary healthcare team. The group focus provided a non-threatening environment for participants and facilitated revisiting of educational information, while at the same time provided repeated contact with HCPs.

> *I think the points of difference [to usual care], that I can see, is the education component... that constant or continued access, a point of contact to a health professional. It's in an environment that's not threatening because they're there in a big group doing exercise and learning more about their health condition [at every session].* [Nurse Manager]

HCPs suggested the repeated sessions of DCEP provided more opportunity for attendees to ask questions of HCPs.

> *I see it [DCEP] as being really valuable because people often tell us that they don't feel that they have the ability to ask the questions that they really want to ask [at an appointment] due to time pressures.* [Pharmacist]

The ability to create an atmosphere through a suitably curated music playlist enabled HCPs to build group cohesion; an underpinning aspect of DCEP's approach.

> *People said they loved the music. We had a mix. There was island music and all sorts of things …. a real big variation of music and they were like, "This is great!" … Being able to make [the playlist] more personalised and more appropriate for the people that are coming in is important and having that flexibility I think is quite good.* [Physio]

**Adoption**

The DCEP delivery characteristics that supported adoption were underpinned by the longstanding networking and relationship development undertaken with external people and organisations over many years. This led to the successful inclusion of others to support DCEP (e.g. venue, staffing) or for delivery of education sessions.

> *Places where we have had existing relationships, existing trusting relationships [built] over time, [these] have worked. We've had a long-standing relationship with [name of a health provider]. And they've been good. They've supported us. They had their staff running the exercise class long before we had a contract sorted with them. They needed to trust us. And they did. And then there's others … and I've been working with them for years. One person always agrees [to come and talk] and does it free of charge. He sees it as part of his role.* [Clinical Lead]

It was evident in the data however, that taking time to develop relationships and not asking too much of people or organisations, was imperative for the adoption of DCEP by community organisations.

> *We tried to work closely with [name of health provider]. … It didn't go well. … The challenge was that we didn't really have an opportunity to work through the*

*necessary discussions because, all of a sudden, we were asking a lot of them in a relatively short period of time. We managed to sour that relationship through communication not being ideal and just asking for too much, too soon.* [Clinical Lead]

While training of HCPs assisted with engagement in DCEP delivery, HCPs' knowledge and beliefs about DCEP suggested a buy-in to its philosophy was essential. A challenging aspect was engaging HCPs whose daily practice aligned with this philosophy.

*And I do think that if staff aren't clear on some of the values around [DCEP] it is difficult … It's not classic cardiac rehab, or pulmonary rehab. It's not, 'do this', 'do this', or blow whistles. We do try and run [DCEP] with a certain ethos.* [Clinical Lead]

One HCP stated a team player is required.

*I definitely think there are certain personalities that probably fit better with the programme [approach. It's] those people that work in a team. The team needs to be working in order to make [DCEP] work.* [Physio]

Additionally, HCPs recommended that an ability to connect with individuals/family/whānau and facilitate development of relationships was an important attribute for successful implementation of DCEP.

*You certainly need someone who can engage with people [especially] when you've got all these random people that don't know each other, and you need to engage with them and then try and get them to engage with each other! It's quite key to how [DCEP] runs as well.* [Physio]

**Implementation**

Initial training was undertaken with HCPs involved in DCEP delivery via zoom (i.e. introduction and orientation), followed by self-directed study of relevant resources. Sharing of pertinent resources was ongoing and shared with the team via email.

> *I am aware that we try to bring some of the MI [Motivational Interviewing] 'Spirit' to the group setting. The 'Talking to Change' podcast series by Chris Wagner is great but in particular the 5th episode … is specifically related to MI in groups. It is the best explanation, I have heard, of the atmosphere we try to create within DCEP.* [Clinical Lead]

Training updates were held to answer any outstanding or frequently asked questions and to train any new HCPs who had joined since the previous training. However, some HCPs missed these opportunities. New HCPs to DCEP talked about information not being handed on.

> *That was the problem, that none of it [training about what to do] was handed over. Absolutely nothing.* [Nurse]

The orientation training for DCEP was not repeated for new HCPs:

> *No, I don't know that there was any orientation!* [Dietician]

HCPs participants suggested that the networks and communication between and amongst people involved in DCEP could have been more structured and improved. There was also limited networking experienced by educators.

> *You just slot yourself in and move on, don't you?* [Podiatrist]

Limited feedback was provided to educators about content for and applicability of their sessions.

*And nobody came back and said that was a bad talk.* [Podiatrist]

Implementation from an administrative perspective included ensuring that there was good administrator as:

*There was a lot of coordinating and making sure that we had all our ducks in a row basically, to keep it going*. (Administrator)

This included the logistics of finding the suitable venues in which to hold DCEP.

Accessible for, sometimes, older, frailer people with physical disabilities; good parking, ideally, free parking …. trying to break down the barriers, any barriers to access [including culturally appropriate and accessible venues]; and maybe in a good location, as in, um, closer to the high-needs communities where we wanted to work in, with the people with a high incidence of T2D. And then it was a venue that was big enough to house up to 25 people, with bathroom, kitchen… a sound system or something like that. Yep, affordable. And, um, but also, that the exercise equipment… 'cause we've got some exercycles on wheels, some mats, some benches-type things or steps, and some rowing machines. Which are all portable but require storage space. [Clinical lead]

**Maintenance**

An administrator suggested that DCEP, because of its preventative, collaborative and community focus should be an attractive long-term investment for national and local planners and funders.

*From an investment point of view, you cannot underestimate the investment in preventative work* [Nurse Manager].

Additionally, a broader approach that included people with any long-term condition/s should be a consideration moving forward.

> *My personal view is around having [DCEP] as long-term conditions focused, not just diabetes. I think the sustainability in the community, particularly in some of our rural areas, would be difficult with just a diabetes focused programme. It would be a challenge. … Therefore, [if you broaden the programme] you're not doubling up on your resources. You can use the process and get greater 'bang for your buck.* [Nurse Manager]

To achieve sustainability, it was suggested that any programme would need to be delivered close to where people lived, especially in rural areas because that is where people with complex needs and multiple long-term conditions often live because living costs are lower.

> *And travel from [rural town] to [city] is quite difficult and can be expensive for people.* [Nurse Manager]

The timing of the classes was often a major barrier to those who were working.

> *The middle of day obviously excludes a large portion of people from being able to participate.* [Pharmacist]

It also excluded attendees from bringing along their family/whanau.

> *Probably the timing of the programme that didn't allow it for people to take a significant other. But I think if it was in the evenings [around] 6pm, people got a bit more availability.* [Nurse]

Additionally, it was felt DCEP would need to have the local and wider community supporting its implementation and integration into the community.

*Has to be a programme that can be picked up and taken somewhere and supported from a distance. [It would need] good community engagement so that everybody knows it's available for a wider population, and that there is commitment from all the layers [local providers, planners and funders etc.,] who need to be involved. But if it's not a funded programme, then there needs to be a community response to what we're going to do, for the long-term.* [Nurse Manager]

DCEP was also perceived as having value in that it provided exposure to different work environments because:

*physiotherapists have a role in exercise for people with long-term health conditions.* [Physio]

However, for physiotherapists, a tension was evident between the value placed on the approach of DCEP by HCPs and potential HCPs, and the facility to recoup wages at a rate similar to that earned in private practice.

*If you're working in a private practice, that person can be billing for at least 2-3 consultations through ACC, an hour, which brings in quite a bit more money than [the] hourly rate that [the programme could] pay someone. So, approaching a private practice to buy out their staff time [is tricky].* [Clinical Lead]

As DCEP was developed to support people living in low socioeconomic conditions it was offered free to attendees. Funding however to support aspects of DCEP (i.e. venue hire, staff wages) was identified as a perennial issue.

*Funding [laughs]. I mean that always comes up with everything.* [GP]

## DISCUSSION

To inform future development of DCEP and similar lifestyle programmes for people living with T2D, we undertook a process evaluation of the implementation of DCEP into community-based settings within two cities in the lower South Island of NZ. We used a three-stage approach. Initially, key topics of implementation interest were identified through thematic analysis and we then sought to the understand the "why" of success (or not) of our implementation via application of the CFIR framework. To inform future development of DCEP, we identified the practicalities of the outcomes ("the who, what, where, how, and when") using the RE-AIM Framework.[15 16] Below we discuss our findings relative to the RE-AIM Framework.

**Reach**

Whilst we met our reach target (i.e. sample size and regional ethnic representation), had we not had to use the randomisation process of the RCT (thus potentially deterring Māori participants) reach could have been extended. It could have also been further extended had we promoted self-referral in addition to GP referral, given the latter was potentially 'gate-keeping'. PHO 'ownership' of DCEP and community champions could further enhance reach.

The RCT process was found culturally unacceptable to Māori and potentially for other ethnic groups such as Pasifika, potentially reducing the reach of DCEP, similar to a finding in a recent systematic review.[18] Wider literature suggests that the NZ health system's individualised approach to healthcare,[19-21] and by extension that of the RCT randomisation process, denies people the psychosocial benefit attained through inclusion of family/whānau in preventative and rehabilitation programmes.[22]

Further, to improve reach and access to DCEP, wider and enhanced communication targeted directly to people living with T2D was needed, especially emphasing the self-

referral option. Self-referral has been shown to enhance population representation for people accessing psychological therapies for mental health in the United Kingdom (UK)[23] and availability of funding and staff training support to provide community rehabilitation programmes is crucial to equitable access. In contrast, other UK research[24] has found that people on low incomes considered self-referral to be an obstacle to psychological therapies. These authors suggested the need to better understand the complexities of effective referral and/or self-referral in primary care, such as how services are discussed with patients and assumptions about people's readiness to self-refer.[24] Our findings suggest that improving the referral cycle would additionally require 'ownership' of DCEP by local primary healthcare organisations (PHOs), who because of the 'buy-in' would then refer patients into the programme on an ongoing basis. To enable programmes that address issues of inequities for Māori, a strategy 'by Māori for Māori' is crucial,[25] [26] but funding, development and implementation of such programmes continues to be challenge in NZ. As noted in the foreword of the 2019 Health Quality and Safety Commission report: "It is not a matter of favouritism, political correctness or deference to Māori; rather, it is a matter of health and wellbeing and the eradication of inequities."[27]

**Effectiveness**

Essentially DCEP was considered effective in that both attendees and HCPs spoke of the beneficial impact it had in creating a social and welcoming environment which, although founded on relationships and connections, was tailored to the individual. People felt comfortable attending and empowered to learn.

DCEP was valued by both attendees and HCPs because it appeared to offer benefits that impacted wellness and social connectedness, with group interactions and the

ability to build relationships considered important facets. It is well established that development of meaningful relationships with other people generates a feeling of belonging (or social connection) and an improvement in wellbeing and health.[28-31] Further, for older adults, social support, especially from family, is associated with increased engagement in physical activity.[32] Group participation for people with long-term conditions has significant benefits (on, for example, self-efficacy, self-care, quality of life, pain, psychological symptoms).[33] For such populations, numerous factors (such as mental, emotional and physical symptoms)[34 35] or wider social determinants of health[36] make it difficult to develop and maintain support networks, and thus organised healthcare groups can become important enablers. Effective, caring, empathetic communication is a cornerstone of relationship development [30 37] and relationship-centred care.[38] Relationship-centred care is argued to be the founding principle of healthcare provision[38] and is contended to have a positive effect on health outcomes.[39] Our findings further reinforce the substantiation for relationship-centred care in rehabilitation programmes.

**Adoption**

Key to adoption of DCEP were the networking and relationships with local health providers and communities. However, the building of these relationships should not be underestimated – it takes time and should not be rushed. Also, of importance, was whether the HCPs delivering DCEP valued the philosophy of DCEP (based on the 'spirit' of Motivational Interviewing).[40] Training of staff and communication between the various HCPs involved was not optimal and needs further consideration and development.

Not only is relationship centred care important for recipients of healthcare, our findings emphasise the long-term relationship development and networking with healthcare providers and the community required for the initiation and adoption of community-based rehabilitation programmes. This process cannot be rushed, and is an important facilitator of attendance, particularly for indigenous peoples.[15] From an organisational perspective, HCPs felt that champions and the 'right' type of HCPs employed to deliver DCEP were important for adoption. From the perspective of attendees, the inclusive, non-judgemental and welcoming atmosphere of DCEP encouraged their engagement.

**Implementation**

HCPs' buy-in to the underlying philosophy of DCEP and a team player attitude contributed to successful delivery of DCEP. The literature suggests obtaining HCPs' buy-in is a perennial issue when introducing change or innovation.[41] Understanding and addressing the organisational factors impacting on implementation, and indeed organisational readiness,[42] along with understanding of predictors of HCPs readiness, are needed to increase team cohesiveness and engagement with a programme.[41-44] HCPs also suggested better DCEP training was needed, including improved communication amongst involved HCPs. Strengthening such aspects would increase the psychological meaningfulness, a prerequisite for buy-in,[45] the reward resulting in greater investment in DCEP delivery.[41] Our findings suggest champions for DCEP were required to facilitate cultural and context specific factors, impacting not only reach but implementation.[46]

**Maintenance**

To maintain DCEP, especially if aiming to reach those in most need, DCEP needs to be delivered closer to where people live; in rural NZ, this would also necessitate a

generic approach catering for people with multimorbidity, instead of condition-specific approaches. As DCEP was developed for those living in low socio-economic situations, it was free to attend; this however meant on-going funding challenges, even though its preventative attributes may, in the long-term, be cost-saving for the health system.

DCEP was considered impactful as a health preventative programme. A plethora of literature espouses the benefit of exercise and education and their impact on mitigating risk of disease progression and improved outcomes for people with long-term conditions.[47] With limited healthcare resources,[48] a more sustainable model of a generic programme for people living with multiple conditions rather than a condition specific focus has been suggested. Delivered locally and offered at times appropriate for the community concerned with local and wider community support would improve engagement[49] but sourcing funding would require attention. Ownership by a PHO or community-based health organisation (for example, a Māori health provider) has also been proposed.[49]

**Strengths and limitations**

A strength and a limitation of our study was the broad and rich data we collected. Whilst this ensured a wide and diverse capture of opinions, it also required an initial focussing analysis to identify key topics that we then explored in more depth with the CFIR[12] and RE-AIM[11] frameworks. The initial analysis may have missed smaller and possibly important issues that merited consideration. Although our RCT met ethnic representation, the process evaluation had low Māori or Pasifika representation. Further to this, whilst the interviewers were ethnically diverse, the three researchers

who analysed the data were Pākehā (non-Māori) negating the application of a Māori or Pasifika lens to the analysis.

### Implications for policy and practice

Lifestyle programmes such as DCEP are developed based on community input and community relationships. Whilst acceptable and effective in promoting healthcare in a person-centred manner, their survival appears dependent, not on perceived acceptability or perceived effectiveness, but on ongoing funding, which is largely short term and not sustained. The funding appears to be used as a "band-aid" for identified problems and not dedicated and embedded to enable a preventative long-term strategy. A case in point of a lifestyle intervention programme developed by Māori for Māori in Dunedin,[50] found to be successful and beneficial for attending Māori with T2D, attracted enough funding from the Health Funding Authority to continue, but only for one year. The Health Funding Authority and the programme no longer exist.[50]

## CONCLUSION

What we have learnt in implementing a lifestyle programme such as DCEP is that to ensure success, time and care needs to be taken to build and maintain networks, trust and relationships. This requires good communication channels. The networks and relationships required are not only between those delivering the programmes and the target community group, but also between local healthcare organisations (for example, district health boards, general practices, PHOs and Māori health providers) as well as between the HCPs involved within DCEP. Healthcare programmes that have a person-centred focus enable access and ongoing attendance. It does, however, require HCPs to practise in a nuanced person-centred manner, and as staff turnover is frequently high, a programme of continual training is also required. Future programmes may be

more viable if delivered closer to where people live and, instead of having a condition-specific approach, could take a more generic approach to cater for people with multiple long-term conditions.

*Word count: 5317*

## SUPPLEMENTARY FILES

Supplementary File 1: COREQ-32 reporting checklist. An assessment of the study reporting against the domains of the COREQ-32 reporting checklist for interviews and focus groups. (.pdf)

Supplementary File 2: First stage of analysis (Consolidated Framework for Implementation Research) with illustrative quotes (.pdf)

## ACKNOWLEDGMENTS

We would like to thank all the participants/whānau and health care professionals who contributed to the study and to the Clinical Advisory Group and lay advisors.

## CONTRIBUTORSHIP STATEMENT

Conceptualization LH, CH, TSt, RM, TSu, FDN, PJ, ARG, JM**;** Methodology TSt, LH, AW; Formal analysis AW, LH, TSt; Writing – Original draft AW, LH, TSt; Writing – Review and editing All authors; Funding acquisition LH wrote the grant application with input from CH, TSt, RM, TSu, FDN, PJ, ARG, JM; All authors read and approved the final manuscript.

## COMPETING INTERESTS

All authors declare that they have no competing interests.

## FUNDING

This study was funded by the Health Research Council of New Zealand (HRC Project Grant 17/233). The funding body has not had any role in design of the study or outputs from the study. Funding was not provided by the trial sponsor (the University of Otago, Dunedin, Otago, New Zealand).

## ETHICS APPROVAL

Ethical approval for the DCEP trial and evaluation was obtained from the Health and Disability Ethics Committee, Ministry of Health (HDEC17/CEN/241/AM01).All participants provided written, signed consent to participate.

## DATA SHARING STATEMENT

Full de-identified interview transcripts will not be shared. Informed consent, in line with the approving ethics committee, only allows for the use of de-identified extracts within research reporting and writing, in order to maintain the privacy of participants based in a defined regional area and population, thus making their identification with full transcripts more likely.

## REFERENCES

1. World Health Organisation. Diabetes: WHO; 2021 [Available from: https://www.who.int/news-room/fact-sheets/detail/diabetes accessed 05/07/2021.
2. Ministry of Health. New Zealand Health Survey 2019-2020 annual data 2021 [Available from: https://minhealthnz.shinyapps.io/nz-health-survey-2019-20-annual-data-explorer/_w_069d3399/#!/explore-indicators accessed 30/08/2021.
3. Harwood M, Tane T, Broome L, et al. Mana Tū: a whānau ora approach to type 2 diabetes. *NZMJ* 2018; 131(1485). https://assets-global.website-files.com/5e332a62c703f653182faf47/5e332a62c703f6cb7b2fcc1b_Harwood%20FINAL.pdf.
4. New Zealand Guidelines Group. Guidance on the management of type 2 diabetes 2011. Wellington, New Zealand, 2011.
5. Davies MJ, Heller S, Skinner TC, et al. Effectiveness of the diabetes education and self management for ongoing and newly diagnosed (DESMOND) programme for people with newly diagnosed type 2 diabetes: cluster randomised controlled trial. *BMJ* 2008;3367(7642):491–5. doi: https://10.1136/bmj.39474.922025.BE
6. Hale L, Stokes T, Scarth B, et al. Protocol for a randomised controlled trial to evaluate the effectiveness of the diabetes community exercise and education programme (DCEP) for long-term management of diabetes *BMJ Open* 2019;9:e025578. doi: https://10.1136/bmjopen-2018-025578
7. Higgs C, Skinner M, Hale L. Outcomes of a community-based lifestyle programme for adults with diabetes or pre-diabetes. *J Prim Health Care* 2016;8(2):130-9. doi: 10.1071/hc15038 [published Online First: 2016/08/02]
8. Ministry of Health. Population of Southern District Health Board Wellington, NZ: Ministry of Health; 2021 [Available from: https://www.health.govt.nz/new-zealand-health-system/my-dhb/southern-dhb/population-southern-dhb accessed August 2021.
9. Ministry of Health. Wai 2575 Māori Health Trends Report. Wellington, NZ: Ministry of Health, 2019.
10. Ministry of Health. Whakamaua: Māori Health Action Plan 2020–2025. Wellington, NZ: Ministry of Health, 2020.
11. Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American journal of public health* 1999;89(9):1322-27. doi: 10.2105/ajph.89.9.1322
12. Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science* 2009;4(1):50. doi: 10.1186/1748-5908-4-50
13. MarÍa Tejada Tayabas L, Castillo León T, Monarrez Espino J. Qualitative evaluation: A critical and interpretative complementary approach to improve health programs and services. *International Journal of Qualitative Studies on Health and Well-being* 2014; 9(1). https://doi.org/10.3402/qhw.v9.24417.
14. Thomas DR. A general inductive approach for analyzing qualitative evaluation data. *Am J Eval* 2006;27(2):237-46. doi: 10.1177/1098214005283748

15. King DK, Shoup JA, Raebel MA, et al. Planning for Implementation Success Using RE-AIM and CFIR Frameworks: A Qualitative Study. *Front Public Health* 2020;8:59. doi: 10.3389/fpubh.2020.00059 [published Online First: 2020/03/21]
16. Holtrop JS, Rabin BA, Glasgow RE. Qualitative approaches to use of the RE-AIM framework: rationale and methods. *BMC Health Services Research* 2018;18(1):177. doi: 10.1186/s12913-018-2938-8
17. 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 : journal of the International Society for Quality in Health Care* 2007;19(6):349-57. doi: 10.1093/intqhc/mzm042 [published Online First: 2007/09/18]
18. Glover M, Kira A, Johnston V, et al. A systematic review of barriers and facilitators to participation in randomized controlled trials by Indigenous people from New Zealand, Australia, Canada and the United States. *Global Health Promotion* 2014;22(1):21-31. doi: 10.1177/1757975914528961
19. Gifford H, Cvitanovic L, Boulton A, et al. Constructing prevention programmes with a Māori health service provider view. *Kōtuitui: New Zealand Journal of Social Sciences Online* 2017;12(2):165-78. doi: 10.1080/1177083X.2017.1352521
20. Graham R, Masters-Awatere B. Experiences of Māori of Aotearoa New Zealand's public health system: a systematic review of two decades of published qualitative research. *Australian and New Zealand Journal of Public Health* 2020;44(3):193-200. doi: https://doi.org/10.1111/1753-6405.12971
21. Sopina E, Clinton J, Mahony F, et al. Alleviating the burden of chronic conditions in New Zealand (The ABCC NZ study): New Zealand experts' perspectives of chronic conditions management. In: Auckland Uo, ed. New Zealand, 2008.
22. Hartmann M, Bäzner E, Wild B, et al. Effects of interventions involving the family in the treatment of adult patients with chronic physical diseases: a meta-analysis. *Psychother Psychosom* 2010;79(3):136-48. doi: 10.1159/000286958 [published Online First: 2010/02/27]
23. Brown JS, Boardman J, Whittinger N, et al. Can a self-referral system help improve access to psychological treatments? *Br J Gen Pract* 2010;60(574):365-71. doi: 10.3399/bjgp10X501877 [published Online First: 2010/04/29]
24. Thomas F, Hansford L, Ford J, et al. How accessible and acceptable are current GP referral mechanisms for IAPT for low-income patients? Lay and primary care perspectives. *J Ment Health* 2020;29(6):706-11. doi: 10.1080/09638237.2019.1677876 [published Online First: 2019/11/05]
25. Smith LT. Kaupapa Māori Research- Some Kaupapa Māori Principles. 2015. https://researchcommons.waikato.ac.nz/bitstream/handle/10289/12026/Kaupapa%20M%C4%81ori%20Research.pdf?sequence=21 (accessed Nov 2021).
26. Thompson N. Do Māori initiatives by Māori and for Maori really help Māori? *Aotearoa New Zealand Social Work* 2008;4:56-59. doi: https://doi.org/10.11157/anzswj-vol20iss4id332
27. Health Quality and Safety Commission. He matapihi ki te kounga o ngā manaakitanga ā-hauora o Aotearoa 2019. A window on the quality of Aotearoa New Zealand's health care 2019, 2019.

28. Seppala E, Rossomando T, Doty J. Social connection and compassion: Important predictors of health and well-being. *Social Research: An International Quarterly* 2013;80(2):411-30.
29. Sirven N, Debrand T. Social participation and healthy ageing: An international comparison using SHARE data. *Social Science & Medicine* 2008;67:2017-26. doi: 10.1016/j.socscimed.2008.09.056
30. Wilkinson A, Atlas J, Nelson K, et al. Client perceptions of engaging with a health and social care navigation service: A qualitative study. *Chronic Illness* 2020;0(0):1742395320937046. doi: 10.1177/1742395320937046
31. Zavaleta D, Samuel K, Mills C. OPHI Working Paper No. 67. Social isolation: A conceptual and measurement proposal: Oxford Poverty & Human Development Initiative, University of Oxford, 2014.
32. Lindsay Smith G, Banting L, Eime R, et al. The association between social support and physical activity in older adults: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity* 2017;14(1):56. doi: 10.1186/s12966-017-0509-8
33. Jackson M, Jones D, Dyson J, et al. Facilitated group work for people with long-term conditions: a systematic review of benefits from studies of group-work interventions. *British Journal of General Practice* 2019;69(682):e363. doi: 10.3399/bjgp19X702233
34. Griffith LE, Raina P, Levasseur M, et al. Functional disability and social participation restriction associated with chronic conditions in middle-aged and older adults. *J Epidemiol Community Health* 2017;71(4):381-89. doi: 10.1136/jech-2016-207982 [published Online First: 2016/10/19]
35. Wilkinson A, Bowen L, Gustavsson E, et al. Maintenance and development of social connection by people with long-term conditions: A qualitative study. *International Journal of Environmental Research and Public Health* 2019;16(11):1875. doi: 10.3390/ijerph16111875
36. Barnes M, Taylor D, Ward L. Being well enough in old age. *Critical Social Policy* 2013;33(3):473-93. doi: 10.1177/0261018312471163
37. Carlson T, Moewaka Barnes H, Reid S, et al. Whanaungatanga: A space to be ourselves. *Journal of Indigenous Wellbeing* 2016; 1(2). https://journalindigenouswellbeing.com/media/2018/07/51.44.Whanaungatanga-A-space-to-be-ourselves.pdf.
38. Beach MC, Inui T. Relationship-centered care. A constructive reframing. *J Gen Intern Med* 2006;21 Suppl 1(Suppl 1):S3-8. doi: 10.1111/j.1525-1497.2006.00302.x
39. Kelley J, Kraft-Todd G, Schapira L, et al. The influence of the patient-clinician relationship on healthcare outcomes: a systematic review and meta-analysis of randomised controlled trials. *PLoS One* 2014;9:e94207. doi: https://doi.org/10.1371/journal.pone.0094207
40. Miller WR, Rollnick S. Applications of motivational interviewing. Motivational interviewing: Helping people change. 3rd ed. New York: Guilford Press 2013.
41. French-Bravo M, Crow G. Shared governance: The role of buy-in in bringing about change. *OJIN: The Online Journal of Issues in Nursing* 2015;20(2) doi: 10.3912/OJIN.Vol20No02PPT02
42. Weiner BJ. A theory of organizational readiness for change. *Implementation Sci* 2009;4(67) doi: https://doi.org/10.1186/1748-5908-4-67

43. LaVela S, Hill J. Staff perceptions of implementation of a team-based model of patient-cetnred primary care. *International Journal of Person Centred Medicine* 2014;4(4) doi: https://doi.org/10.5750/ijpcm.v4i4.456
44. Moroney D. From model to reality: The role of implementation readiness. *Journal of Youth Development* 2020;15(6):162-70. doi: 10/5195/jyd.2020.1057
45. Kahn WA. Psychological conditions of personal engagement and disengagement at work. *Academy of Management* 1990;33(4):692-724.
46. Pinto JK, Slevin DP. The project champion: key to implementation success. *Proj Manag J* 1989; 20(4). https://www.pmi.org/learning/library/project-champion-key-implementation-success-2135 (accessed Nov 2021).
47. Barker K, Holland AE, Lee AL, et al. A rehabilitation programme for people with multimorbidity versus usual care: A pilot randomized controlled trial. *Journal of comorbidity* 2018;8(1):2235042X18783918-2235042X18. doi: 10.1177/2235042X18783918
48. Dieleman JL, Campbell M, Chapin A, et al. Future and potential spending on health 2015-40: development assistance for health, and government, prepaid private, and out-of-pocket health spending in 184 countries. *The Lancet* 2017;389(10083):2005-30. doi: 10.1016/S0140-6736(17)30873-5
49. Wali S, Superina S, Mashford-Pringle A, et al. What do you mean by engagement? - evaluating the use of community engagement in the design and implementation of chronic disease-based interventions for Indigenous populations - scoping review. *Int J Equity Health* 2021;20(1):8. doi: 10.1186/s12939-020-01346-6 [published Online First: 2021/01/08]
50. Murphy E, McAuley KA, Bell D, et al. A new approach to design and implement a lifestyle intervention programme to prevent type 2 diabetes in New Zealand Maori. *Asia Pac J Clin Nutr* 2003;12(4):419-22. [published Online First: 2003/12/16]

**SUPPLEMENTARY FILE 2**

**First stage of analysis (Consolidated Framework for Implementation Research) with illustrative quotes**

| **Domain** (constructs) | |
|---|---|
| **The intervention characteristics** | **Illustrative quote** |
| HCP: **Community of practice**<br><br>(Relative advantage) | Well it's fantastic. …. and also it's, you know, obviously a great social, a lot of people with these conditions feel quite isolated so a programme like this gives them a chance to interact with other people and I think sometimes they learn a lot more from people they're with than people like me. They know what it's like living with their conditions and they can share their experiences. |
| Attendees: **Supportive intervention**<br><br>(Evidence strength & quality) | I didn't know anybody else, um, but we were all of similar age and we were all in the same boat and I think that was probably a big part. Previously you felt as if you were on your own with your diabetes. But here we all were and we were all quite open about things like um, you know medication, the exercise part, I went in there thinking well I am here for exercise, so for the three quarters of an hour we were to exercise I made a really good attempt. and I did enjoy that. … And we were all, I think by the end of the programme to, one of the biggest benefits was actually, the comradery that you had with everybody ….. all you know, hi [attendee name] how are you today and you were the same, kind of got to know people a bit and thoroughly enjoyed that. And that probably was um, took me going back, [attendee name] and I kept us going back on the maintenance programme. (A324) |
| HCP: **A valuable resource**<br><br>(Relative advantage; Design quality & packaging; Cost) | I think, personally, really important. I think it's something that could grow and develop and be a real resource.<br><br>I think it's amazing. I think it's fantastic. We really refer an awful lot of people to the DCEP just simply because I feel really confident because I know the expertise that are there, so that's always a great starting point. If you refer people you need to be confident that they're going to be in good hands. Obviously, particularly if they've got diabetes and other health related problems, that they are going to be cared for and put through a programme that's specially designed for them and that's really, really, really valuable, I think. The other thing that it is, there is no cost apart from the donation which is really valuable as well and just being able to refer people to a community service. |
| Attendees: **Acceptable and valued**<br><br>(Evidence strength & quality) | Well if it was, if you know doctors could refer people that are border line diabetic or people that are type 2 and have ended up on insulin and it was just a good way to you know, find out about things. Because if you just go for one day, you know all those questions, but over 12 weeks there is different things that crop up that you are able to ask. So just on one day you might not think of everything, but with 12 weeks, yeah. And like with having like the dietician and the |

| | |
|---|---|
| | pharmacists and all those different people, you know, you kind of thought of something and other people asks questions as well, and you think, oh yeah, I had been wondering about that. (A920)<br><br>So it's been a um, yeh it's been a tough couple of years but for us the DCEP has been an important part, a positive part. It's been a real support in terms, as I say both a health and psychical fitness point of view. ….. So we're very grateful for the programme and we found it really worthwhile. |
| HCP: **Perhaps too social**, and thus not enough exercise.<br><br>(Relative advantage) | I've had a couple of patients that have come in, not for the maintenance programme, they've just come to have their blood pressure taken ….. so they haven't done any exercise in the maintenance, and they haven't done anything other than pop in to have their blood pressures taken. ……. actually, some of them don't even exercise.<br><br>They come to the class, and that's the big thing. They come to class to socialise, and the exercise is like a side issue. And for the exercise purists, this is challenging. And I'm constantly challenged by this. And I've got to constantly stand by it. And my line will go something like, typically, you're working with the sedentary population, who do next to no physical activity, who will get the maximum bang for buck from going doing no physical activity to doing some physical activity. So, if they're motivated to come because they feel comfortable and not judged, and accepted, and they can just do what they can manage, then that's more important than anything else. |
| Attendees: **Not enough exercise**<br><br>(Adaptability) | The maintenance class, the only thing I'm finding, this is the only negative I have about the whole thing, alright? You know how we used to just do forty minutes to forty-five minutes of exercise? And it was fine. Well, when I went to the maintenance class and you can do it an hour, and I want to do the hour, there's not enough variety to be able to do to fill in the hour. I started to find I was getting a bit bored. …… you have to keep looking to see if the machine you wanted was free so that you, you know or go to something else. (A238)<br><br>One lady, all she did was walk around a couple of laps and then sat down for the most of the time and talked and all that. It was um, a get out of home activity for her and she did you know a few wee laps and that was it for her. You know, that was better than sitting at home just doing nothing, that was her exercise you know, it was catered for everybody. It really was. (A887) |
| Attendees: **Tailored person-centred approach**<br><br>(Adaptability; Design quality & packaging) | There's a number of things I can't do because of my hip. My hip's down to bone on bone so it's kind of discomfort. I'm on fairly high levels of pain relief um, and I take a whole bottle of [pain medication] to get here. So, yes, they've helped me and pointed me in the right direction to give me the strengths in the areas I will need to have it when I come out of theatre and move onto stage, the next stage in life. (A205) |

| | |
|---|---|
| | I think it makes you more comfortable the fact that you've got the nurse there and the physio there. Like um, for me, um, like having them there to guide you and support you … show you like, [Physio] would show me like she would sort of challenge me, like um, and she's like "Oh, I think that's too easy for you. So we're going to do this." And I was like… "Oh, do we have, you know, do we have to?" And she's like, "You're doing that too easy, we're going to do this." (A238)<br><br>I am 13 months out of a triple bypass ah so I have a few issues with my chest. So, [Physio] has been working with me to exercise and strengthen chest muscles. And this is something that would never have happened if I hadn't had been involved in this, you know. (A373) |
| HCP: **Importance of relationships and communication**<br><br>(Relative advantage) | It is better in terms of relationship building if we're there doing the exercises with them… I definitely think there's advantages to working amongst the people ... for building rapport and trust. My first session I went to, I rolled up in my work gear, and they were all, like, "where's your gears?" And, so, for my second session, I was, like, "right, well, I'm coming prepared then." "I'm coming in my lycra"! "Activate your tights." Then it just, kind of, it felt a bit more comfortable, um, in terms of… they just seemed to be a bit more… relaxed.<br><br>I try and engage with people, like um, like I try and engage with everyone to start with and I make time to block out, so what I tend to do is when people are you know doing their thing I'll walk around and chat and I'll do that connection so I am working on a kind of personal connection, not just a I'm your physio kind of connection but actually kind of finding out a bit about them and oh you know, "What do you do," and this, that, I'll share a little bit about myself and so I sort of engage them from there and then I tend to like, particularly the bikes, when the bikes are together and things like that, you end up having a conversation with two people at the same time and they end up talking and you kind of move on [laughs]. |
| Attendees: **Social atmosphere**<br><br>(Evidence strength & quality; Relative advantage) | I have quite enjoyed it, um, we have had a really good mix of a good bunch of ah people in it, and I thought, like Lena has been wonderful and so have the nursed that have come along. So, it has really been good that way. And, I have enjoyed most, most of the um, classes that I have afterwards, I have learnt a hell of a lot more from that. … you spend three quarters of an hour each lesson on a particular subject and you have got interaction of the other people so it is really good. (A373)<br><br>Do I enjoy it here? I love it. Are the people great? Fantastic. And the group is fantastic, we've made new friends um, and they're all respective of one another, but they all have ideas and laugh and joke amongst themselves. The majority are women, but that means absolutely nothing, it |

| | |
|---|---|
| | just means that they drew that envelope. It could've gone the other way just as easily. Do I have any, no I have no regrets. Am I going to carry on? Hell yeah! (A205) |
| Attendees: **Unpretentious environment**<br><br>(Adaptability) | I think um, family inclusion is good, um, especially like the meal preparations and all that sort of thing and why it is important to go for a walk after dinner and how it is nice if you can have someone walking with you, and all that sort of thing. Um, so I think that is really beneficial to have um, a significant other as part of the programme. (A639)<br><br>I brought hubby along when he had a week off. I said come along, so he came along and did a few exercises and listened, it was a good talk that day and he gained valuable information, that day, through diet and all that. (A887)<br><br>And, you know, I mean, we don't, it's like, when people go to the gym, they've got all the flash gears on, you know, just to be looked at, that's what I think. We can go there how we are, we're taken how we are, and get on with it. ….. which is good, you know, those are the sorts of people you want, and they don't use big, like, um, flash words. They use language that we understand. (A21)<br><br>Encouragement, you know talking amongst yourself. A lot of humour quite a bit of hilarity you know. Oh, we have had some good laughs, yeah. And that, I guess that was one of the reasons why we kept going back to, um, because we had some laughs and because we were comfortable. (A639) |
| Attendees: **Beneficial**<br><br>(Evidence strength & quality; Relative advantage) | I have quite enjoyed it, um, we have had a really good mix of a good bunch of ah people in it, and I thought, like [Physio] has been wonderful and so have the nurses that have come along. So, it has really been good that way. And, I have enjoyed most, most of the um, classes that I have afterwards, I have learnt a hell of a lot more from that. In fact, I would say that I have learnt more from that, I did the Desmond ah, course and ah, I have found this more beneficial than the Desmond. The Desmond was too much to try and squeeze in over a six-hour period, you know …. and to try and take in all the information that they give you in such a short time it is really hard. Whereas where you spend three quarters of an hour each lesson on a particular subject and you have got interaction of the other people so it is really good. (A373)<br><br>Well, I can just show you. Like, if you start at my book. Like you see, my, on the 24th of the 4th, my blood pressure was 160 over 190 which is quite high. … And then, as we keep going down, it went down to 140 over 90….. And then it went to 132 over 82. Um and then towards the end, like I was getting 124 over 82. Ah, my blood sugars range between 8.4 and 4.7. …And like when I, I got my certificate up on the bookshelf up there, and when I got it, I came home and put it on Facebook and all the um, I got all these comments about it and everything. (A238) |

| | |
|---|---|
| Attendees: **Advice confusion**<br><br>(Design quality & packaging) | I got really confused about what it right and what is not right. I had started on a diet control management of diabetes and it was working for me and they were telling me something different. They were telling me about whole grain breads and pastas were ok and rice and all that, and yet in my diet I had none of that. (A639) |
| Attendees: **Costs**<br><br>(Evidence strength & quality; Relative advantage; Design quality & packaging; Cost) | I really liked the venue and I was quite surprised um, about the equipment that was available. So, walking into the [venue] where I had been several times before for different things and seeing it all set up where there is a gym was quite cool. … I like working out and I like doing that and I even like it better when I am doing it for free. (A639)<br><br>It is unique because it is an exercise programme that doesn't cost us anything, it is very local. Um, it is utilising a business locally. And it is free. (A887)<br><br>I enjoyed it. I'm not an exercise… I'm an active person, but I have to be doing something constructive, like shifting the sheep or doing something like that. Whereas, um, to go, say, to the gym… and that's the other thing, gyms are so expensive to go to, and when you're on a pension or something like that, um, yeah, it's one of those things that get left behind. The fact that it was free, it was good. (A280)<br><br>… because of the cost of petrol and everything, twice a week getting to the other side of town is um. … It is a bit too much. (A159)<br><br>(Interviewer: Yeah, like if you had to pay for it.) I probably wouldn't go then. Yeah, I don't think, there would be a handful of people that were there wouldn't be able to afford that either. Yeah. A couple of them on their, well that is only my opinion of looking at them, I don't think they would come if there was a fee to it. (A639) |
| HCP: **Timing of the classes**<br><br>(Adaptability) | The middle of day obviously excludes a large portion of people from being able to participate. Um, and it makes it exponentially more complicated. But, having something that's available as, like, an after-work type option… you know, some of the patients are working 2 jobs. … type 2 diabetic working, like you say, more than one job, limits their exercise opportunities, plus they're stressed, probably eating at their desk and not eating great.<br><br>I think that having that availability, that flex, I think yeh definitely long term going forward recognising that people who are working get diabetes. (HCP) |
| Attendees: **Timing of the classes** | I don't know. I think basically it depends on where people are in their lives. I mean I was lucky in that I'm retired, so I took retirement early so as a result of that I made a point of using that as |

| | |
|---|---|
| (Adaptability) | part of my physical exercise programme, to actually take part. I think a lot of the people that were there were working people. And so I think it was harder for them to actually, to come once the actual programme started and I think it's, while they could probably get it off for 12 weeks, having it, continuing that over a year period probably became a little bit more difficult. So yeh, so my, yeh, my feelings are that it probably was the fact that some are working. Some of them, I have seen some of them who will be in the group doing exercise, like walking out and about. So some of them obviously have carried on their exercise but they haven't obviously wanted to do it in an organised setting, that's down for a particular time of the week. And so it gives them a bit more flexibility if they're doing it themselves, so that would probably be my take on it. |
| HCP: **Good venues**<br><br>(Complexity) | Community halls, and went to scout halls, in the end. And… things that were important to look for were: access, as in accessible for, sometimes, older, frailer people with physical disabilities; good parking, ideally, free parking, so you didn't have to search for 10 minutes to find a park or pay for expensive parking, trying to break down the barriers, any barriers to access; and maybe in a good location, as in, um, closer to the high-needs communities where we wanted to work in, with the people with a high incidence of type 2 diabetes. And then it was a venue that was big enough to house up to 25 people, with bathroom, kitchen… a sound system or something like that. Yep, affordable. And, um, but also, that the exercise equipment… 'cause we've got some exercycles on wheels, some mats, some benches-type things or steps, and some rowing machines. Which are all portable but require storage space. So, not only did the venue need to be able to fit that exercise equipment in, if it was a multi-purpose, it needed to have a storage space where you could store that space also. |
| HCP: **Importance of relationships and communication**<br><br>(Relative advantage) | It is better in terms of relationship building if we're there doing the exercises with them… I definitely think there's advantages to working amongst the people ... for building rapport and trust. My first session I went to, I rolled up in my work gear, and they were all, like, "where's your gears?" And, so, for my second session, I was, like, "right, well, I'm coming prepared then." "I'm coming in my lycra"! "Activate your tights." Then it just, kind of, it felt a bit more comfortable, um, in terms of… they just seemed to be a bit more… relaxed.<br><br>I try and engage with people, like um, like I try and engage with everyone to start with and I make time to block out, so what I tend to do is when people are you know doing their thing I'll walk around and chat and I'll do that connection so I am working on a kind of personal connection, not just a I'm your physio kind of connection but actually kind of finding out a bit about them and oh you know, "What do you do," and this, that, I'll share a little bit about myself and so I sort of engage them from there and then I tend to like, particularly the bikes, when the bikes are together and things like that, you end up |

| | |
|---|---|
| | having a conversation with two people at the same time and they end up talking and you kind of move on [laughs]. |
| **Outer setting** | |
| HCP: **Ongoing funding**<br><br>(External policy & incentives) | Well, I think, I think, from an investment point of view, you cannot underestimate the investment in preventative kind of work. It needs, you know, these patients, so, even the social aspect of them being engaged socially has to have good patient outcomes. And benefits. And then, um, doing an exercise programme in a supported way, it has to make a difference to people's kind of, where they're heading and what they're doing with their long-term condition. So, yeah, I think it's a valuable investment to make. Um, just that, who's going to make that investment, and where does that sit? And that's why I think it needs to be a collaborative, kind of, community investment. Because no, our health system here is strapped financially. (HCP)<br><br>There is going to be no shortage of people that will benefit for the foreseeable future. Um, so, I think there needs to be options like this. Like, it's kind of a step up from Green Prescriptions. It's a more costly intervention, absolutely. But the cost of managing people with multiple long-term conditions as they age just exponentially goes real high. (HCP) |
| HCP: **Engagement with communities**<br><br>(Patient needs & resources) | Just around engagement with the community, and how you approach community, especially Māori community, rather than approach Māori participants. It's not a usual programme, but it's great to see that. They've had a good focus. It's, it, and I've also seen benefit…, and I like the idea of that, some of the programme, they're inviting whānau too. So, it's not just about one patient with diabetes, it's about a whānau, can go too. …… It's a no-brainer. (HCP) |
| **Inner setting** | |
| HCP: **Importance of administration**<br><br>(Networks and communications) | And the same like thinking about what else is going on in the community so we had a number, particularly in this last group we had quite a lot of people that were involved in outdoor bowls and once outdoor bowls season clicked in, our numbers went down [laughs] it's on same day so yeh having a little think about what else is in the community, what else that might those people be involved in as well I guess, and that's going to be really hard to work around from a bigger group perspective. I think if you had a bigger group it probably wouldn't be that noticeable but um, certainly if you're in a smaller community, having a think about what else are those people involved in because with timing those groups around that. Um access and stuff here was fine. Like parking was really easy, everyone was like you can park straight outside the door, yeh it was good. Bus stop not that far away. (HCP) |

| | |
|---|---|
| HCP: **Issues with training**<br><br>(Implementation climate: Learning climate) | Just going over the motivational interviewing, lots of practical sort of stuff like we did the other day would've been good and where we got to practice it on, you know pair up and practice doing that discussion<br><br>Like looking at blood sugar levels if you're at 17 then it's actually a little bit risky to exercise … yeh just that safety stuff. Um and just kind of having that team, let's the whole team know that this is when it's unsafe or this is what we do so kind of know 'cause like there was a couple of times we had, particularly the first group we had a lady who threw some really high blood pressures and so we had this kind of team management approach around her, you know? "You're not allowed to exercise until you go get your blood pressure done," and then the nurse would sort of say yes or no.<br><br>Yeh, is there anything else that you feel is important to mention about the programme going forward like you know, this is going to be written up into a package to that anyone should be able to read and be able to roll out in any community. Like cultural appropriateness or something we haven't talked about, and health literacy and talking to people that maybe don't have the same language around health issues. |
| HCP: Nursing **staff changeover** was particularly high<br><br>(Implementation climate: Goals & feedback; Available resources) | I think from a staffing perspective again just having the ability for people to take leave 'cause you know like we have had pretty much the year and a half of just nonstop and apart from that break over Christmas it's, we've been here every week and I think ongoing that would be… I think you need more than just the two people that are running it, I think you need to have a bit of a team.<br><br>Mainly, that is probably due to our kind of staff turnover. And keeping the communication flowing when there's new staff, um, between the research project, us and, um, trying to orientate new staff members to the programme, the intention and what it's doing, and how it, kind of, the operational components of what they need to do. |
| HCP: **Attributes and skills of staff**<br><br>(Culture) | Partnership acceptance, compassion are, ultimately, helpfulness. How can I work with you to be helpful? Um, and so, that attitude was core. Non-judgemental, accepting, come from that place and that space because too many people don't necessarily have, unfortunately, healthcare experiences that they really enjoy. Particularly people with multiple, long-term health conditions. They see numerous healthcare professionals, numerous times, and are told, "do this, do this, and do this." And not many people are particularly good at 'doing this, doing this, doing this', hence they keep on presenting with continuously deteriorating health concerns. So, it's trying to develop trusting, meaningful relationships with these people. Don't judge them, accept them. And, actually, often, they open up to you a bit more. And you can find out more, what's actually going on with them. |

| | |
|---|---|
| | Certainly someone who can engage easier with people is quite important in this space where you've got all these random people that don't know each other and you need to engage with them and then try and get them to engage with each other, it's um, I think that's quite key to how it runs as well. |
| Attendees: **Good staff**<br><br>(Culture) | I think it is fantastic. I think it should be, you can't make exercise compulsory, we are adults we won't be dictated to. Therefore, it should be encouraged to the maximum. It takes a special type of person to lead it and I think Lena and Michelle were wonderful. Um, there will be other people out there that are of a similar approach as they are, they have, I think their term is bedside manner. They have got a fantastic approach and way with people. They never at any point and time made you feel a lesser person or embarrassed or, I don't know what I am looking for, but there was nothing that they ever said that put you down in any shape or form. They were full of encouragement all the way. (A205) |
| **Characteristics of individuals** | |
| Attendees: **DCEP enhanced attendees' self-efficacy**<br><br>(Self-efficacy) | But, as it moved on you know, we walked in and straight away we were over to get our blood pressure done. We are lining up there, we want our blood pressure done before we go ahead and do any exercise, so that we can, well, so that I can see how it is going and all that, you, know from day to day …… Um, I always check my labels when I buy food, I always do. I take so long at the supermarket; it drives him nuts. (A887)<br><br>And I take, I took my um, notebook to the doctor's appointment that I went to and showed him…everything. And I'll take it to, like the dietician and stuff like that just to, so they can see what, what's been happening over the last few months. 'Cos I've got it all there on paper. (A238)<br><br>But something the programme has encouraged me to do and I do it almost every day is actually to before I have any um, cup of tea, or first thing in the morning before I have anything, I will sit down and do my blood sugar test, which I haven't been doing very regularly before …… Since we started the programme, um, we have actually purchased exercise equipment, we brought um, the rower and the exercycle and mini trampoline and so we actually are using those at home. (A324) |
| Attendees: **Reduced anxiety**<br><br>(Individual stage of change) | The first day of the programme I was probably a little bit anxious about it. Like not sure what you were going to, what was going to happen or what you were going, or what it was going to be like? And what, and what the people were going to be like. Because it's a, it's a big thing to put yourself into that sort of … situation. Um, and but then, as the, as the weeks went on, you just |

| | |
|---|---|
| | got more comfortable with everybody. With [physiotherapist], with the people, with yourself. (A238) |

HCP: Healthcare professional

# COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| **Domain 1: Research team and reflexivity** | | | |
| *Personal characteristics* | | | |
| Interviewer/facilitator | 1 | Which author/s conducted the interview or focus group? | |
| Credentials | 2 | What were the researcher's credentials? E.g. PhD, MD | |
| Occupation | 3 | What was their occupation at the time of the study? | |
| Gender | 4 | Was the researcher male or female? | |
| Experience and training | 5 | What experience or training did the researcher have? | |
| *Relationship with participants* | | | |
| Relationship established | 6 | Was a relationship established prior to study commencement? | |
| Participant knowledge of the interviewer | 7 | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research | |
| Interviewer characteristics | 8 | What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic | |
| **Domain 2: Study design** | | | |
| *Theoretical framework* | | | |
| Methodological orientation and Theory | 9 | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | |
| *Participant selection* | | | |
| Sampling | 10 | How were participants selected? e.g. purposive, convenience, consecutive, snowball | |
| Method of approach | 11 | How were participants approached? e.g. face-to-face, telephone, mail, email | |
| Sample size | 12 | How many participants were in the study? | |
| Non-participation | 13 | How many people refused to participate or dropped out? Reasons? | |
| *Setting* | | | |
| Setting of data collection | 14 | Where was the data collected? e.g. home, clinic, workplace | |
| Presence of non-participants | 15 | Was anyone else present besides the participants and researchers? | |
| Description of sample | 16 | What are the important characteristics of the sample? e.g. demographic data, date | |
| *Data collection* | | | |
| Interview guide | 17 | Were questions, prompts, guides provided by the authors? Was it pilot tested? | |
| Repeat interviews | 18 | Were repeat inter views carried out? If yes, how many? | |
| Audio/visual recording | 19 | Did the research use audio or visual recording to collect the data? | |
| Field notes | 20 | Were field notes made during and/or after the inter view or focus group? | |
| Duration | 21 | What was the duration of the inter views or focus group? | |
| Data saturation | 22 | Was data saturation discussed? | |
| Transcripts returned | 23 | Were transcripts returned to participants for comment and/or | |

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| | | correction? | |
| **Domain 3: analysis and findings** | | | |
| *Data analysis* | | | |
| Number of data coders | 24 | How many data coders coded the data? | |
| Description of the coding tree | 25 | Did authors provide a description of the coding tree? | |
| Derivation of themes | 26 | Were themes identified in advance or derived from the data? | |
| Software | 27 | What software, if applicable, was used to manage the data? | |
| Participant checking | 28 | Did participants provide feedback on the findings? | |
| *Reporting* | | | |
| Quotations presented | 29 | Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number | |
| Data and findings consistent | 30 | Was there consistency between the data presented and the findings? | |
| Clarity of major themes | 31 | Were major themes clearly presented in the findings? | |
| Clarity of minor themes | 32 | Is there a description of diverse cases or discussion of minor themes? | |

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

**Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.**

BMJ Open

# Implementation of the Diabetes Community Exercise and Education Programme (DCEP) for the management of type 2 diabetes: qualitative process evaluation

| | |
|---|---|
| Journal: | *BMJ Open* |
| Manuscript ID | bmjopen-2021-059853.R1 |
| Article Type: | Original research |
| Date Submitted by the Author: | 29-Mar-2022 |
| Complete List of Authors: | Stokes, Tim; University of Otago Dunedin School of Medicine, Department of General Practice & Rural Health<br>Wilkinson, Amanda; University of Otago Division of Health Sciences, School of Physiotherapy<br>Jayakaran, Prasath; University of Otago Division of Health Sciences, School of Physiotherapy<br>Higgs, Chris; University of Otago Division of Health Sciences, School of Physiotherapy<br>Keen, Donna; University of Otago Division of Health Sciences, School of Physiotherapy<br>Mani, Ramakrishnan; University of Otago Division of Health Sciences, School of Physiotherapy<br>Sullivan, Trudy; University of Otago Dunedin School of Medicine, Department of Preventive and Social Medicine<br>Gray, Andrew; University of Otago Division of Health Sciences, Biostatistics Centre<br>Doolan-Noble, F; University of Otago Dunedin School of Medicine, Department of General Practice and Rural Health<br>Mann, Jim; University of Otago, Department of Human Nutrition<br>Hale, Leigh; University of Otago Division of Health Sciences, School of Physiotherapy |
| Primary Subject Heading: | Diabetes and endocrinology |
| Secondary Subject Heading: | General practice / Family practice, Health services research |
| Keywords: | DIABETES & ENDOCRINOLOGY, PRIMARY CARE, QUALITATIVE RESEARCH |
| | |

*I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.*

*The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.*

*Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.*

# Implementation of the Diabetes Community Exercise and Education Programme (DCEP) for the management of type 2 diabetes: qualitative process evaluation

Tim Stokes,[1*] Amanda Wilkinson,[2] Prasath Jayakaran,[2] Christopher Higgs,[2] Donna Keen,[2] Ramakrishnan Mani,[2] Trudy Sullivan,[3] Andrew R Gray,[4] Fiona Doolan-Noble,[1] Jim Mann,[5] Leigh Hale.[2]

[1]Department of General Practice and Rural Health, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

[2]School of Physiotherapy, University of Otago, Dunedin, New Zealand

[3]Department of Preventive and Social Medicine, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

[4]Biostatistics Centre, University of Otago, Dunedin, New Zealand

[5]Department of Human Nutrition, University of Otago, Dunedin, New Zealand

**Corresponding author**

Professor Tim Stokes: tim.stokes@otago.ac.nz

Department of General Practice and Rural Health, Dunedin School of Medicine, University of Otago, PO Box 56, Dunedin 9054, New Zealand

## ABSTRACT

**Objectives:** To examine context-specific delivery factors, facilitators and barriers to implementation of the Diabetes Community Exercise and Education Programme (DCEP) for adults with type 2 diabetes (T2D) using the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) Framework.

**Design:** A qualitative evaluation embedded within the DCEP pragmatic randomised controlled trial. Data collected via focus groups and interviews and analysed thematically.

**Setting:** Community-based in two cities (Dunedin and Invercargill) in the lower south island of New Zealand.

**Participants:** Seventeen adults diagnosed with T2D attending DCEP and 14 healthcare professionals involved in DCEP delivery.

**Intervention:** DCEP is a twice weekly session of exercise and education over 12 weeks, followed by a twice weekly on-going exercise class.

**Results:** Whilst our reach target was met (sample size, ethnic representation), the randomisation process potentially deterred Māori and Pasifika from participating. The reach of DCEP may be extended through the use of several strategies: promotion of self-referral, primary healthcare organisation ownership and community champions. DCEP was considered effective based on perceived benefit. The social and welcoming environment created relationships and connections. People felt comfortable attending DCEP and empowered to learn. Key to implementation and adoption was the building of trusting relationships with local health providers and communities. This takes time and care and cannot be rushed. Training of staff and

optimising communication needed further attention. To maintain DCEP, delivery close to where people live and a generic approach catering for people with multiple chronic conditions may be required.

**Conclusions:** For success, lifestyle programmes such as DCEP, need time and diligence to build and maintain networks and trust. Beyond frontline delivery staff and target populations, relationships should extend to local healthcare organisations and communities. Access and ongoing attendance are enabled by health care professionals practicing in a nuanced person-centred manner; this, plus high staff turnover, necessitates on-going training.

*Abstract word count: 300*

## Strengths and limitations of this study

- Data were collected from both DCEP attendees and healthcare professionals involved in DCEP, delivery, enabling capture of wide and diverse opinions.
- The initial focussing analysis to identify key topics may have missed smaller and possibly important issues that merited consideration.
- Although our RCT met ethnic representation, this qualitative evaluation had low Māori or Pasifika representation.
- Whilst the interviewers were ethnically diverse, the three researchers who analysed the data were Pākehā (non-Māori) negating a Māori or Pasifika lens to the analysis.

## INTRODUCTION

Type 2 diabetes (T2D) is a substantial health issue. Globally, 8.5% of adults aged 18 years and older are estimated to have T2D.[1] In Aotearoa/New Zealand (NZ) over 250,000 people are estimated to have T2D (self-reported prevalence 5.9%), with high prevalence among Māori (the indigenous people of NZ) (7.9%), Pasifika (people from the Pacific Islands now living in NZ) (13.6%), and people living in low socioeconomic areas (10.4%).[2] Alongside blood glucose control via medication, diet control and being physically active are the key evidence-based components of management,[1 3] especially if delivered by healthcare professionals.[4] In NZ, diabetes primary healthcare is provided by general practitioners (GPs) and nurses focussing on screening and diagnosis, education and pharmacological management.[5 6] The educational component is largely achieved via referral to the Diabetes Education Self-Management Newly Diagnosed and Ongoing Diabetes (DESMOND) programme, a one-day group-delivered educational programme.[7] We are not aware of any formal exercise programmes delivered by registered healthcare professionals (HCPs) to people with T2D in NZ. To address this challenge in the southern region of NZ, we developed the Diabetes Community Exercise and Education Programme (DCEP), which has now been in existence for over 10 years.

DCEP is a group exercise and educational programme, tailored to individual needs, and specifically designed to enable access for Māori, Pasifika, and people living in low socioeconomic areas. The aim of DCEP is to support adults living with T2D to take control of their health and to live well with their long-term condition. There are two parts to DCEP. Participants attend a twice weekly exercise and education session for 12 weeks, followed by a twice weekly maintenance exercise class. The programme has previously been described in detail.[8] The potential benefits of DCEP highlighted in a

feasibility study,[9] justified a pragmatic randomised controlled trial (RCT) to evaluate the effects of DCEP (plus usual care) on the glycated haemoglobin (HbA1c) levels, physical health outcomes and health-related quality of life of individuals living with T2D, compared to usual care alone.[8] The target sample size for the primary outcome (glycaemic control) was 220 individuals with T2D which included a 40% dropout rate. We recruited and analysed data from 165 participants. The results of the RCT showed no statistically significant differences between groups for both the primary outcome (blood glucose control - HbA1c) and secondary outcomes (Incremental Shuttle Walk Test, body weight, waist circumference, blood pressure, quality of life measures) at one-year follow-up.[10] The RCT, however, was successful in engaging its target population and there was good attendance in the first 12 weeks (as described below).

Reflective of the ethnicity in the lower South Island of NZ, 14% of the cohort were Māori and 6% Pasifika, with 27% of participants living in areas considered by the NZ Deprivation Index to be in the most deprived deciles (deciles 9 and 10).[11] Adherence to the 12-week DCEP intervention was good, a majority (56%) attended 15 or more of the 24 sessions (41% attending for ≥20/24 sessions, 15% for 15-19/24 sessions, 21% for 2-15/24 sessions and 23% for no attendance or one session). Attendance at the subsequent maintenance classes was however poor (23% attending >50% and 35% attending 10-40% of available sessions, with 42% attending no sessions).

Given the success in targeting the populations of interest and initial attendance at DCEP and NZ's current health inequities, and associated poorer outcomes for Māori,[12] [13] an in-depth explorative evaluation of DCEP is warranted to inform future practice. This paper reports a qualitative process evaluation to identify practical ways to improve DCEP delivery and inform its future development. This evaluation, embedded within the DCEP RCT, aimed to examine the context-specific delivery factors, facilitators and

barriers to implementation of the DCEP using the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) Framework.[14]

## METHODS

### Study Setting

This community-based study took place in in two separate urban centres in the lower South Island of NZ: Dunedin (Otago Region) and Invercargill (Southland Region) in community exercise venues.

### Design

A qualitative process evaluation of DCEP was undertaken as part of a two-arm parallel, open label RCT (ACTRN12617001624370). The trial protocol[8] and main trial findings[10] have been previously reported. The trial recruited adults (age ≥35 years) with a diagnosis of T2D via general practices and public advertisements. DCEP was introduced sequentially, starting in Dunedin and then three months later in Invercargill. Following baseline evaluation, participants were randomly allocated to either DCEP (plus usual care) or usual care. Participants randomised to DCEP attended the 12-week programme and then continued in the maintenance programme for a further 12 months. Across the duration of the trial, seven DCEP 12-week classes were held.

### Data collection

Interviews and focus groups were held at both study sites following the 12-week programme and at the end of the trial until data saturation (when no new data repeated what was in the previous data)[15] occurred. From DCEP participants consenting to

interview, 2-3 were purposively (by attendance) interviewed after completion of each class. Semi-structured interviews were used with DCEP attendees and any attending whānau (family). Guided by their availability or for logistical reasons, we used either interviews or focus groups for all the HCPs involved in DCEP who consented to interview. The interview topic guide was informed by The Consolidated Framework for Implementation Research (CFIR).[16] (Table 1). All interviews and focus groups occurred at a mutually arranged time and place, were audio-recorded with permission and were about one hour long. Research assistants, with bachelor's degrees and from a variety of backgrounds (nursing, psychology, social science) and ethnicities (Māori, Pākehā (non-Māori)) and known to the attendees, undertook the interviews. All audio recordings were transcribed verbatim by a professional transcription company.

**Table 1: Interview topic guide**

| |
|---|
| **Questions for both DCEP attendees and healthcare professionals:** |
| Tell me about your experience of DCEP? |
| How could we improve DCEP? |
| How suitable / appropriate / acceptable is DCEP for your community? |
| How can we make DCEP continue in your community beyond the trial? |
| **Additional healthcare professional questions:** |
| What are the important aspects of DCEP? Why? |
| In order to deliver DCEP, what are important attributes / training do healthcare professionals require? |
| How did DCEP influence your practice? |

## Data analysis

Data were first thematically analysed using the General Inductive Approach, a pragmatic approach specifically designed for evaluative health research.[17 18] Three researchers (AW, LH, TSt) read the transcripts multiple times to gain an understanding of the key topics of interest, coded them accordingly and identified illustrative quotes. To assist defining these key topics, a short summary was written by AW for each transcript summarising the main points of the interview. The transcripts of HCPs were analysed first. The key topics were then further analysed over two stages using both the CFIR and RE-AIM frameworks.[19] The rationale for using both frameworks is that CFIR enables the understanding of the "why" of success (or not) of implementation while the RE-AIM describes the practicalities of the outcomes (the who, what, where, how, and when).[19 20] In the first stage, the relevant constructs and domains from the CFIR were used to deductively explore and organise data. To further categorise the organised data, in the second stage, the five RE-AIM domains were applied by AW and LH. Multiple discussions between the research team members (AW, LH, TSt) finalised the analysis by consensus. The

consolidated criteria for reporting qualitative research (COREQ)[21] were used to inform reporting of the study findings (Supplementary File 1).

### Patient and public involvement

Patients or members of the general public were not involved in the design or conduct of this study.

## RESULTS

We interviewed 17 DCEP participants diagnosed with T2D and randomised to DCEP and 18 HCPs. The characteristics of participants are presented in tables 2 and 3.

**Table 2 Characteristics of DCEP participants (N= 17)**

| Category | Participants |
|---|---|
| ***Location*** | |
| Dunedin | 7 |
| Invercargill | 10 |
| ***Sex*** | |
| Female | 11 |
| Male | 6 |
| ***Age*** | Age range 39-76; mean age 61 |
| ***Ethnicity*** | |
| NZ European/Pākehā | 13 |
| Māori | 3 |
| Cook Island Māori (Pasifika) | 1 |

**Table 3 Characteristics of health care professional stakeholders (N=18)**

| Category | Participants |
|---|---|
| ***Location*** | |
| Dunedin | 7 |
| Invercargill | 11 |
| ***Sex*** | |
| Female | 15 |
| Male | 3 |
| ***Ethnicity*** | |
| NZ European/Pākehā | 17 |
| Māori | 1 |
| ***Health Care Profession***[1] | |
| Nurses | 5 |
| Physiotherapist | 1 |
| Clinical DCEP Lead | 1 |
| Pharmacist | 2 |
| Podiatrist | 1 |
| Dietician | 1 |
| General Practitioner | 1 |
| Counsellor | 1 |
| DCEP Administrator | 1 |
| Primary Care Liaison Coordinator for Arthritis NZ | 1 |
| Diabetes NZ coordinators | 2 |
| SmokeFree NZ coordinator | 1 |

Table 4 presents a summary of the key CFIR domains identified. Supplementary file 2 presents the detailed CFIR findings along with illustrative quotes. Below we

present the findings relative to the RE-AIM framework domains (namely, Reach, Effectiveness, Adoption, Implementation, and Maintenance).

**Table 4: Summary of the key CFIR domains**

| Domains | Summary |
|---|---|
| Individual | Training and good communication of HCPs was crucial – they had to buy into the philosophies of DCEP and person-centred care and be trained into the nuances of delivering individualised care and attendee driven education within a group setting. Further, HCPs had to have, or develop, the ability to create trusting and caring relationships with attendees thus enabling a social and welcoming atmosphere and encouraging attendance. In turn, the supportive social environment enhanced the relationships and interactions of attendees, so they derived benefit from each other. Additionally, the correct venues had to be found (for example, in terms of location, safety, access both to and into, temperature, culturally acceptability, inexpensive to hire); the time in the day for the class was crucial (for example, not impacting on work); and the correct equipment purchased (for example, durable, practical, easily transportable and stored). |
| Inner setting | The most prominent findings were securing appropriate HCPs and their ongoing training. |
| Outer setting | The outer setting both assisted and offered challenges to implementation. Whilst we had long standing and strong relationships with many HCPs, for the trial we needed to work with new healthcare providers. We found that we rushed the process with some new healthcare providers or did not quite understand the local political environment for others. As we were not merging DCEP into an existing healthcare practice but rather setting up an independent community-based class, we learnt the necessity of taking time, and focused energy, as well as having local champions, to build such relationships and good communication strategies. Further, the navigation of relationships was ongoing as HCPs changed – both those that delivered DCEP and the managers of the services involved. Ongoing funding was another major challenge to the sustainability of DCEP. |
| Characteristics of individuals | Attendees talked about their increasing self-efficacy to manage their health, undertaking self-management activities and growing more comfortable to attend DCEP. |

## Reach

As described above, the RCT attained its targeted sample size, and its ethnic composition was reflective of that of the study setting. HCP participants suggested however that the RCT randomization process challenged recruitment as it was

considered culturally unacceptable for Māori and Pasifika. For these populations, whānau (family) support is important and potential participants would have been more comfortable if they could attend together; the possibility of being randomised to different groups as individuals was undesirable.

> *[Our] community feel more comfortable coming in groups. [I] recommend they be randomised together. [I] can then go along with them to whatever programme they get randomised to [to facilitate introductions and help create relationships]. [If] this could be the case, I am happy to promote the research on my marae and to the general practice.* [Nurse]

Referral into the trial was assisted by community champions of DCEP.

> *We just got a few champions [to work with us]. We got this big practice and got a nurse onboard. She just worked with a lot people with diabetes and just referred them*. [Clinical Lead]

However, there was a need for improved communication channels, beyond GPs, for getting information about DCEP out and how people could self-refer to it.

> *I do the [name of clinic] at the hospital as well, and I give it [information about the programme] out to people who come in to see me. As soon as I said, 'You need to see your GP [to get a referral],' some said, 'I don't know about it.' They didn't want to contact their GP 'cos they thought of that as an extra expense [paying to see the GP to get a referral to the programme]. … It was a big barrier.* [Podiatrist]
>
> *You can self-refer into the study.* [Interviewer]

It was thought that having a primary healthcare organisation (PHO) endorse, fund and run DCEP would increase general practice referral; thus, mitigating the observed resistance from some general practices about referring patients into DCEP.

> *We had some resistance from general practices about referring ['their' patients]. … So, I think if the PHO owned it, they would promote it around their respective practices. They would target their practices that they identified as having high-needs patients [who would benefit from participating in DCEP].* [Clinical Lead]

**Effectiveness**

Both attendees and HCPs expressed a range of positive beliefs about DCEP. The group approach of DCEP facilitated relationship development amongst the whole group, both between HCPs and attendees, and amongst attendees themselves.

> *I try and engage with everyone to start with … when people are doing their thing, I'll walk around and chat and I'll do that connecting. I am working on a kind of personal connection, not just a 'I'm your physio' kind of connection but actually finding out a bit about them, [like asking] 'What do you do?' I'll [also] share a little bit about myself and so I sort of engage them from there. When the bikes are together, you end up having a conversation with two people at the same time and [then] they end up talking.* [Physio]

The group nature of DCEP intervention also encouraged inclusion of family/whānau (important in Māori culture). Family came along to support and joined in with the education and exercise sessions.

> *I really like the idea of [the approach of DCEP]. Instead of just being [targeted at] one person with diabetes, it's actually engaging for whānau to come and do this*

*[join in]. So, it's been wonderful to see husbands and wives coming in and talking and walking that journey together.* [Nurse]

Attendees [A#] stated meeting people, connecting and enjoying each other's company was key to their continued attendance.

*I guess that was one of the reasons why we kept going back, because we had some laughs and because we were comfortable.* [A639]

Others suggested that DCEP was an integral, positive and supportive part of their lives.

*It's been a tough couple of years, but for us, DCEP has been an important part, a positive part [of our lives]. It's been a real support [from] both a health and physical fitness point of view.* [A577].

One participant stated that attending DCEP had changed her health care behavior.

*Something the programme has encouraged me to do [my blood sugar levels] and I do it almost every day. Before I have my cup of tea, or first thing in the morning before I have anything [to eat].* [A324]

Attendees also found the HCPs welcoming and appreciated the individual attention that provided exercise tailored to their needs.

*[physiotherapist] was prepared to work with us all individually if we required it, and if we had any specific issues that she could help with.* [A373]

Attendees considered the format of DCEP, while different from others they had attended, was good and thought provoking. They seemed to enjoy the group discussions that were facilitated by educators and occurred organically between participants.

> *We have had more discussion from the people within the group during and afterwards. When you are discussing that [new information] among group of people, there are things that come out that you didn't know about.* [A373]

One participant summed up impact of DCEP by stating:

> *I feel better just for meeting the people that I met, doing the stuff that I did, learning what I did.* [A639]

HCPs considered that DCEP had several advantages over the other two usual healthcare options, namely, DESMOND or advice given through routine consultations with members of the primary healthcare team. The group focus provided a non-threatening environment for participants and facilitated revisiting of educational information, while at the same time provided repeated contact with HCPs.

> *I think the points of difference [to usual care], that I can see, is the education component... that constant or continued access, a point of contact to a health professional. It's in an environment that's not threatening because they're there in a big group doing exercise and learning more about their health condition [at every session].* [Nurse Manager]

HCPs suggested the repeated sessions of DCEP provided more opportunity for attendees to ask questions of HCPs.

> *I see it [DCEP] as being really valuable because people often tell us that they don't feel that they have the ability to ask the questions that they really want to ask [at an appointment] due to time pressures.* [Pharmacist]

The ability to create an atmosphere through a suitably curated music playlist enabled HCPs to build group cohesion; an underpinning aspect of DCEP's approach.

*People said they loved the music. We had a mix. There was island music and all sorts of things …. a real big variation of music and they were like, "This is great!" … Being able to make [the playlist] more personalised and more appropriate for the people that are coming in is important and having that flexibility I think is quite good.* [Physio]

**Adoption**

The DCEP delivery characteristics that supported adoption were underpinned by the longstanding networking and relationship development undertaken with external people and organisations over many years. This led to the successful inclusion of others to support DCEP (e.g. venue, staffing) or for delivery of education sessions.

*Places where we have had existing relationships, existing trusting relationships [built] over time, [these] have worked. We've had a long-standing relationship with [name of a health provider]. And they've been good. They've supported us. They had their staff running the exercise class long before we had a contract sorted with them. They needed to trust us. And they did. And then there's others … and I've been working with them for years. One person always agrees [to come and talk] and does it free of charge. He sees it as part of his role.* [Clinical Lead]

It was evident in the data however, that taking time to develop relationships and not asking too much of people or organisations, was imperative for the adoption of DCEP by community organisations.

*We tried to work closely with [name of health provider]. … It didn't go well. … The challenge was that we didn't really have an opportunity to work through the necessary discussions because, all of a sudden, we were asking a lot of them in a relatively short period of time. We managed to sour that relationship through*

*communication not being ideal and just asking for too much, too soon.* [Clinical Lead]

While training of HCPs assisted with engagement in DCEP delivery, HCPs' knowledge and beliefs about DCEP suggested a buy-in to its philosophy was essential. A challenging aspect was engaging HCPs whose daily practice aligned with this philosophy.

*And I do think that if staff aren't clear on some of the values around [DCEP] it is difficult … It's not classic cardiac rehab, or pulmonary rehab. It's not, 'do this', 'do this', or blow whistles. We do try and run [DCEP] with a certain ethos.* [Clinical Lead]

One HCP stated a team player is required.

*I definitely think there are certain personalities that probably fit better with the programme [approach. It's] those people that work in a team. The team needs to be working in order to make [DCEP] work.* [Physio]

Additionally, HCPs recommended that an ability to connect with individuals/family/whānau and facilitate development of relationships was an important attribute for successful implementation of DCEP.

*You certainly need someone who can engage with people [especially] when you've got all these random people that don't know each other, and you need to engage with them and then try and get them to engage with each other! It's quite key to how [DCEP] runs as well.* [Physio]

**Implementation**

Initial training was undertaken with HCPs involved in DCEP delivery via zoom (i.e. introduction and orientation), followed by self-directed study of relevant resources. Sharing of pertinent resources was ongoing and shared with the team via email.

> *I am aware that we try to bring some of the MI [Motivational Interviewing] 'Spirit' to the group setting. The 'Talking to Change' podcast series by Chris Wagner is great but in particular the 5th episode … is specifically related to MI in groups. It is the best explanation, I have heard, of the atmosphere we try to create within DCEP.* [Clinical Lead]

Training updates were held to answer any outstanding or frequently asked questions and to train any new HCPs who had joined since the previous training. However, some HCPs missed these opportunities. New HCPs to DCEP talked about information not being handed on.

> *That was the problem, that none of it [training about what to do] was handed over. Absolutely nothing.* [Nurse]

The orientation training for DCEP was not repeated for new HCPs:

> *No, I don't know that there was any orientation!* [Dietician]

HCPs participants suggested that the networks and communication between and amongst people involved in DCEP could have been more structured and improved. There was also limited networking experienced by educators.

> *You just slot yourself in and move on, don't you?* [Podiatrist]

Limited feedback was provided to educators about content for and applicability of their sessions.

> *And nobody came back and said that was a bad talk.* [Podiatrist]

Implementation from an administrative perspective included ensuring that there was good administrator as:

*There was a lot of coordinating and making sure that we had all our ducks in a row basically, to keep it going*. (Administrator)

This included the logistics of finding the suitable venues in which to hold DCEP.

*Accessible for, sometimes, older, frailer people with physical disabilities; good parking, ideally, free parking …. trying to break down the barriers, any barriers to access [including culturally appropriate and accessible venues]; and maybe in a good location, as in, um, closer to the high-needs communities where we wanted to work in, with the people with a high incidence of T2D. And then it was a venue that was big enough to house up to 25 people, with bathroom, kitchen… a sound system or something like that. Yep, affordable. And, um, but also, that the exercise equipment… 'cause we've got some exercycles on wheels, some mats, some benches-type things or steps, and some rowing machines. Which are all portable but require storage space.* [Clinical lead]

**Maintenance**

An administrator suggested that DCEP, because of its preventative, collaborative and community focus should be an attractive long-term investment for national and local planners and funders.

*From an investment point of view, you cannot underestimate the investment in preventative work* [Nurse Manager].

Additionally, a broader approach that included people with any long-term condition/s should be a consideration moving forward.

*My personal view is around having [DCEP] as long-term conditions focused, not just diabetes. I think the sustainability in the community, particularly in some of our rural areas, would be difficult with just a diabetes focused programme. It would be a challenge. … Therefore, [if you broaden the programme] you're not doubling up on your resources. You can use the process and get greater 'bang for your buck.* [Nurse Manager]

To achieve sustainability, it was suggested that any programme would need to be delivered close to where people lived, especially in rural areas because that is where people with complex needs and multiple long-term conditions often live because living costs are lower.

*And travel from [rural town] to [city] is quite difficult and can be expensive for people.* [Nurse Manager]

The timing of the classes was often a major barrier to those who were working.

*The middle of day obviously excludes a large portion of people from being able to participate.* [Pharmacist]

It also excluded attendees from bringing along their family/whanau.

*Probably the timing of the programme that didn't allow it for people to take a significant other. But I think if it was in the evenings [around] 6pm, people got a bit more availability.* [Nurse]

Additionally, it was felt DCEP would need to have the local and wider community supporting its implementation and integration into the community.

*Has to be a programme that can be picked up and taken somewhere and supported from a distance. [It would need] good community engagement so that*

*everybody knows it's available for a wider population, and that there is commitment from all the layers [local providers, planners and funders etc.,] who need to be involved. But if it's not a funded programme, then there needs to be a community response to what we're going to do, for the long-term.* [Nurse Manager]

DCEP was also perceived as having value in that it provided exposure to different work environments because:

*physiotherapists have a role in exercise for people with long-term health conditions.* [Physio]

However, for physiotherapists, a tension was evident between the value placed on the approach of DCEP by HCPs and potential HCPs, and the facility to recoup wages at a rate similar to that earned in private practice.

*If you're working in a private practice, that person can be billing for at least 2-3 consultations through ACC, an hour, which brings in quite a bit more money than [the] hourly rate that [the programme could] pay someone. So, approaching a private practice to buy out their staff time [is tricky].* [Clinical Lead]

As DCEP was developed to support people living in low socioeconomic conditions it was offered free to attendees. Funding however to support aspects of DCEP (i.e. venue hire, staff wages) was identified as a perennial issue.

*Funding [laughs]. I mean that always comes up with everything.* [GP]

## DISCUSSION

To inform future development of DCEP and similar lifestyle programmes for people living with T2D, we undertook a process evaluation of the implementation of DCEP

into community-based settings within two cities in the lower South Island of NZ. We used a three-stage approach. Initially, key topics of implementation interest were identified through thematic analysis and we then sought to the understand the "why" of success (or not) of our implementation via application of the CFIR framework. To inform future development of DCEP, we identified the practicalities of the outcomes ("the who, what, where, how, and when") using the RE-AIM Framework.[19 20] Below we discuss our findings relative to the RE-AIM Framework.

**Reach**

Whilst we met our reach target (i.e. sample size and regional ethnic representation), had we not had to use the randomisation process of the RCT (thus potentially deterring Māori participants) reach could have been extended. It could have also been further extended had we promoted self-referral in addition to GP referral, given the latter was potentially 'gate-keeping'. PHO 'ownership' of DCEP and community champions could further enhance reach.

The RCT process was found culturally unacceptable to Māori and potentially for other ethnic groups such as Pasifika, potentially reducing the reach of DCEP, similar to a finding in a recent systematic review.[22] Wider literature suggests that the NZ health system's individualised approach to healthcare,[23-25] and by extension that of the RCT randomisation process, denies people the psychosocial benefit attained through inclusion of family/whānau in preventative and rehabilitation programmes.[26]

Further, to improve reach and access to DCEP, wider and enhanced communication targeted directly to people living with T2D was needed, especially emphasing the self-referral option. Self-referral has been shown to enhance population representation for people accessing psychological therapies for mental health in the United Kingdom

(UK)[27] and availability of funding and staff training support to provide community rehabilitation programmes is crucial to equitable access. In contrast, other UK research[24] has found that people on low incomes considered self-referral to be an obstacle to psychological therapies. These authors suggested the need to better understand the complexities of effective referral and/or self-referral in primary care, such as how services are discussed with patients and assumptions about people's readiness to self-refer.[28] Our findings suggest that improving the referral cycle would additionally require 'ownership' of DCEP by local primary healthcare organisations (PHOs), who because of the 'buy-in' would then refer patients into the programme on an ongoing basis. To enable programmes that address issues of inequities for Māori, a strategy 'by Māori for Māori' is crucial,[29] [30] but funding, development and implementation of such programmes continues to be challenge in NZ. As noted in the foreword of the 2019 Health Quality and Safety Commission report: "It is not a matter of favouritism, political correctness or deference to Māori; rather, it is a matter of health and wellbeing and the eradication of inequities."[31]

**Effectiveness**

Essentially DCEP was considered effective in that both attendees and HCPs spoke of the beneficial impact it had in creating a social and welcoming environment which, although founded on relationships and connections, was tailored to the individual. People felt comfortable attending and empowered to learn.

DCEP was valued by both attendees and HCPs because it appeared to offer benefits that impacted wellness and social connectedness, with group interactions and the ability to build relationships considered important facets. It is well established that development of meaningful relationships with other people generates a feeling of

belonging (or social connection) and an improvement in wellbeing and health.[32-35] Further, for older adults, social support, especially from family, is associated with increased engagement in physical activity.[36] Group participation for people with long-term conditions has significant benefits (on, for example, self-efficacy, self-care, quality of life, pain, psychological symptoms).[37] For such populations, numerous factors (such as mental, emotional and physical symptoms)[38 39] or wider social determinants of health[40] make it difficult to develop and maintain support networks, and thus organised healthcare groups can become important enablers. Effective, caring, empathetic communication is a cornerstone of relationship development [34 41] and relationship-centred care.[42] Relationship-centred care is argued to be the founding principle of healthcare provision[42] and is contended to have a positive effect on health outcomes.[43] Our findings further reinforce the substantiation for relationship-centred care in rehabilitation programmes.

**Adoption**

Key to adoption of DCEP were the networking and relationships with local health providers and communities. However, the building of these relationships should not be underestimated – it takes time and should not be rushed. Also, of importance, was whether the HCPs delivering DCEP valued the philosophy of DCEP (based on the 'spirit' of Motivational Interviewing).[44] Training of staff and communication between the various HCPs involved was not optimal and needs further consideration and development.

Not only is relationship centred care important for recipients of healthcare, our findings emphasise the long-term relationship development and networking with healthcare providers and the community required for the initiation and adoption of community-

based rehabilitation programmes. This process cannot be rushed, and is an important facilitator of attendance, particularly for indigenous peoples.[19] From an organisational perspective, HCPs felt that champions and the 'right' type of HCPs employed to deliver DCEP were important for adoption. From the perspective of attendees, the inclusive, non-judgemental and welcoming atmosphere of DCEP encouraged their engagement.

**Implementation**

HCPs' buy-in to the underlying philosophy of DCEP and a team player attitude contributed to successful delivery of DCEP. The literature suggests obtaining HCPs' buy-in is a perennial issue when introducing change or innovation.[45] Understanding and addressing the organisational factors impacting on implementation, and indeed organisational readiness,[46] along with understanding of predictors of HCPs readiness, are needed to increase team cohesiveness and engagement with a programme.[45-48] HCPs also suggested better DCEP training was needed, including improved communication amongst involved HCPs. Strengthening such aspects would increase the psychological meaningfulness, a prerequisite for buy-in,[49] the reward resulting in greater investment in DCEP delivery.[45] Our findings suggest champions for DCEP were required to facilitate cultural and context specific factors, impacting not only reach but implementation.[50]

**Maintenance**

To maintain DCEP, especially if aiming to reach those in most need, DCEP needs to be delivered closer to where people live; in rural NZ, this would also necessitate a generic approach catering for people with multimorbidity, instead of condition-specific approaches. As DCEP was developed for those living in low socio-economic situations, it was free to attend; this however meant on-going funding challenges, even

though its preventative attributes may, in the long-term, be cost-saving for the health system.

DCEP was considered impactful as a health preventative programme. A plethora of literature espouses the benefit of exercise and education and their impact on mitigating risk of disease progression and improved outcomes for people with long-term conditions.[51] With limited healthcare resources,[52] a more sustainable model of a generic programme for people living with multiple conditions rather than a condition specific focus has been suggested. Delivered locally and offered at times appropriate for the community concerned with local and wider community support would improve engagement[53] but sourcing funding would require attention. Ownership by a PHO or community-based health organisation (for example, a Māori health provider) has also been proposed.[53]

**Strengths and limitations**

A strength of our study was the use of two complementary implementation science frameworks (CFIR and RE-AIM) to better understand the DCEP implementation process. A strength and a limitation of our study was the broad and rich data we collected. Whilst this ensured a wide and diverse capture of opinions, it also required an initial focussing analysis to identify key topics that we then explored in more depth with the CFIR[16] and RE-AIM[14] frameworks. The initial analysis may have missed smaller and possibly important issues that merited consideration. Although our RCT met ethnic representation, the process evaluation had low Māori or Pasifika representation. Further to this, whilst the interviewers were ethnically diverse, the three researchers who analysed the data were Pākehā (non-Māori) negating the application of a Māori or Pasifika lens to the analysis.

## Implications for policy and practice

Lifestyle programmes such as DCEP are developed based on community input and community relationships. Whilst acceptable and effective in promoting healthcare in a person-centred manner, their survival appears dependent, not on perceived acceptability or perceived effectiveness, but on ongoing funding, which is largely short term and not sustained. The funding appears to be used as a "band-aid" for identified problems and not dedicated and embedded to enable a preventative long-term strategy. A case in point of a lifestyle intervention programme developed by Māori for Māori in Dunedin,[54] found to be successful and beneficial for attending Māori with T2D, attracted enough funding from the Health Funding Authority to continue, but only for one year. The Health Funding Authority and the programme no longer exist.[54]

## CONCLUSION

What we have learnt in implementing a lifestyle programme such as DCEP is that to ensure success, time and care needs to be taken to build and maintain networks, trust and relationships. This requires good communication channels. The networks and relationships required are not only between those delivering the programmes and the target community group, but also between local healthcare organisations (for example, district health boards, general practices, PHOs and Māori health providers) as well as between the HCPs involved within DCEP. Healthcare programmes that have a person-centred focus enable access and ongoing attendance. It does, however, require HCPs to practise in a nuanced person-centred manner, and as staff turnover is frequently high, a programme of continual training is also required. Future programmes may be more viable if delivered closer to where people live and, instead of having a condition-

specific approach, could take a more generic approach to cater for people with multiple long-term conditions.

*Word count: 5393*

## SUPPLEMENTARY FILES

Supplementary File 1: COREQ-32 reporting checklist. An assessment of the study reporting against the domains of the COREQ-32 reporting checklist for interviews and focus groups. (.pdf)

Supplementary File 2: First stage of analysis (Consolidated Framework for Implementation Research - CFIR) with illustrative quotes (.pdf)

## ACKNOWLEDGMENTS

We would like to thank all the participants/whānau and health care professionals who contributed to the study and to the Clinical Advisory Group and lay advisors.

## CONTRIBUTORSHIP STATEMENT

Conceptualization LH, CH, TSt, RM, TSu, FDN, PJ, ARG, JM, DK**;** Methodology TSt, LH, AW; Formal analysis AW, LH, TSt; Writing – Original draft AW, LH, TSt; Writing – review and editing All authors; Funding acquisition LH wrote the grant application with input from CH, TSt, RM, TSu, FDN, PJ, ARG, JM, DK; All authors read and approved the final manuscript.

## COMPETING INTERESTS

All authors declare that they have no competing interests.

## FUNDING

This study was funded by the Health Research Council of New Zealand (HRC Project Grant 17/233). The funding body has not had any role in design of the study or outputs from the study. Funding was not provided by the trial sponsor (the University of Otago, Dunedin, Otago, New Zealand).

## ETHICS APPROVAL

Ethical approval for the DCEP trial and evaluation was obtained from the Health and Disability Ethics Committee, Ministry of Health (HDEC17/CEN/241/AM01).All participants provided written, signed consent to participate.

## DATA SHARING STATEMENT

Full de-identified interview transcripts will not be shared. Informed consent, in line with the approving ethics committee, only allows for the use of de-identified extracts within research reporting and writing, in order to maintain the privacy of participants based in a defined regional area and population, thus making their identification with full transcripts more likely.

## REFERENCES


1. World Health Organisation. Diabetes: WHO; 2021 [Available from: https://www.who.int/news-room/fact-sheets/detail/diabetes accessed 16/03/2022].
2. Ministry of Health. New Zealand Health Survey 2019-2020 annual data 2021 [Available from: https://minhealthnz.shinyapps.io/nz-health-survey-2019-20-annual-data-explorer/_w_069d3399/#!/explore-indicators accessed 16/03/2022].
3. Hemmingsen B, Gimenez-Perez G, Mauricio D, et al. Diet, physical activity or both for prevention or delay of type 2 diabetes mellitus and its associated complications in people at increased risk of developing type 2 diabetes mellitus. *Cochrane Database Syst Rev* 2017;12(12):Cd003054. doi: 10.1002/14651858.CD003054.pub4
4. O'Donoghue G, O'Sullivan C, Corridan I, et al. Lifestyle Interventions to Improve Glycemic Control in Adults with Type 2 Diabetes Living in Low-and-Middle Income Countries: A Systematic Review and Meta-Analysis of Randomized Controlled Trials (RCTs). *Int J Environ Res Public Health* 2021;18(12) doi: 10.3390/ijerph18126273
5. Harwood M, Tane T, Broome L, et al. Mana Tū: a whānau ora approach to type 2 diabetes. *NZMJ* 2018; 131(1485): 76-83.
6. New Zealand Guidelines Group. Guidance on the management of type 2 diabetes 2011. Wellington, New Zealand Guidelines Group: 2011. [Available from: https://www.moh.govt.nz/notebook/nbbooks.nsf/0/60306295DECB0BC6CC257A4F000FC0CB/$file/NZGG-management-of-type-2-diabetes-web.pdf accessed 16/03/2022]
7. Davies MJ, Heller S, Skinner TC, et al. Effectiveness of the diabetes education and self management for ongoing and newly diagnosed (DESMOND) programme for people with newly diagnosed type 2 diabetes: cluster randomised controlled trial. *BMJ* 2008;3367(7642):491–5. doi: https://10.1136/bmj.39474.922025.BE
8. Hale L, Stokes T, Scarth B, et al. Protocol for a randomised controlled trial to evaluate the effectiveness of the diabetes community exercise and education programme (DCEP) for long-term management of diabetes *BMJ Open* 2019;9:e025578. doi: https://10.1136/bmjopen-2018-025578
9. Higgs C, Skinner M, Hale L. Outcomes of a community-based lifestyle programme for adults with diabetes or pre-diabetes. *J Prim Health Care* 2016;8(2):130-9. doi: 10.1071/hc15038.
10. Hale L, Higgs C, Gray AR, et al. The Diabetes Community Exercise Programme plus usual care versus usual care in patients with type 2 diabetes: a randomised, two-arm, parallel, open-label trial. *eClinicalMedicine* 2022;46:101361. https://doi.org/10.1016/j.eclinm.2022.101361
11. Ministry of Health. Population of Southern District Health Board Wellington, NZ: Ministry of Health; 2021 [Available from: https://www.health.govt.nz/new-zealand-health-system/my-dhb/southern-dhb/population-southern-dhb accessed 16/03/2022].
12. Ministry of Health. Wai 2575 Māori Health Trends Report. Wellington, NZ: Ministry of Health, 2019.[Available from:

https://www.health.govt.nz/publication/wai-2575-maori-health-trends-report accessed 16/03/2022]
13. Ministry of Health. Whakamaua: Māori Health Action Plan 2020–2025. Wellington, NZ: Ministry of Health, 2020.[Available from: https://www.health.govt.nz/publication/whakamaua-maori-health-action-plan-2020-2025 accessed 16/03/2022]
14. Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American journal of public health* 1999;89(9):1322-27. doi: 10.2105/ajph.89.9.1322
15. Saunders B, Sim J, Kingstone T, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & quantity* 2018;52(4):1893-907. doi: 10.1007/s11135-017-0574-8 [published Online First: 2018/06/26]
16. Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science* 2009;4(1):50. doi: 10.1186/1748-5908-4-50
17. MarÍa Tejada Tayabas L, Castillo León T, Monarrez Espino J. Qualitative evaluation: A critical and interpretative complementary approach to improve health programs and services. *International Journal of Qualitative Studies on Health and Well-being* 2014; 9(1). https://doi.org/10.3402/qhw.v9.24417.
18. Thomas DR. A general inductive approach for analyzing qualitative evaluation data. *Am J Eval* 2006;27(2):237-46. doi: 10.1177/1098214005283748
19. King DK, Shoup JA, Raebel MA, et al. Planning for Implementation Success Using RE-AIM and CFIR Frameworks: A Qualitative Study. *Front Public Health* 2020;8:59. doi: 10.3389/fpubh.2020.00059.
20. Holtrop JS, Rabin BA, Glasgow RE. Qualitative approaches to use of the RE-AIM framework: rationale and methods. *BMC Health Services Research* 2018;18(1):177. doi: 10.1186/s12913-018-2938-8
21. 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 : journal of the International Society for Quality in Health Care* 2007;19(6):349-57. doi: 10.1093/intqhc/mzm042.
22. Glover M, Kira A, Johnston V, et al. A systematic review of barriers and facilitators to participation in randomized controlled trials by Indigenous people from New Zealand, Australia, Canada and the United States. *Global Health Promotion* 2014;22(1):21-31. doi: 10.1177/1757975914528961
23. Gifford H, Cvitanovic L, Boulton A, et al. Constructing prevention programmes with a Māori health service provider view. *Kōtuitui: New Zealand Journal of Social Sciences Online* 2017;12(2):165-78. doi: 10.1080/1177083X.2017.1352521
24. Graham R, Masters-Awatere B. Experiences of Māori of Aotearoa New Zealand's public health system: a systematic review of two decades of published qualitative research. *Australian and New Zealand Journal of Public Health* 2020;44(3):193-200. doi: https://doi.org/10.1111/1753-6405.12971
25. Sopina E, Clinton J, Mahony F, et al. Alleviating the burden of chronic conditions in New Zealand (The ABCC NZ study): New Zealand experts' perspectives of chronic conditions management. Auckland: University of Auckland, 2008.

26. Hartmann M, Bäzner E, Wild B, et al. Effects of interventions involving the family in the treatment of adult patients with chronic physical diseases: a meta-analysis. *Psychother Psychosom* 2010;79(3):136-48. doi: 10.1159/000286958
27. Brown JS, Boardman J, Whittinger N, et al. Can a self-referral system help improve access to psychological treatments? *Br J Gen Pract* 2010;60(574):365-71. doi: 10.3399/bjgp10X501877
28. Thomas F, Hansford L, Ford J, et al. How accessible and acceptable are current GP referral mechanisms for IAPT for low-income patients? Lay and primary care perspectives. *J Ment Health* 2020;29(6):706-11. doi: 10.1080/09638237.2019.1677876
29. Smith LT. Kaupapa Māori Research- Some Kaupapa Māori Principles. Hamilton, NZ: University of Waikato, 2015. [Available from: https://researchcommons.waikato.ac.nz/bitstream/handle/10289/12026/Kaupapa%20M%C4%81ori%20Research.pdf?sequence=21 accessed 16/03/2022].
30. Thompson N. Do Māori initiatives by Māori and for Maori really help Māori? *Aotearoa New Zealand Social Work* 2008;4:56-59. doi: https://doi.org/10.11157/anzswj-vol20iss4id332
31. Health Quality and Safety Commission. He matapihi ki te kounga o ngā manaakitanga ā-hauora o Aotearoa 2019. A window on the quality of Aotearoa New Zealand's health care 2019. Wellington, NZ: HQSC, 2019. [Available from: https://www.hqsc.govt.nz/assets/Our-data/General/Window_2019_web_final.pdf accessed 16/03/2022].
32. Seppala E, Rossomando T, Doty J. Social connection and compassion: Important predictors of health and well-being. *Social Research: An International Quarterly* 2013;80(2):411-30.
33. Sirven N, Debrand T. Social participation and healthy ageing: An international comparison using SHARE data. *Social Science & Medicine* 2008;67:2017-26. doi: 10.1016/j.socscimed.2008.09.056
34. Wilkinson A, Atlas J, Nelson K, et al. Client perceptions of engaging with a health and social care navigation service: A qualitative study. *Chronic Illness* 2020;0(0):1742395320937046. doi: 10.1177/1742395320937046
35. Zavaleta D, Samuel K, Mills C. OPHI Working Paper No. 67. Social isolation: A conceptual and measurement proposal: Oxford Poverty & Human Development Initiative, University of Oxford, 2014. [Available from: https://ophi.org.uk/social-isolation-a-conceptual-and-measurement-proposal/ accessed 16/03/2022]
36. Lindsay Smith G, Banting L, Eime R, et al. The association between social support and physical activity in older adults: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity* 2017;14(1):56. doi: 10.1186/s12966-017-0509-8
37. Jackson M, Jones D, Dyson J, et al. Facilitated group work for people with long-term conditions: a systematic review of benefits from studies of group-work interventions. *British Journal of General Practice* 2019;69(682):e363. doi: 10.3399/bjgp19X702233
38. Griffith LE, Raina P, Levasseur M, et al. Functional disability and social participation restriction associated with chronic conditions in middle-aged and older adults. *J Epidemiol Community Health* 2017;71(4):381-89. doi: 10.1136/jech-2016-207982
39. Wilkinson A, Bowen L, Gustavsson E, et al. Maintenance and development of social connection by people with long-term conditions: A qualitative study.

*International Journal of Environmental Research and Public Health* 2019;16(11):1875. doi: 10.3390/ijerph16111875
40. Barnes M, Taylor D, Ward L. Being well enough in old age. *Critical Social Policy* 2013;33(3):473-93. doi: 10.1177/0261018312471163
41. Carlson T, Moewaka Barnes H, Reid S, et al. Whanaungatanga: A space to be ourselves. *Journal of Indigenous Wellbeing* 2016; 1(2): 44-59.
42. Beach MC, Inui T. Relationship-centered care. A constructive reframing. *J Gen Intern Med* 2006;21 Suppl 1(Suppl 1):S3-8. doi: 10.1111/j.1525-1497.2006.00302.x
43. Kelley J, Kraft-Todd G, Schapira L, et al. The influence of the patient-clinician relationship on healthcare outcomes: a systematic review and meta-analysis of randomised controlled trials. *PLoS One* 2014;9:e94207. doi: https://doi.org/10.1371/journal.pone.0094207
44. Miller WR, Rollnick S. Applications of motivational interviewing. Motivational interviewing: Helping people change. 3rd ed. New York: Guilford Press 2013.
45. French-Bravo M, Crow G. Shared governance: The role of buy-in in bringing about change. *OJIN: The Online Journal of Issues in Nursing* 2015;20(2) doi: 10.3912/OJIN.Vol20No02PPT02
46. Weiner BJ. A theory of organizational readiness for change. *Implementation Sci* 2009;4(67) doi: https://doi.org/10.1186/1748-5908-4-67
47. LaVela S, Hill J. Staff perceptions of implementation of a team-based model of patient-cetnred primary care. *International Journal of Person Centred Medicine* 2014;4(4) doi: https://doi.org/10.5750/ijpcm.v4i4.456
48. Moroney D. From model to reality: The role of implementation readiness. *Journal of Youth Development* 2020;15(6):162-70. doi: 10/5195/jyd.2020.1057
49. Kahn WA. Psychological conditions of personal engagement and disengagement at work. *Academy of Management* 1990;33(4):692-724.
50. Pinto JK, Slevin DP. The project champion: key to implementation success. *Proj Manag J* 1989; 20(4). https://www.pmi.org/learning/library/project-champion-key-implementation-success-2135 (accessed Nov 2021).
51. Barker K, Holland AE, Lee AL, et al. A rehabilitation programme for people with multimorbidity versus usual care: A pilot randomized controlled trial. *Journal of comorbidity* 2018;8(1):2235042X18783918-2235042X18. doi: 10.1177/2235042X18783918
52. Dieleman JL, Campbell M, Chapin A, et al. Future and potential spending on health 2015-40: development assistance for health, and government, prepaid private, and out-of-pocket health spending in 184 countries. *The Lancet* 2017;389(10083):2005-30. doi: 10.1016/S0140-6736(17)30873-5
53. Wali S, Superina S, Mashford-Pringle A, et al. What do you mean by engagement? - evaluating the use of community engagement in the design and implementation of chronic disease-based interventions for Indigenous populations - scoping review. *Int J Equity Health* 2021;20(1):8. doi: 10.1186/s12939-020-01346-6.
54. Murphy E, McAuley KA, Bell D, et al. A new approach to design and implement a lifestyle intervention programme to prevent type 2 diabetes in New Zealand Maori. *Asia Pac J Clin Nutr* 2003;12(4):419-22.

# COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| **Domain 1: Research team and reflexivity** | | | |
| *Personal characteristics* | | | |
| Interviewer/facilitator | 1 | Which author/s conducted the interview or focus group? | |
| Credentials | 2 | What were the researcher's credentials? E.g. PhD, MD | |
| Occupation | 3 | What was their occupation at the time of the study? | |
| Gender | 4 | Was the researcher male or female? | |
| Experience and training | 5 | What experience or training did the researcher have? | |
| *Relationship with participants* | | | |
| Relationship established | 6 | Was a relationship established prior to study commencement? | |
| Participant knowledge of the interviewer | 7 | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research | |
| Interviewer characteristics | 8 | What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic | |
| **Domain 2: Study design** | | | |
| *Theoretical framework* | | | |
| Methodological orientation and Theory | 9 | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | |
| *Participant selection* | | | |
| Sampling | 10 | How were participants selected? e.g. purposive, convenience, consecutive, snowball | |
| Method of approach | 11 | How were participants approached? e.g. face-to-face, telephone, mail, email | |
| Sample size | 12 | How many participants were in the study? | |
| Non-participation | 13 | How many people refused to participate or dropped out? Reasons? | |
| *Setting* | | | |
| Setting of data collection | 14 | Where was the data collected? e.g. home, clinic, workplace | |
| Presence of non-participants | 15 | Was anyone else present besides the participants and researchers? | |
| Description of sample | 16 | What are the important characteristics of the sample? e.g. demographic data, date | |
| *Data collection* | | | |
| Interview guide | 17 | Were questions, prompts, guides provided by the authors? Was it pilot tested? | |
| Repeat interviews | 18 | Were repeat inter views carried out? If yes, how many? | |
| Audio/visual recording | 19 | Did the research use audio or visual recording to collect the data? | |
| Field notes | 20 | Were field notes made during and/or after the inter view or focus group? | |
| Duration | 21 | What was the duration of the inter views or focus group? | |
| Data saturation | 22 | Was data saturation discussed? | |
| Transcripts returned | 23 | Were transcripts returned to participants for comment and/or | |

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| | | correction? | |
| **Domain 3: analysis and findings** | | | |
| *Data analysis* | | | |
| Number of data coders | 24 | How many data coders coded the data? | |
| Description of the coding tree | 25 | Did authors provide a description of the coding tree? | |
| Derivation of themes | 26 | Were themes identified in advance or derived from the data? | |
| Software | 27 | What software, if applicable, was used to manage the data? | |
| Participant checking | 28 | Did participants provide feedback on the findings? | |
| *Reporting* | | | |
| Quotations presented | 29 | Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number | |
| Data and findings consistent | 30 | Was there consistency between the data presented and the findings? | |
| Clarity of major themes | 31 | Were major themes clearly presented in the findings? | |
| Clarity of minor themes | 32 | Is there a description of diverse cases or discussion of minor themes? | |

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

**Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.**

**SUPPLEMENTARY FILE 2**

**First stage of analysis (Consolidated Framework for Implementation Research) with illustrative quotes**

| **Domain** (constructs) | |
|---|---|
| **The intervention characteristics** | **Illustrative quote** |
| HCP: **Community of practice**<br><br>(Relative advantage) | Well it's fantastic. …. and also it's, you know, obviously a great social, a lot of people with these conditions feel quite isolated so a programme like this gives them a chance to interact with other people and I think sometimes they learn a lot more from people they're with than people like me. They know what it's like living with their conditions and they can share their experiences. |
| Attendees: **Supportive intervention**<br><br>(Evidence strength & quality) | I didn't know anybody else, um, but we were all of similar age and we were all in the same boat and I think that was probably a big part. Previously you felt as if you were on your own with your diabetes. But here we all were and we were all quite open about things like um, you know medication, the exercise part, I went in there thinking well I am here for exercise, so for the three quarters of an hour we were to exercise I made a really good attempt. and I did enjoy that. … And we were all, I think by the end of the programme to, one of the biggest benefits was actually, the comradery that you had with everybody ….. all you know, hi [attendee name] how are you today and you were the same, kind of got to know people a bit and thoroughly enjoyed that. And that probably was um, took me going back, [attendee name] and I kept us going back on the maintenance programme. (A324) |
| HCP: **A valuable resource**<br><br>(Relative advantage; Design quality & packaging; Cost) | I think, personally, really important. I think it's something that could grow and develop and be a real resource.<br><br>I think it's amazing. I think it's fantastic. We really refer an awful lot of people to the DCEP just simply because I feel really confident because I know the expertise that are there, so that's always a great starting point. If you refer people you need to be confident that they're going to be in good hands. Obviously, particularly if they've got diabetes and other health related problems, that they are going to be cared for and put through a programme that's specially designed for them and that's really, really, really valuable, I think. The other thing that it is, there is no cost apart from the donation which is really valuable as well and just being able to refer people to a community service. |
| Attendees: **Acceptable and valued**<br><br>(Evidence strength & quality) | Well if it was, if you know doctors could refer people that are border line diabetic or people that are type 2 and have ended up on insulin and it was just a good way to you know, find out about things. Because if you just go for one day, you know all those questions, but over 12 weeks there is different things that crop up that you are able to ask. So just on one day you might not think of everything, but with 12 weeks, yeah. And like with having like the dietician and the |

| | |
|---|---|
| | pharmacists and all those different people, you know, you kind of thought of something and other people asks questions as well, and you think, oh yeah, I had been wondering about that. (A920)<br><br>So it's been a um, yeh it's been a tough couple of years but for us the DCEP has been an important part, a positive part. It's been a real support in terms, as I say both a health and psychical fitness point of view. ….. So we're very grateful for the programme and we found it really worthwhile. |
| HCP: **Perhaps too social**, and thus not enough exercise.<br><br>(Relative advantage) | I've had a couple of patients that have come in, not for the maintenance programme, they've just come to have their blood pressure taken ….. so they haven't done any exercise in the maintenance, and they haven't done anything other than pop in to have their blood pressures taken. ……. actually, some of them don't even exercise.<br><br>They come to the class, and that's the big thing. They come to class to socialise, and the exercise is like a side issue. And for the exercise purists, this is challenging. And I'm constantly challenged by this. And I've got to constantly stand by it. And my line will go something like, typically, you're working with the sedentary population, who do next to no physical activity, who will get the maximum bang for buck from going doing no physical activity to doing some physical activity. So, if they're motivated to come because they feel comfortable and not judged, and accepted, and they can just do what they can manage, then that's more important than anything else. |
| Attendees: **Not enough exercise**<br><br>(Adaptability) | The maintenance class, the only thing I'm finding, this is the only negative I have about the whole thing, alright? You know how we used to just do forty minutes to forty-five minutes of exercise? And it was fine. Well, when I went to the maintenance class and you can do it an hour, and I want to do the hour, there's not enough variety to be able to do to fill in the hour. I started to find I was getting a bit bored. …… you have to keep looking to see if the machine you wanted was free so that you, you know or go to something else. (A238)<br><br>One lady, all she did was walk around a couple of laps and then sat down for the most of the time and talked and all that. It was um, a get out of home activity for her and she did you know a few wee laps and that was it for her. You know, that was better than sitting at home just doing nothing, that was her exercise you know, it was catered for everybody. It really was. (A887) |
| Attendees: **Tailored person-centred approach**<br><br>(Adaptability; Design quality & packaging) | There's a number of things I can't do because of my hip. My hip's down to bone on bone so it's kind of discomfort. I'm on fairly high levels of pain relief um, and I take a whole bottle of [pain medication] to get here. So, yes, they've helped me and pointed me in the right direction to give me the strengths in the areas I will need to have it when I come out of theatre and move onto stage, the next stage in life. (A205) |

| | |
|---|---|
| | I think it makes you more comfortable the fact that you've got the nurse there and the physio there. Like um, for me, um, like having them there to guide you and support you … show you like, [Physio] would show me like she would sort of challenge me, like um, and she's like "Oh, I think that's too easy for you. So we're going to do this." And I was like… "Oh, do we have, you know, do we have to?" And she's like, "You're doing that too easy, we're going to do this." (A238)<br><br>I am 13 months out of a triple bypass ah so I have a few issues with my chest. So, [Physio] has been working with me to exercise and strengthen chest muscles. And this is something that would never have happened if I hadn't had been involved in this, you know. (A373) |
| HCP: **Importance of relationships and communication**<br><br>(Relative advantage) | It is better in terms of relationship building if we're there doing the exercises with them… I definitely think there's advantages to working amongst the people ... for building rapport and trust. My first session I went to, I rolled up in my work gear, and they were all, like, "where's your gears?" And, so, for my second session, I was, like, "right, well, I'm coming prepared then." "I'm coming in my lycra"! "Activate your tights." Then it just, kind of, it felt a bit more comfortable, um, in terms of… they just seemed to be a bit more… relaxed.<br><br>I try and engage with people, like um, like I try and engage with everyone to start with and I make time to block out, so what I tend to do is when people are you know doing their thing I'll walk around and chat and I'll do that connection so I am working on a kind of personal connection, not just a I'm your physio kind of connection but actually kind of finding out a bit about them and oh you know, "What do you do," and this, that, I'll share a little bit about myself and so I sort of engage them from there and then I tend to like, particularly the bikes, when the bikes are together and things like that, you end up having a conversation with two people at the same time and they end up talking and you kind of move on [laughs]. |
| Attendees: **Social atmosphere**<br><br>(Evidence strength & quality; Relative advantage) | I have quite enjoyed it, um, we have had a really good mix of a good bunch of ah people in it, and I thought, like Lena has been wonderful and so have the nursed that have come along. So, it has really been good that way. And, I have enjoyed most, most of the um, classes that I have afterwards, I have learnt a hell of a lot more from that. … you spend three quarters of an hour each lesson on a particular subject and you have got interaction of the other people so it is really good. (A373)<br><br>Do I enjoy it here? I love it. Are the people great? Fantastic. And the group is fantastic, we've made new friends um, and they're all respective of one another, but they all have ideas and laugh and joke amongst themselves. The majority are women, but that means absolutely nothing, it |

| | |
|---|---|
| | just means that they drew that envelope. It could've gone the other way just as easily. Do I have any, no I have no regrets. Am I going to carry on? Hell yeah! (A205) |
| Attendees: **Unpretentious environment**<br><br>(Adaptability) | I think um, family inclusion is good, um, especially like the meal preparations and all that sort of thing and why it is important to go for a walk after dinner and how it is nice if you can have someone walking with you, and all that sort of thing. Um, so I think that is really beneficial to have um, a significant other as part of the programme. (A639)<br><br>I brought hubby along when he had a week off. I said come along, so he came along and did a few exercises and listened, it was a good talk that day and he gained valuable information, that day, through diet and all that. (A887)<br><br>And, you know, I mean, we don't, it's like, when people go to the gym, they've got all the flash gears on, you know, just to be looked at, that's what I think. We can go there how we are, we're taken how we are, and get on with it. ….. which is good, you know, those are the sorts of people you want, and they don't use big, like, um, flash words. They use language that we understand. (A21)<br><br>Encouragement, you know talking amongst yourself. A lot of humour quite a bit of hilarity you know. Oh, we have had some good laughs, yeah. And that, I guess that was one of the reasons why we kept going back to, um, because we had some laughs and because we were comfortable. (A639) |
| Attendees: **Beneficial**<br><br>(Evidence strength & quality; Relative advantage) | I have quite enjoyed it, um, we have had a really good mix of a good bunch of ah people in it, and I thought, like [Physio] has been wonderful and so have the nurses that have come along. So, it has really been good that way. And, I have enjoyed most, most of the um, classes that I have afterwards, I have learnt a hell of a lot more from that. In fact, I would say that I have learnt more from that, I did the Desmond ah, course and ah, I have found this more beneficial than the Desmond. The Desmond was too much to try and squeeze in over a six-hour period, you know …. and to try and take in all the information that they give you in such a short time it is really hard. Whereas where you spend three quarters of an hour each lesson on a particular subject and you have got interaction of the other people so it is really good. (A373)<br><br>Well, I can just show you. Like, if you start at my book. Like you see, my, on the 24th of the 4th, my blood pressure was 160 over 190 which is quite high. … And then, as we keep going down, it went down to 140 over 90….. And then it went to 132 over 82. Um and then towards the end, like I was getting 124 over 82. Ah, my blood sugars range between 8.4 and 4.7. …And like when I, I got my certificate up on the bookshelf up there, and when I got it, I came home and put it on Facebook and all the um, I got all these comments about it and everything. (A238) |

| | |
|---|---|
| Attendees: **Advice confusion**<br><br>(Design quality & packaging) | I got really confused about what it right and what is not right. I had started on a diet control management of diabetes and it was working for me and they were telling me something different. They were telling me about whole grain breads and pastas were ok and rice and all that, and yet in my diet I had none of that. (A639) |
| Attendees: **Costs**<br><br>(Evidence strength & quality; Relative advantage; Design quality & packaging; Cost) | I really liked the venue and I was quite surprised um, about the equipment that was available. So, walking into the [venue] where I had been several times before for different things and seeing it all set up where there is a gym was quite cool. … I like working out and I like doing that and I even like it better when I am doing it for free. (A639)<br><br>It is unique because it is an exercise programme that doesn't cost us anything, it is very local. Um, it is utilising a business locally. And it is free. (A887)<br><br>I enjoyed it. I'm not an exercise… I'm an active person, but I have to be doing something constructive, like shifting the sheep or doing something like that. Whereas, um, to go, say, to the gym… and that's the other thing, gyms are so expensive to go to, and when you're on a pension or something like that, um, yeah, it's one of those things that get left behind. The fact that it was free, it was good. (A280)<br><br>… because of the cost of petrol and everything, twice a week getting to the other side of town is um. … It is a bit too much. (A159)<br><br>(Interviewer: Yeah, like if you had to pay for it.) I probably wouldn't go then. Yeah, I don't think, there would be a handful of people that were there wouldn't be able to afford that either. Yeah. A couple of them on their, well that is only my opinion of looking at them, I don't think they would come if there was a fee to it. (A639) |
| HCP: **Timing of the classes**<br><br>(Adaptability) | The middle of day obviously excludes a large portion of people from being able to participate. Um, and it makes it exponentially more complicated. But, having something that's available as, like, an after-work type option… you know, some of the patients are working 2 jobs. … type 2 diabetic working, like you say, more than one job, limits their exercise opportunities, plus they're stressed, probably eating at their desk and not eating great.<br><br>I think that having that availability, that flex, I think yeh definitely long term going forward recognising that people who are working get diabetes. (HCP) |
| Attendees: **Timing of the classes** | I don't know. I think basically it depends on where people are in their lives. I mean I was lucky in that I'm retired, so I took retirement early so as a result of that I made a point of using that as |

| | |
|---|---|
| (Adaptability) | part of my physical exercise programme, to actually take part. I think a lot of the people that were there were working people. And so I think it was harder for them to actually, to come once the actual programme started and I think it's, while they could probably get it off for 12 weeks, having it, continuing that over a year period probably became a little bit more difficult. So yeh, so my, yeh, my feelings are that it probably was the fact that some are working. Some of them, I have seen some of them who will be in the group doing exercise, like walking out and about. So some of them obviously have carried on their exercise but they haven't obviously wanted to do it in an organised setting, that's down for a particular time of the week. And so it gives them a bit more flexibility if they're doing it themselves, so that would probably be my take on it. |
| HCP: **Good venues**<br><br>(Complexity) | Community halls, and went to scout halls, in the end. And… things that were important to look for were: access, as in accessible for, sometimes, older, frailer people with physical disabilities; good parking, ideally, free parking, so you didn't have to search for 10 minutes to find a park or pay for expensive parking, trying to break down the barriers, any barriers to access; and maybe in a good location, as in, um, closer to the high-needs communities where we wanted to work in, with the people with a high incidence of type 2 diabetes. And then it was a venue that was big enough to house up to 25 people, with bathroom, kitchen… a sound system or something like that. Yep, affordable. And, um, but also, that the exercise equipment… 'cause we've got some exercycles on wheels, some mats, some benches-type things or steps, and some rowing machines. Which are all portable but require storage space. So, not only did the venue need to be able to fit that exercise equipment in, if it was a multi-purpose, it needed to have a storage space where you could store that space also. |
| HCP: **Importance of relationships and communication**<br><br>(Relative advantage) | It is better in terms of relationship building if we're there doing the exercises with them… I definitely think there's advantages to working amongst the people ... for building rapport and trust. My first session I went to, I rolled up in my work gear, and they were all, like, "where's your gears?" And, so, for my second session, I was, like, "right, well, I'm coming prepared then." "I'm coming in my lycra"! "Activate your tights." Then it just, kind of, it felt a bit more comfortable, um, in terms of… they just seemed to be a bit more… relaxed.<br><br>I try and engage with people, like um, like I try and engage with everyone to start with and I make time to block out, so what I tend to do is when people are you know doing their thing I'll walk around and chat and I'll do that connection so I am working on a kind of personal connection, not just a I'm your physio kind of connection but actually kind of finding out a bit about them and oh you know, "What do you do," and this, that, I'll share a little bit about myself and so I sort of engage them from there and then I tend to like, particularly the bikes, when the bikes are together and things like that, you end up |

| | |
|---|---|
| | having a conversation with two people at the same time and they end up talking and you kind of move on [laughs]. |
| **Outer setting** | |
| HCP: **Ongoing funding**<br><br>(External policy & incentives) | Well, I think, I think, from an investment point of view, you cannot underestimate the investment in preventative kind of work. It needs, you know, these patients, so, even the social aspect of them being engaged socially has to have good patient outcomes. And benefits. And then, um, doing an exercise programme in a supported way, it has to make a difference to people's kind of, where they're heading and what they're doing with their long-term condition. So, yeah, I think it's a valuable investment to make. Um, just that, who's going to make that investment, and where does that sit? And that's why I think it needs to be a collaborative, kind of, community investment. Because no, our health system here is strapped financially. (HCP)<br><br>There is going to be no shortage of people that will benefit for the foreseeable future. Um, so, I think there needs to be options like this. Like, it's kind of a step up from Green Prescriptions. It's a more costly intervention, absolutely. But the cost of managing people with multiple long-term conditions as they age just exponentially goes real high. (HCP) |
| HCP: **Engagement with communities**<br><br>(Patient needs & resources) | Just around engagement with the community, and how you approach community, especially Māori community, rather than approach Māori participants. It's not a usual programme, but it's great to see that. They've had a good focus. It's, it, and I've also seen benefit…, and I like the idea of that, some of the programme, they're inviting whānau too. So, it's not just about one patient with diabetes, it's about a whānau, can go too. …… It's a no-brainer. (HCP) |
| **Inner setting** | |
| HCP: **Importance of administration**<br><br>(Networks and communications) | And the same like thinking about what else is going on in the community so we had a number, particularly in this last group we had quite a lot of people that were involved in outdoor bowls and once outdoor bowls season clicked in, our numbers went down [laughs] it's on same day so yeh having a little think about what else is in the community, what else that might those people be involved in as well I guess, and that's going to be really hard to work around from a bigger group perspective. I think if you had a bigger group it probably wouldn't be that noticeable but um, certainly if you're in a smaller community, having a think about what else are those people involved in because with timing those groups around that. Um access and stuff here was fine. Like parking was really easy, everyone was like you can park straight outside the door, yeh it was good. Bus stop not that far away. (HCP) |

| | |
|---|---|
| HCP: **Issues with training**<br><br>(Implementation climate: Learning climate) | Just going over the motivational interviewing, lots of practical sort of stuff like we did the other day would've been good and where we got to practice it on, you know pair up and practice doing that discussion<br><br>Like looking at blood sugar levels if you're at 17 then it's actually a little bit risky to exercise … yeh just that safety stuff. Um and just kind of having that team, let's the whole team know that this is when it's unsafe or this is what we do so kind of know 'cause like there was a couple of times we had, particularly the first group we had a lady who threw some really high blood pressures and so we had this kind of team management approach around her, you know? "You're not allowed to exercise until you go get your blood pressure done," and then the nurse would sort of say yes or no.<br><br>Yeh, is there anything else that you feel is important to mention about the programme going forward like you know, this is going to be written up into a package to that anyone should be able to read and be able to roll out in any community. Like cultural appropriateness or something we haven't talked about, and health literacy and talking to people that maybe don't have the same language around health issues. |
| HCP: Nursing **staff changeover** was particularly high<br><br>(Implementation climate: Goals & feedback; Available resources) | I think from a staffing perspective again just having the ability for people to take leave 'cause you know like we have had pretty much the year and a half of just nonstop and apart from that break over Christmas it's, we've been here every week and I think ongoing that would be… I think you need more than just the two people that are running it, I think you need to have a bit of a team.<br><br>Mainly, that is probably due to our kind of staff turnover. And keeping the communication flowing when there's new staff, um, between the research project, us and, um, trying to orientate new staff members to the programme, the intention and what it's doing, and how it, kind of, the operational components of what they need to do. |
| HCP: **Attributes and skills of staff**<br><br>(Culture) | Partnership acceptance, compassion are, ultimately, helpfulness. How can I work with you to be helpful? Um, and so, that attitude was core. Non-judgemental, accepting, come from that place and that space because too many people don't necessarily have, unfortunately, healthcare experiences that they really enjoy. Particularly people with multiple, long-term health conditions. They see numerous healthcare professionals, numerous times, and are told, "do this, do this, and do this." And not many people are particularly good at 'doing this, doing this, doing this', hence they keep on presenting with continuously deteriorating health concerns. So, it's trying to develop trusting, meaningful relationships with these people. Don't judge them, accept them. And, actually, often, they open up to you a bit more. And you can find out more, what's actually going on with them. |

| | |
|---|---|
| | Certainly someone who can engage easier with people is quite important in this space where you've got all these random people that don't know each other and you need to engage with them and then try and get them to engage with each other, it's um, I think that's quite key to how it runs as well. |
| Attendees: **Good staff**<br><br>(Culture) | I think it is fantastic. I think it should be, you can't make exercise compulsory, we are adults we won't be dictated to. Therefore, it should be encouraged to the maximum. It takes a special type of person to lead it and I think Lena and Michelle were wonderful. Um, there will be other people out there that are of a similar approach as they are, they have, I think their term is bedside manner. They have got a fantastic approach and way with people. They never at any point and time made you feel a lesser person or embarrassed or, I don't know what I am looking for, but there was nothing that they ever said that put you down in any shape or form. They were full of encouragement all the way. (A205) |
| **Characteristics of individuals** | |
| Attendees: **DCEP enhanced attendees' self-efficacy**<br><br>(Self-efficacy) | But, as it moved on you know, we walked in and straight away we were over to get our blood pressure done. We are lining up there, we want our blood pressure done before we go ahead and do any exercise, so that we can, well, so that I can see how it is going and all that, you, know from day to day …… Um, I always check my labels when I buy food, I always do. I take so long at the supermarket; it drives him nuts. (A887)<br><br>And I take, I took my um, notebook to the doctor's appointment that I went to and showed him…everything. And I'll take it to, like the dietician and stuff like that just to, so they can see what, what's been happening over the last few months. 'Cos I've got it all there on paper. (A238)<br><br>But something the programme has encouraged me to do and I do it almost every day is actually to before I have any um, cup of tea, or first thing in the morning before I have anything, I will sit down and do my blood sugar test, which I haven't been doing very regularly before …… Since we started the programme, um, we have actually purchased exercise equipment, we brought um, the rower and the exercycle and mini trampoline and so we actually are using those at home. (A324) |
| Attendees: **Reduced anxiety**<br><br>(Individual stage of change) | The first day of the programme I was probably a little bit anxious about it. Like not sure what you were going to, what was going to happen or what you were going, or what it was going to be like? And what, and what the people were going to be like. Because it's a, it's a big thing to put yourself into that sort of … situation. Um, and but then, as the, as the weeks went on, you just |

| | |
|---|---|
| | got more comfortable with everybody. With [physiotherapist], with the people, with yourself. (A238) |

HCP: Healthcare professional

BMJ Open

# Implementation of the Diabetes Community Exercise and Education Programme (DCEP) for the management of type 2 diabetes: qualitative process evaluation

| | |
|---|---|
| Journal: | *BMJ Open* |
| Manuscript ID | bmjopen-2021-059853.R2 |
| Article Type: | Original research |
| Date Submitted by the Author: | 05-May-2022 |
| Complete List of Authors: | Stokes, Tim; University of Otago Dunedin School of Medicine, Department of General Practice & Rural Health<br>Wilkinson, Amanda; University of Otago Division of Health Sciences, School of Physiotherapy<br>Jayakaran, Prasath; University of Otago Division of Health Sciences, School of Physiotherapy<br>Higgs, Chris; University of Otago Division of Health Sciences, School of Physiotherapy<br>Keen, Donna; University of Otago Division of Health Sciences, School of Physiotherapy<br>Mani, Ramakrishnan; University of Otago Division of Health Sciences, School of Physiotherapy<br>Sullivan, Trudy; University of Otago Dunedin School of Medicine, Department of Preventive and Social Medicine<br>Gray, Andrew; University of Otago Division of Health Sciences, Biostatistics Centre<br>Doolan-Noble, F; University of Otago Dunedin School of Medicine, Department of General Practice and Rural Health<br>Mann, Jim; University of Otago, Department of Human Nutrition<br>Hale, Leigh; University of Otago Division of Health Sciences, School of Physiotherapy |
| Primary Subject Heading: | Diabetes and endocrinology |
| Secondary Subject Heading: | General practice / Family practice, Health services research |
| Keywords: | DIABETES & ENDOCRINOLOGY, PRIMARY CARE, QUALITATIVE RESEARCH |
| | |

*I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.*

*The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.*

*Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.*

# Implementation of the Diabetes Community Exercise and Education Programme (DCEP) for the management of type 2 diabetes: qualitative process evaluation

Tim Stokes,[1*] Amanda Wilkinson,[2] Prasath Jayakaran,[2] Christopher Higgs,[2] Donna Keen,[2] Ramakrishnan Mani,[2] Trudy Sullivan,[3] Andrew R Gray,[4] Fiona Doolan-Noble,[1] Jim Mann,[5] Leigh Hale.[2]

[1]Department of General Practice and Rural Health, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

[2]School of Physiotherapy, University of Otago, Dunedin, New Zealand

[3]Department of Preventive and Social Medicine, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

[4]Biostatistics Centre, University of Otago, Dunedin, New Zealand

[5]Department of Human Nutrition, University of Otago, Dunedin, New Zealand

**Corresponding author**

Professor Tim Stokes: tim.stokes@otago.ac.nz

Department of General Practice and Rural Health, Dunedin School of Medicine, University of Otago, PO Box 56, Dunedin 9054, New Zealand

## ABSTRACT

**Objectives:** To examine context-specific delivery factors, facilitators and barriers to implementation of the Diabetes Community Exercise and Education Programme (DCEP) for adults with type 2 diabetes (T2D) using the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) Framework.

**Design:** A qualitative evaluation embedded within the DCEP pragmatic randomised controlled trial. Data collected via focus groups and interviews and analysed thematically.

**Setting:** Community-based in two cities (Dunedin and Invercargill) in the lower south island of New Zealand.

**Participants:** Seventeen adults diagnosed with T2D attending DCEP and 14 healthcare professionals involved in DCEP delivery.

**Intervention:** DCEP is a twice weekly session of exercise and education over 12 weeks, followed by a twice weekly on-going exercise class.

**Results:** Whilst our reach target was met (sample size, ethnic representation), the randomisation process potentially deterred Māori and Pasifika from participating. The reach of DCEP may be extended through the use of several strategies: promotion of self-referral, primary healthcare organisation ownership and community champions. DCEP was considered effective based on perceived benefit. The social and welcoming environment created relationships and connections. People felt comfortable attending DCEP and empowered to learn. Key to implementation and adoption was the building of trusting relationships with local health providers and communities. This takes time and care and cannot be rushed. Training of staff and

optimising communication needed further attention. To maintain DCEP, delivery close to where people live and a generic approach catering for people with multiple chronic conditions may be required.

**Conclusions:** For success, lifestyle programmes such as DCEP, need time and diligence to build and maintain networks and trust. Beyond frontline delivery staff and target populations, relationships should extend to local healthcare organisations and communities. Access and ongoing attendance are enabled by health care professionals practicing in a nuanced person-centred manner; this, plus high staff turnover, necessitates on-going training.

*Abstract word count: 300*

## Strengths and limitations of this study

| |
|---|
| • Data were collected from both DCEP attendees and healthcare professionals involved in DCEP, delivery, enabling capture of wide and diverse opinions.<br>• |
| • The initial focussing analysis to identify key topics may have missed smaller and possibly important issues that merited consideration.<br>• |
| • Although our RCT met ethnic representation, this qualitative evaluation had low Māori or Pasifika representation.<br>• |
| • Whilst the interviewers were ethnically diverse, the three researchers who analysed the data were Pākehā (non-Māori) negating a Māori or Pasifika lens to the analysis. |

## INTRODUCTION

Type 2 diabetes (T2D) is a substantial health issue. Globally, 8.5% of adults aged 18 years and older are estimated to have T2D.[1] In Aotearoa/New Zealand (NZ) over 250,000 people are estimated to have T2D (self-reported prevalence 5.9%), with high prevalence among Māori (the indigenous people of NZ) (7.9%), Pasifika (people from the Pacific Islands now living in NZ) (13.6%), and people living in low socioeconomic areas (10.4%).[2] Alongside blood glucose control via medication, diet control and being physically active are the key evidence-based components of management,[1 3] especially if delivered by healthcare professionals.[4] In NZ, diabetes primary healthcare is provided by general practitioners (GPs) and nurses focussing on screening and diagnosis, education and pharmacological management.[5 6] The educational component is largely achieved via referral to the Diabetes Education Self-Management Newly Diagnosed and Ongoing Diabetes (DESMOND) programme, a one-day group-delivered educational programme.[7] We are not aware of any formal exercise programmes delivered by registered healthcare professionals (HCPs) to people with T2D in NZ. To address this challenge in the southern region of NZ, we developed the Diabetes Community Exercise and Education Programme (DCEP), which has now been in existence for over 10 years.

DCEP is a group exercise and educational programme, tailored to individual needs, and specifically designed to enable access for Māori, Pasifika, and people living in low socioeconomic areas. The aim of DCEP is to support adults living with T2D to take control of their health and to live well with their long-term condition. There are two parts to DCEP. Participants attend a twice weekly exercise and education session for 12 weeks, followed by a twice weekly maintenance exercise class. The programme has previously been described in detail.[8] The potential benefits of DCEP highlighted in a

feasibility study,[9] justified a pragmatic randomised controlled trial (RCT) to evaluate the effects of DCEP (plus usual care) on the glycated haemoglobin (HbA1c) levels, physical health outcomes and health-related quality of life of individuals living with T2D, compared to usual care alone.[8] The target sample size for the primary outcome (glycaemic control) was 220 individuals with T2D which included a 40% dropout rate. We recruited and analysed data from 165 participants. The results of the RCT showed no statistically significant differences between groups for both the primary outcome (blood glucose control - HbA1c) and secondary outcomes (Incremental Shuttle Walk Test, body weight, waist circumference, blood pressure, quality of life measures) at one-year follow-up.[10] The RCT, however, was successful in engaging its target population and there was good attendance in the first 12 weeks (as described below).

Reflective of the ethnicity in the lower South Island of NZ, 14% of the cohort were Māori and 6% Pasifika, with 27% of participants living in areas considered by the NZ Deprivation Index to be in the most deprived deciles (deciles 9 and 10).[11] Adherence to the 12-week DCEP intervention was good, a majority (56%) attended 15 or more of the 24 sessions (41% attending for ≥20/24 sessions, 15% for 15-19/24 sessions, 21% for 2-15/24 sessions and 23% for no attendance or one session). Attendance at the subsequent maintenance classes was however poor (23% attending >50% and 35% attending 10-40% of available sessions, with 42% attending no sessions).

Given the success in targeting the populations of interest and initial attendance at DCEP and NZ's current health inequities, and associated poorer outcomes for Māori,[12] [13] an in-depth explorative evaluation of DCEP is warranted to inform future practice. This paper reports a qualitative process evaluation to identify practical ways to improve DCEP delivery and inform its future development. This evaluation, embedded within the DCEP RCT, aimed to examine the context-specific delivery factors, facilitators and

barriers to implementation of the DCEP using the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) Framework.[14]

## METHODS

### Study Setting

This community-based study took place in in two separate urban centres in the lower South Island of NZ: Dunedin (Otago Region) and Invercargill (Southland Region) in community exercise venues.

### Design

A qualitative process evaluation of DCEP was undertaken as part of a two-arm parallel, open label RCT (ACTRN12617001624370). The trial protocol[8] and main trial findings[10] have been previously reported. The trial recruited adults (age ≥35 years) with a diagnosis of T2D via general practices and public advertisements. DCEP was introduced sequentially, starting in Dunedin and then three months later in Invercargill. Following baseline evaluation, participants were randomly allocated to either DCEP (plus usual care) or usual care. Participants randomised to DCEP attended the 12-week programme and then continued in the maintenance programme for a further 12 months. Across the duration of the trial, seven DCEP 12-week classes were held.

### Data collection

Interviews and focus groups were held at both study sites following the 12-week programme and at the end of the trial until data saturation (when no new data repeated what was in the previous data)[15] occurred. From DCEP participants consenting to

interview, 2-3 were purposively (by attendance) interviewed after completion of each class. Semi-structured interviews were used with DCEP attendees and any attending whānau (family). Guided by their availability or for logistical reasons, we used either interviews or focus groups for all the HCPs involved in DCEP who consented to interview. The interview topic guide was informed by The Consolidated Framework for Implementation Research (CFIR).[16] (Table 1). All interviews and focus groups occurred at a mutually arranged time and place, were audio-recorded with permission and were about one hour long. Research assistants, with bachelor's degrees and from a variety of backgrounds (nursing, psychology, social science) and ethnicities (Māori, Pākehā (non-Māori)) and known to the attendees, undertook the interviews. All audio recordings were transcribed verbatim by a professional transcription company.

**Table 1: Interview topic guide**

| |
|---|
| **Questions for both DCEP attendees and healthcare professionals:** |
| Tell me about your experience of DCEP? |
| How could we improve DCEP? |
| How suitable / appropriate / acceptable is DCEP for your community? |
| How can we make DCEP continue in your community beyond the trial? |
| **Additional healthcare professional questions:** |
| What are the important aspects of DCEP? Why? |
| In order to deliver DCEP, what are important attributes / training do healthcare professionals require? |
| How did DCEP influence your practice? |

## Data analysis

Data were first thematically analysed using the General Inductive Approach, a pragmatic approach specifically designed for evaluative health research.[17 18] Three researchers (AW, LH, TSt) read the transcripts multiple times to gain an understanding of the key topics of interest, coded them accordingly and identified illustrative quotes. To assist defining these key topics, a short summary was written by AW for each transcript summarising the main points of the interview. The transcripts of HCPs were analysed first. The key topics were then further analysed over two stages using both the CFIR and RE-AIM frameworks.[19] The rationale for using both frameworks is that CFIR enables the understanding of the "why" of success (or not) of implementation while the RE-AIM describes the practicalities of the outcomes (the who, what, where, how, and when).[19 20] In the first stage, the relevant constructs and domains from the CFIR were used to deductively explore and organise data. To further categorise the organised data, in the second stage, the five RE-AIM domains were applied by AW and LH. Multiple discussions between the research team members (AW, LH, TSt) finalised the analysis by consensus. The

consolidated criteria for reporting qualitative research (COREQ)[21] were used to inform reporting of the study findings (Supplementary File 1).

### Patient and public involvement

Patients or members of the general public were not involved in the design or conduct of this study.

## RESULTS

We interviewed 17 DCEP participants diagnosed with T2D and randomised to DCEP and 18 HCPs. The characteristics of participants are presented in tables 2 and 3.

**Table 2 Characteristics of DCEP participants (N= 17)**

| Category | Participants |
|---|---|
| ***Location*** | |
| Dunedin | 7 |
| Invercargill | 10 |
| ***Sex*** | |
| Female | 11 |
| Male | 6 |
| ***Age*** | Age range 39-76; mean age 61 |
| ***Ethnicity*** | |
| NZ European/Pākehā | 13 |
| Māori | 3 |
| Cook Island Māori (Pasifika) | 1 |

**Table 3 Characteristics of health care professional stakeholders (N=18)**

| Category | Participants |
|---|---|
| ***Location*** | |
| Dunedin | 7 |
| Invercargill | 11 |
| ***Sex*** | |
| Female | 15 |
| Male | 3 |
| ***Ethnicity*** | |
| NZ European/Pākehā | 17 |
| Māori | 1 |
| ***Health Care Profession***[1] | |
| Nurses | 5 |
| Physiotherapist | 1 |
| Clinical DCEP Lead | 1 |
| Pharmacist | 2 |
| Podiatrist | 1 |
| Dietician | 1 |
| General Practitioner | 1 |
| Counsellor | 1 |
| DCEP Administrator | 1 |
| Primary Care Liaison Coordinator for Arthritis NZ | 1 |
| Diabetes NZ coordinators | 2 |
| SmokeFree NZ coordinator | 1 |

Table 4 presents a summary of the key CFIR domains identified. Supplementary file 2 presents the detailed CFIR findings along with illustrative quotes. Below we

present the findings relative to the RE-AIM framework domains (namely, Reach, Effectiveness, Adoption, Implementation, and Maintenance).

**Table 4: Summary of the key CFIR domains**

| Domains | Summary |
|---|---|
| Individual | Training and good communication of HCPs was crucial – they had to buy into the philosophies of DCEP and person-centred care and be trained into the nuances of delivering individualised care and attendee driven education within a group setting. Further, HCPs had to have, or develop, the ability to create trusting and caring relationships with attendees thus enabling a social and welcoming atmosphere and encouraging attendance. In turn, the supportive social environment enhanced the relationships and interactions of attendees, so they derived benefit from each other. Additionally, the correct venues had to be found (for example, in terms of location, safety, access both to and into, temperature, culturally acceptability, inexpensive to hire); the time in the day for the class was crucial (for example, not impacting on work); and the correct equipment purchased (for example, durable, practical, easily transportable and stored). |
| Inner setting | The most prominent findings were securing appropriate HCPs and their ongoing training. |
| Outer setting | The outer setting both assisted and offered challenges to implementation. Whilst we had long standing and strong relationships with many HCPs, for the trial we needed to work with new healthcare providers. We found that we rushed the process with some new healthcare providers or did not quite understand the local political environment for others. As we were not merging DCEP into an existing healthcare practice but rather setting up an independent community-based class, we learnt the necessity of taking time, and focused energy, as well as having local champions, to build such relationships and good communication strategies. Further, the navigation of relationships was ongoing as HCPs changed – both those that delivered DCEP and the managers of the services involved. Ongoing funding was another major challenge to the sustainability of DCEP. |
| Characteristics of individuals | Attendees talked about their increasing self-efficacy to manage their health, undertaking self-management activities and growing more comfortable to attend DCEP. |

## Reach

As described above, the RCT attained its targeted sample size, and its ethnic composition was reflective of that of the study setting. HCP participants suggested however that the RCT randomization process challenged recruitment as it was

considered culturally unacceptable for Māori and Pasifika. For these populations, whānau (family) support is important and potential participants would have been more comfortable if they could attend together; the possibility of being randomised to different groups as individuals was undesirable.

> *[Our] community feel more comfortable coming in groups. [I] recommend they be randomised together. [I] can then go along with them to whatever programme they get randomised to [to facilitate introductions and help create relationships]. [If] this could be the case, I am happy to promote the research on my marae and to the general practice.* [Nurse]

Referral into the trial was assisted by community champions of DCEP, such as general practice staff. However, there was also a need for improved communication channels, beyond GPs, for getting information about DCEP out and how people could self-refer to it. Further, it was thought that having a primary healthcare organisation (PHO) endorse, fund and run DCEP would increase general practice referral; thus, mitigating the observed resistance from some general practices about referring patients into DCEP.

> *We had some resistance from general practices about referring ['their' patients]. … So, I think if the PHO owned it, they would promote it around their respective practices. They would target their practices that they identified as having high-needs patients [who would benefit from participating in DCEP].* [Clinical Lead]

**Effectiveness**

Both attendees and HCPs expressed a range of positive beliefs about DCEP. The group approach of DCEP facilitated relationship development amongst the whole group, both between HCPs and attendees, and amongst attendees themselves.

*I try and engage with everyone to start with … when people are doing their thing, I'll walk around and chat and I'll do that connecting. I am working on a kind of personal connection, not just a 'I'm your physio' kind of connection but actually finding out a bit about them, [like asking] 'What do you do?' I'll [also] share a little bit about myself and so I sort of engage them from there. When the bikes are together, you end up having a conversation with two people at the same time and [then] they end up talking.* [Physio]

The group nature of DCEP intervention also encouraged inclusion of family/whānau (important in Māori culture). Family came along to support and joined in with the education and exercise sessions.

*I really like the idea of [the approach of DCEP]. Instead of just being [targeted at] one person with diabetes, it's actually engaging for whānau to come and do this [join in]. So, it's been wonderful to see husbands and wives coming in and talking and walking that journey together.* [Nurse]

Attendees [A#] stated meeting people, connecting and enjoying each other's company was key to their continued attendance.

*I guess that was one of the reasons why we kept going back, because we had some laughs and because we were comfortable.* [A639]

Others suggested that DCEP was an integral, positive and supportive part of their lives and had led to behaviour change, such as testing their blood sugar levels daily.

Attendees also found the HCPs welcoming and appreciated the individual attention that provided exercise tailored to their needs.

*[physiotherapist] was prepared to work with us all individually if we required it, and if we had any specific issues that she could help with.* [A373]

Attendees considered the format of DCEP, while different from others they had attended, was good and thought provoking. They seemed to enjoy the group discussions that were facilitated by educators and occurred organically between participants.

*We have had more discussion from the people within the group during and afterwards. When you are discussing that [new information] among group of people, there are things that come out that you didn't know about.* [A373]

One participant summed up impact of DCEP by stating:

*I feel better just for meeting the people that I met, doing the stuff that I did, learning what I did.* [A639]

HCPs considered that DCEP had several advantages over the other two usual healthcare options, namely, DESMOND or advice given through routine consultations with members of the primary healthcare team. The group focus provided a non-threatening environment for participants and facilitated revisiting of educational information, while at the same time provided repeated contact with HCPs.

*I think the points of difference [to usual care], that I can see, is the education component... that constant or continued access, a point of contact to a health professional. It's in an environment that's not threatening because they're there in a big group doing exercise and learning more about their health condition [at every session].* [Nurse Manager]

HCPs suggested the repeated sessions of DCEP provided more opportunity for attendees to ask questions of HCPs.

> *I see it [DCEP] as being really valuable because people often tell us that they don't feel that they have the ability to ask the questions that they really want to ask [at an appointment] due to time pressures.* [Pharmacist]

The ability to create an atmosphere through a suitably curated music playlist enabled HCPs to build group cohesion; an underpinning aspect of DCEP's approach.

> *People said they loved the music. We had a mix. There was [Pacific] island music and all sorts of things …. a real big variation of music and they were like, "This is great!" … Being able to make [the playlist] more personalised and more appropriate for the people that are coming in is important and having that flexibility I think is quite good.* [Physio]

**Adoption**

The DCEP delivery characteristics that supported adoption were underpinned by the longstanding networking and relationship development undertaken with external people and organisations over many years. This led to the successful inclusion of others to support DCEP (e.g. venue, staffing) or for delivery of education sessions.

> *Places where we have had existing relationships, existing trusting relationships [built] over time, [these] have worked. We've had a long-standing relationship with [name of a health provider]. And they've been good. They've supported us. They had their staff running the exercise class long before we had a contract sorted with them. They needed to trust us. And they did. And then there's others … and I've been working with them for years. One person always agrees [to come and talk] and does it free of charge. He sees it as part of his role.* [Clinical Lead]

It was evident in the data, however, that taking time to develop relationships and not asking too much of people or organisations, was imperative for the adoption of DCEP by community organisations.

> *We tried to work closely with [name of health provider]. … It didn't go well. … The challenge was that we didn't really have an opportunity to work through the necessary discussions because, all of a sudden, we were asking a lot of them in a relatively short period of time. We managed to sour that relationship through communication not being ideal and just asking for too much, too soon.* [Clinical Lead]

While training of HCPs assisted with engagement in DCEP delivery, HCPs' knowledge and beliefs about DCEP suggested a buy-in to its philosophy was essential. Challenging aspects were ensuring team players were recruited whose daily practice aligned with the DCEP philosophy.

> *And I do think that if staff aren't clear on some of the values around [DCEP] it is difficult … It's not classic cardiac rehab, or pulmonary rehab. It's not, 'do this', 'do this', or blow whistles. We do try and run [DCEP] with a certain ethos.* [Clinical Lead]

Additionally, HCPs recommended that an ability to connect with individuals/family/whānau and facilitate development of relationships was an important attribute for successful implementation of DCEP.

> *You certainly need someone who can engage with people [especially] when you've got all these random people that don't know each other, and you need to engage with them and then try and get them to engage with each other! It's quite key to how [DCEP] runs as well.* [Physio]

**Implementation**

Initial training was undertaken with HCPs involved in DCEP delivery via zoom (i.e. introduction and orientation), followed by self-directed study of relevant resources. Sharing of pertinent resources was ongoing and shared with the team via email. Training updates were held to answer any outstanding or frequently asked questions and to train any new HCPs who had joined since the previous training. However, some HCPs missed these opportunities. The orientation training for DCEP was not repeated for new HCPs and new HCPs to DCEP talked about information not being handed on.

> *That was the problem, that none of it [training about what to do] was handed over. Absolutely nothing.* [Nurse]

HCP participants suggested that the networks and communication between and amongst people involved in DCEP could have been more structured and improved. There was also limited networking experienced by educators and limited feedback was provided to educators about content for and applicability of their sessions.

> *And nobody came back and said that was a bad talk.* [Podiatrist]

Implementation from an administrative perspective included ensuring that there was a good administrator as:

> *There was a lot of coordinating and making sure that we had all our ducks in a row basically, to keep it going*. (Administrator)

This included the logistics of finding suitable venues in which to hold DCEP. Venues needed to be accessible, close to high-needs populations and be large enough to fit the participants and their exercise equipment in.

**Maintenance**

It was suggested that DCEP, because of its preventative, collaborative and community focus should be an attractive long-term investment for national and local planners and funders. Additionally, a broader approach that included people with any long-term condition/s should be a consideration moving forward.

> *My personal view is around having [DCEP] as long-term conditions focused, not just diabetes. I think the sustainability in the community, particularly in some of our rural areas, would be difficult with just a diabetes focused programme. It would be a challenge. … Therefore, [if you broaden the programme] you're not doubling up on your resources. You can use the process and get greater 'bang for your buck.* [Nurse Manager]

To achieve sustainability, it was suggested that any programme would need to be delivered close to where people lived, especially in rural areas, where people with complex needs and multiple long-term conditions often live because living costs are lower. It can be expensive and difficult for this group to travel into urban centres to attend DCEP.

The timing of the classes, being held in the middle of the day, was often a major barrier to those who were working and also excluded attendees from bringing along their family/whanau, an evening class was suggested as a way of promoting attendance. Additionally, it was felt DCEP would need to have the local and wider community supporting its implementation and integration into the community.

> *[it] has to be a programme that can be picked up and taken somewhere and supported from a distance. [It would need] good community engagement so that everybody knows it's available for a wider population, and that there is*

*commitment from all the layers [local providers, planners and funders etc.,] who need to be involved. But if it's not a funded programme, then there needs to be a community response to what we're going to do, for the long-term.* [Nurse Manager]

DCEP was also perceived as having value for physiotherapists as it broadened their expertise to include exercise programmes for people with long term conditions. However, for physiotherapists, a tension was evident between the value placed on the approach of DCEP by HCPs and potential HCPs, and the facility to recoup wages at a rate similar to that earned in private practice.

*If you're working in a private practice, that person can be billing for at least 2-3 consultations through ACC [Accident Compensation Corporation], an hour, which brings in quite a bit more money than [the] hourly rate that [the programme could] pay someone. So, approaching a private practice to buy out their staff time [is tricky].* [Clinical Lead]

As DCEP was developed to support people living in low socioeconomic conditions it was offered free to attendees. This, however, meant that funding streams had to be identified to support aspects of DCEP (i.e. venue hire, staff wages).

## DISCUSSION

To inform future development of DCEP and similar lifestyle programmes for people living with T2D, we undertook a process evaluation of the implementation of DCEP into community-based settings within two cities in the lower South Island of NZ. We used a three-stage approach. Initially, key topics of implementation interest were identified through thematic analysis and we then sought to the understand the "why" of success (or not) of our implementation via application of the CFIR framework. To

inform future development of DCEP, we identified the practicalities of the outcomes ("the who, what, where, how, and when") using the RE-AIM Framework.[19 20] Below we discuss our findings relative to the RE-AIM Framework.

**Reach**

Whilst we met our reach target (i.e. sample size and regional ethnic representation), had we not had to use the randomisation process of the RCT (thus potentially deterring Māori participants) reach could have been extended. It could have also been further extended had we promoted self-referral in addition to GP referral, given the latter was potentially 'gate-keeping'. PHO 'ownership' of DCEP and community champions could further enhance reach.

The RCT process was found culturally unacceptable to Māori and potentially for other ethnic groups such as Pasifika, potentially reducing the reach of DCEP, similar to a finding in a recent systematic review.[22] Wider literature suggests that the NZ health system's individualised approach to healthcare,[23-25] and by extension that of the RCT randomisation process, denies people the psychosocial benefit attained through inclusion of family/whānau in preventative and rehabilitation programmes.[26]

Further, to improve reach and access to DCEP, wider and enhanced communication targeted directly to people living with T2D was needed, especially emphasing the self-referral option. Self-referral has been shown to enhance population representation for people accessing psychological therapies for mental health in the United Kingdom (UK)[27] and availability of funding and staff training support to provide community rehabilitation programmes is crucial to equitable access. In contrast, other UK research[24] has found that people on low incomes considered self-referral to be an obstacle to psychological therapies. These authors suggested the need to better

understand the complexities of effective referral and/or self-referral in primary care, such as how services are discussed with patients and assumptions about people's readiness to self-refer.[28] Our findings suggest that improving the referral cycle would additionally require 'ownership' of DCEP by local primary healthcare organisations (PHOs), who because of the 'buy-in' would then refer patients into the programme on an ongoing basis. To enable programmes that address issues of inequities for Māori, a strategy 'by Māori for Māori' is crucial,[29 30] but funding, development and implementation of such programmes continues to be challenge in NZ. As noted in the foreword of the 2019 Health Quality and Safety Commission report: "It is not a matter of favouritism, political correctness or deference to Māori; rather, it is a matter of health and wellbeing and the eradication of inequities."[31]

**Effectiveness**

Essentially DCEP was considered effective in that both attendees and HCPs spoke of the beneficial impact it had in creating a social and welcoming environment which, although founded on relationships and connections, was tailored to the individual. People felt comfortable attending and empowered to learn.

DCEP was valued by both attendees and HCPs because it appeared to offer benefits that impacted wellness and social connectedness, with group interactions and the ability to build relationships considered important facets. It is well established that development of meaningful relationships with other people generates a feeling of belonging (or social connection) and an improvement in wellbeing and health.[32-35] Further, for older adults, social support, especially from family, is associated with increased engagement in physical activity.[36] Group participation for people with long-term conditions has significant benefits (on, for example, self-efficacy, self-care,

quality of life, pain, psychological symptoms).[37] For such populations, numerous factors (such as mental, emotional and physical symptoms)[38 39] or wider social determinants of health[40] make it difficult to develop and maintain support networks, and thus organised healthcare groups can become important enablers. Effective, caring, empathetic communication is a cornerstone of relationship development [34 41] and relationship-centred care.[42] Relationship-centred care is argued to be the founding principle of healthcare provision[42] and is contended to have a positive effect on health outcomes.[43] Our findings further reinforce the substantiation for relationship-centred care in rehabilitation programmes.

**Adoption**

Key to adoption of DCEP were the networking and relationships with local health providers and communities. However, the building of these relationships should not be underestimated – it takes time and should not be rushed. Also, of importance, was whether the HCPs delivering DCEP valued the philosophy of DCEP (based on the 'spirit' of Motivational Interviewing).[44] Training of staff and communication between the various HCPs involved was not optimal and needs further consideration and development.

Not only is relationship centred care important for recipients of healthcare, our findings emphasise the long-term relationship development and networking with healthcare providers and the community required for the initiation and adoption of community-based rehabilitation programmes. This process cannot be rushed, and is an important facilitator of attendance, particularly for indigenous peoples.[19] From an organisational perspective, HCPs felt that champions and the 'right' type of HCPs employed to deliver

DCEP were important for adoption. From the perspective of attendees, the inclusive, non-judgemental and welcoming atmosphere of DCEP encouraged their engagement.

**Implementation**

HCPs' buy-in to the underlying philosophy of DCEP and a team player attitude contributed to successful delivery of DCEP. The literature suggests obtaining HCPs' buy-in is a perennial issue when introducing change or innovation.[45] Understanding and addressing the organisational factors impacting on implementation, and indeed organisational readiness,[46] along with understanding of predictors of HCPs readiness, are needed to increase team cohesiveness and engagement with a programme.[45-48] HCPs also suggested better DCEP training was needed, including improved communication amongst involved HCPs. Strengthening such aspects would increase the psychological meaningfulness, a prerequisite for buy-in,[49] the reward resulting in greater investment in DCEP delivery.[45] Our findings suggest champions for DCEP were required to facilitate cultural and context specific factors, impacting not only reach but implementation.[50]

**Maintenance**

To maintain DCEP, especially if aiming to reach those in most need, DCEP needs to be delivered closer to where people live; in rural NZ, this would also necessitate a generic approach catering for people with multimorbidity, instead of condition-specific approaches. As DCEP was developed for those living in low socio-economic situations, it was free to attend; this however meant on-going funding challenges, even though its preventative attributes may, in the long-term, be cost-saving for the health system.

DCEP was considered impactful as a health preventative programme. A plethora of literature espouses the benefit of exercise and education and their impact on mitigating risk of disease progression and improved outcomes for people with long-term conditions.[51] With limited healthcare resources,[52] a more sustainable model of a generic programme for people living with multiple conditions rather than a condition specific focus has been suggested. Delivered locally and offered at times appropriate for the community concerned with local and wider community support would improve engagement[53] but sourcing funding would require attention. Ownership by a PHO or community-based health organisation (for example, a Māori health provider) has also been proposed.[53]

**Strengths and limitations**

A strength of our study was the use of two complementary implementation science frameworks (CFIR and RE-AIM) to better understand the DCEP implementation process. A strength and a limitation of our study was the broad and rich data we collected. Whilst this ensured a wide and diverse capture of opinions, it also required an initial focussing analysis to identify key topics that we then explored in more depth with the CFIR[16] and RE-AIM[14] frameworks. The initial analysis may have missed smaller and possibly important issues that merited consideration. Although our RCT met ethnic representation, the process evaluation had low Māori or Pasifika representation. Further to this, whilst the interviewers were ethnically diverse, the three researchers who analysed the data were Pākehā (non-Māori) negating the application of a Māori or Pasifika lens to the analysis.

**Implications for policy and practice**

Lifestyle programmes such as DCEP are developed based on community input and community relationships. Whilst acceptable and effective in promoting healthcare in a person-centred manner, their survival appears dependent, not on perceived acceptability or perceived effectiveness, but on ongoing funding, which is largely short term and not sustained. The funding appears to be used as a "band-aid" for identified problems and not dedicated and embedded to enable a preventative long-term strategy. A case in point of a lifestyle intervention programme developed by Māori for Māori in Dunedin,[54] found to be successful and beneficial for attending Māori with T2D, attracted enough funding from the Health Funding Authority to continue, but only for one year. The Health Funding Authority and the programme no longer exist.[54]

## CONCLUSION

What we have learnt in implementing a lifestyle programme such as DCEP is that to ensure success, time and care needs to be taken to build and maintain networks, trust and relationships. This requires good communication channels. The networks and relationships required are not only between those delivering the programmes and the target community group, but also between local healthcare organisations (for example, district health boards, general practices, PHOs and Māori health providers) as well as between the HCPs involved within DCEP. Healthcare programmes that have a person-centred focus enable access and ongoing attendance. It does, however, require HCPs to practise in a nuanced person-centred manner, and as staff turnover is frequently high, a programme of continual training is also required. Future programmes may be more viable if delivered closer to where people live and, instead of having a condition-specific approach, could take a more generic approach to cater for people with multiple long-term conditions.

*Word count: 4908*

## SUPPLEMENTARY FILES

Supplementary File 1: COREQ-32 reporting checklist. An assessment of the study reporting against the domains of the COREQ-32 reporting checklist for interviews and focus groups. (.pdf)

Supplementary File 2: First stage of analysis (Consolidated Framework for Implementation Research - CFIR) with illustrative quotes (.pdf)

## ACKNOWLEDGMENTS

We would like to thank all the participants/whānau and health care professionals who contributed to the study and to the Clinical Advisory Group and lay advisors.

## CONTRIBUTORSHIP STATEMENT

Conceptualization LH, CH, TSt, RM, TSu, FDN, PJ, ARG, JM, DK**;** Methodology TSt, LH, AW; Formal analysis AW, LH, TSt; Writing – Original draft AW, LH, TSt; Writing – review and editing All authors; Funding acquisition LH wrote the grant application with input from CH, TSt, RM, TSu, FDN, PJ, ARG, JM, DK; All authors read and approved the final manuscript.

## COMPETING INTERESTS

All authors declare that they have no competing interests.

## FUNDING

This study was funded by the Health Research Council of New Zealand (HRC Project Grant 17/233). The funding body has not had any role in design of the study or outputs from the study. Funding was not provided by the trial sponsor (the University of Otago, Dunedin, Otago, New Zealand).

## ETHICS APPROVAL

Ethical approval for the DCEP trial and evaluation was obtained from the Health and Disability Ethics Committee, Ministry of Health (HDEC17/CEN/241/AM01).All participants provided written, signed consent to participate.

## DATA SHARING STATEMENT

Full de-identified interview transcripts will not be shared. Informed consent, in line with the approving ethics committee, only allows for the use of de-identified extracts within research reporting and writing, in order to maintain the privacy of participants based in a defined regional area and population, thus making their identification with full transcripts more likely.

## REFERENCES


1. World Health Organisation. Diabetes: WHO; 2021 [Available from: https://www.who.int/news-room/fact-sheets/detail/diabetes accessed 16/03/2022].
2. Ministry of Health. New Zealand Health Survey 2019-2020 annual data 2021 [Available from: https://minhealthnz.shinyapps.io/nz-health-survey-2019-20-annual-data-explorer/_w_069d3399/#!/explore-indicators accessed 16/03/2022].
3. Hemmingsen B, Gimenez-Perez G, Mauricio D, et al. Diet, physical activity or both for prevention or delay of type 2 diabetes mellitus and its associated complications in people at increased risk of developing type 2 diabetes mellitus. *Cochrane Database Syst Rev* 2017;12(12):Cd003054. doi: 10.1002/14651858.CD003054.pub4
4. O'Donoghue G, O'Sullivan C, Corridan I, et al. Lifestyle Interventions to Improve Glycemic Control in Adults with Type 2 Diabetes Living in Low-and-Middle Income Countries: A Systematic Review and Meta-Analysis of Randomized Controlled Trials (RCTs). *Int J Environ Res Public Health* 2021;18(12) doi: 10.3390/ijerph18126273
5. Harwood M, Tane T, Broome L, et al. Mana Tū: a whānau ora approach to type 2 diabetes. *NZMJ* 2018; 131(1485): 76-83.
6. New Zealand Guidelines Group. Guidance on the management of type 2 diabetes 2011. Wellington, New Zealand Guidelines Group: 2011. [Available from: https://www.moh.govt.nz/notebook/nbbooks.nsf/0/60306295DECB0BC6CC257A4F000FC0CB/$file/NZGG-management-of-type-2-diabetes-web.pdf accessed 16/03/2022]
7. Davies MJ, Heller S, Skinner TC, et al. Effectiveness of the diabetes education and self management for ongoing and newly diagnosed (DESMOND) programme for people with newly diagnosed type 2 diabetes: cluster randomised controlled trial. *BMJ* 2008;3367(7642):491–5. doi: https://10.1136/bmj.39474.922025.BE
8. Hale L, Stokes T, Scarth B, et al. Protocol for a randomised controlled trial to evaluate the effectiveness of the diabetes community exercise and education programme (DCEP) for long-term management of diabetes *BMJ Open* 2019;9:e025578. doi: https://10.1136/bmjopen-2018-025578
9. Higgs C, Skinner M, Hale L. Outcomes of a community-based lifestyle programme for adults with diabetes or pre-diabetes. *J Prim Health Care* 2016;8(2):130-9. doi: 10.1071/hc15038.
10. Hale L, Higgs C, Gray AR, et al. The Diabetes Community Exercise Programme plus usual care versus usual care in patients with type 2 diabetes: a randomised, two-arm, parallel, open-label trial. *eClinicalMedicine* 2022;46:101361. https://doi.org/10.1016/j.eclinm.2022.101361
11. Ministry of Health. Population of Southern District Health Board Wellington, NZ: Ministry of Health; 2021 [Available from: https://www.health.govt.nz/new-zealand-health-system/my-dhb/southern-dhb/population-southern-dhb accessed 16/03/2022].
12. Ministry of Health. Wai 2575 Māori Health Trends Report. Wellington, NZ: Ministry of Health, 2019.[Available from:

https://www.health.govt.nz/publication/wai-2575-maori-health-trends-report accessed 16/03/2022]
13. Ministry of Health. Whakamaua: Māori Health Action Plan 2020–2025. Wellington, NZ: Ministry of Health, 2020.[Available from: https://www.health.govt.nz/publication/whakamaua-maori-health-action-plan-2020-2025 accessed 16/03/2022]
14. Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American journal of public health* 1999;89(9):1322-27. doi: 10.2105/ajph.89.9.1322
15. Saunders B, Sim J, Kingstone T, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & quantity* 2018;52(4):1893-907. doi: 10.1007/s11135-017-0574-8 [published Online First: 2018/06/26]
16. Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science* 2009;4(1):50. doi: 10.1186/1748-5908-4-50
17. MarÍa Tejada Tayabas L, Castillo León T, Monarrez Espino J. Qualitative evaluation: A critical and interpretative complementary approach to improve health programs and services. *International Journal of Qualitative Studies on Health and Well-being* 2014; 9(1). https://doi.org/10.3402/qhw.v9.24417.
18. Thomas DR. A general inductive approach for analyzing qualitative evaluation data. *Am J Eval* 2006;27(2):237-46. doi: 10.1177/1098214005283748
19. King DK, Shoup JA, Raebel MA, et al. Planning for Implementation Success Using RE-AIM and CFIR Frameworks: A Qualitative Study. *Front Public Health* 2020;8:59. doi: 10.3389/fpubh.2020.00059.
20. Holtrop JS, Rabin BA, Glasgow RE. Qualitative approaches to use of the RE-AIM framework: rationale and methods. *BMC Health Services Research* 2018;18(1):177. doi: 10.1186/s12913-018-2938-8
21. 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 : journal of the International Society for Quality in Health Care* 2007;19(6):349-57. doi: 10.1093/intqhc/mzm042.
22. Glover M, Kira A, Johnston V, et al. A systematic review of barriers and facilitators to participation in randomized controlled trials by Indigenous people from New Zealand, Australia, Canada and the United States. *Global Health Promotion* 2014;22(1):21-31. doi: 10.1177/1757975914528961
23. Gifford H, Cvitanovic L, Boulton A, et al. Constructing prevention programmes with a Māori health service provider view. *Kōtuitui: New Zealand Journal of Social Sciences Online* 2017;12(2):165-78. doi: 10.1080/1177083X.2017.1352521
24. Graham R, Masters-Awatere B. Experiences of Māori of Aotearoa New Zealand's public health system: a systematic review of two decades of published qualitative research. *Australian and New Zealand Journal of Public Health* 2020;44(3):193-200. doi: https://doi.org/10.1111/1753-6405.12971
25. Sopina E, Clinton J, Mahony F, et al. Alleviating the burden of chronic conditions in New Zealand (The ABCC NZ study): New Zealand experts' perspectives of chronic conditions management. Auckland: University of Auckland, 2008.

26. Hartmann M, Bäzner E, Wild B, et al. Effects of interventions involving the family in the treatment of adult patients with chronic physical diseases: a meta-analysis. *Psychother Psychosom* 2010;79(3):136-48. doi: 10.1159/000286958
27. Brown JS, Boardman J, Whittinger N, et al. Can a self-referral system help improve access to psychological treatments? *Br J Gen Pract* 2010;60(574):365-71. doi: 10.3399/bjgp10X501877
28. Thomas F, Hansford L, Ford J, et al. How accessible and acceptable are current GP referral mechanisms for IAPT for low-income patients? Lay and primary care perspectives. *J Ment Health* 2020;29(6):706-11. doi: 10.1080/09638237.2019.1677876
29. Smith LT. Kaupapa Māori Research- Some Kaupapa Māori Principles. Hamilton, NZ: University of Waikato, 2015. [Available from: https://researchcommons.waikato.ac.nz/bitstream/handle/10289/12026/Kaupapa%20M%C4%81ori%20Research.pdf?sequence=21 accessed 16/03/2022].
30. Thompson N. Do Māori initiatives by Māori and for Maori really help Māori? *Aotearoa New Zealand Social Work* 2008;4:56-59. doi: https://doi.org/10.11157/anzswj-vol20iss4id332
31. Health Quality and Safety Commission. He matapihi ki te kounga o ngā manaakitanga ā-hauora o Aotearoa 2019. A window on the quality of Aotearoa New Zealand's health care 2019. Wellington, NZ: HQSC, 2019. [Available from: https://www.hqsc.govt.nz/assets/Our-data/General/Window_2019_web_final.pdf accessed 16/03/2022].
32. Seppala E, Rossomando T, Doty J. Social connection and compassion: Important predictors of health and well-being. *Social Research: An International Quarterly* 2013;80(2):411-30.
33. Sirven N, Debrand T. Social participation and healthy ageing: An international comparison using SHARE data. *Social Science & Medicine* 2008;67:2017-26. doi: 10.1016/j.socscimed.2008.09.056
34. Wilkinson A, Atlas J, Nelson K, et al. Client perceptions of engaging with a health and social care navigation service: A qualitative study. *Chronic Illness* 2020;0(0):1742395320937046. doi: 10.1177/1742395320937046
35. Zavaleta D, Samuel K, Mills C. OPHI Working Paper No. 67. Social isolation: A conceptual and measurement proposal: Oxford Poverty & Human Development Initiative, University of Oxford, 2014. [Available from: https://ophi.org.uk/social-isolation-a-conceptual-and-measurement-proposal/ accessed 16/03/2022]
36. Lindsay Smith G, Banting L, Eime R, et al. The association between social support and physical activity in older adults: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity* 2017;14(1):56. doi: 10.1186/s12966-017-0509-8
37. Jackson M, Jones D, Dyson J, et al. Facilitated group work for people with long-term conditions: a systematic review of benefits from studies of group-work interventions. *British Journal of General Practice* 2019;69(682):e363. doi: 10.3399/bjgp19X702233
38. Griffith LE, Raina P, Levasseur M, et al. Functional disability and social participation restriction associated with chronic conditions in middle-aged and older adults. *J Epidemiol Community Health* 2017;71(4):381-89. doi: 10.1136/jech-2016-207982
39. Wilkinson A, Bowen L, Gustavsson E, et al. Maintenance and development of social connection by people with long-term conditions: A qualitative study.

*International Journal of Environmental Research and Public Health* 2019;16(11):1875. doi: 10.3390/ijerph16111875
40. Barnes M, Taylor D, Ward L. Being well enough in old age. *Critical Social Policy* 2013;33(3):473-93. doi: 10.1177/0261018312471163
41. Carlson T, Moewaka Barnes H, Reid S, et al. Whanaungatanga: A space to be ourselves. *Journal of Indigenous Wellbeing* 2016; 1(2): 44-59.
42. Beach MC, Inui T. Relationship-centered care. A constructive reframing. *J Gen Intern Med* 2006;21 Suppl 1(Suppl 1):S3-8. doi: 10.1111/j.1525-1497.2006.00302.x
43. Kelley J, Kraft-Todd G, Schapira L, et al. The influence of the patient-clinician relationship on healthcare outcomes: a systematic review and meta-analysis of randomised controlled trials. *PLoS One* 2014;9:e94207. doi: https://doi.org/10.1371/journal.pone.0094207
44. Miller WR, Rollnick S. Applications of motivational interviewing. Motivational interviewing: Helping people change. 3rd ed. New York: Guilford Press 2013.
45. French-Bravo M, Crow G. Shared governance: The role of buy-in in bringing about change. *OJIN: The Online Journal of Issues in Nursing* 2015;20(2) doi: 10.3912/OJIN.Vol20No02PPT02
46. Weiner BJ. A theory of organizational readiness for change. *Implementation Sci* 2009;4(67) doi: https://doi.org/10.1186/1748-5908-4-67
47. LaVela S, Hill J. Staff perceptions of implementation of a team-based model of patient-cetnred primary care. *International Journal of Person Centred Medicine* 2014;4(4) doi: https://doi.org/10.5750/ijpcm.v4i4.456
48. Moroney D. From model to reality: The role of implementation readiness. *Journal of Youth Development* 2020;15(6):162-70. doi: 10/5195/jyd.2020.1057
49. Kahn WA. Psychological conditions of personal engagement and disengagement at work. *Academy of Management* 1990;33(4):692-724.
50. Pinto JK, Slevin DP. The project champion: key to implementation success. *Proj Manag J* 1989; 20(4). https://www.pmi.org/learning/library/project-champion-key-implementation-success-2135 (accessed Nov 2021).
51. Barker K, Holland AE, Lee AL, et al. A rehabilitation programme for people with multimorbidity versus usual care: A pilot randomized controlled trial. *Journal of comorbidity* 2018;8(1):2235042X18783918-2235042X18. doi: 10.1177/2235042X18783918
52. Dieleman JL, Campbell M, Chapin A, et al. Future and potential spending on health 2015-40: development assistance for health, and government, prepaid private, and out-of-pocket health spending in 184 countries. *The Lancet* 2017;389(10083):2005-30. doi: 10.1016/S0140-6736(17)30873-5
53. Wali S, Superina S, Mashford-Pringle A, et al. What do you mean by engagement? - evaluating the use of community engagement in the design and implementation of chronic disease-based interventions for Indigenous populations - scoping review. *Int J Equity Health* 2021;20(1):8. doi: 10.1186/s12939-020-01346-6.
54. Murphy E, McAuley KA, Bell D, et al. A new approach to design and implement a lifestyle intervention programme to prevent type 2 diabetes in New Zealand Maori. *Asia Pac J Clin Nutr* 2003;12(4):419-22.

## COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| **Domain 1: Research team and reflexivity** | | | |
| *Personal characteristics* | | | |
| Interviewer/facilitator | 1 | Which author/s conducted the interview or focus group? | |
| Credentials | 2 | What were the researcher's credentials? E.g. PhD, MD | |
| Occupation | 3 | What was their occupation at the time of the study? | |
| Gender | 4 | Was the researcher male or female? | |
| Experience and training | 5 | What experience or training did the researcher have? | |
| *Relationship with participants* | | | |
| Relationship established | 6 | Was a relationship established prior to study commencement? | |
| Participant knowledge of the interviewer | 7 | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research | |
| Interviewer characteristics | 8 | What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic | |
| **Domain 2: Study design** | | | |
| *Theoretical framework* | | | |
| Methodological orientation and Theory | 9 | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | |
| *Participant selection* | | | |
| Sampling | 10 | How were participants selected? e.g. purposive, convenience, consecutive, snowball | |
| Method of approach | 11 | How were participants approached? e.g. face-to-face, telephone, mail, email | |
| Sample size | 12 | How many participants were in the study? | |
| Non-participation | 13 | How many people refused to participate or dropped out? Reasons? | |
| *Setting* | | | |
| Setting of data collection | 14 | Where was the data collected? e.g. home, clinic, workplace | |
| Presence of non-participants | 15 | Was anyone else present besides the participants and researchers? | |
| Description of sample | 16 | What are the important characteristics of the sample? e.g. demographic data, date | |
| *Data collection* | | | |
| Interview guide | 17 | Were questions, prompts, guides provided by the authors? Was it pilot tested? | |
| Repeat interviews | 18 | Were repeat inter views carried out? If yes, how many? | |
| Audio/visual recording | 19 | Did the research use audio or visual recording to collect the data? | |
| Field notes | 20 | Were field notes made during and/or after the inter view or focus group? | |
| Duration | 21 | What was the duration of the inter views or focus group? | |
| Data saturation | 22 | Was data saturation discussed? | |
| Transcripts returned | 23 | Were transcripts returned to participants for comment and/or | |

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| | | correction? | |
| **Domain 3: analysis and findings** | | | |
| *Data analysis* | | | |
| Number of data coders | 24 | How many data coders coded the data? | |
| Description of the coding tree | 25 | Did authors provide a description of the coding tree? | |
| Derivation of themes | 26 | Were themes identified in advance or derived from the data? | |
| Software | 27 | What software, if applicable, was used to manage the data? | |
| Participant checking | 28 | Did participants provide feedback on the findings? | |
| *Reporting* | | | |
| Quotations presented | 29 | Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number | |
| Data and findings consistent | 30 | Was there consistency between the data presented and the findings? | |
| Clarity of major themes | 31 | Were major themes clearly presented in the findings? | |
| Clarity of minor themes | 32 | Is there a description of diverse cases or discussion of minor themes? | |

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

**Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.**

**SUPPLEMENTARY FILE 2**

**First stage of analysis (Consolidated Framework for Implementation Research) with illustrative quotes**

| **Domain** (constructs) | |
|---|---|
| **The intervention characteristics** | **Illustrative quote** |
| HCP: **Community of practice**<br><br>(Relative advantage) | Well it's fantastic. …. and also it's, you know, obviously a great social, a lot of people with these conditions feel quite isolated so a programme like this gives them a chance to interact with other people and I think sometimes they learn a lot more from people they're with than people like me. They know what it's like living with their conditions and they can share their experiences. |
| Attendees: **Supportive intervention**<br><br>(Evidence strength & quality) | I didn't know anybody else, um, but we were all of similar age and we were all in the same boat and I think that was probably a big part. Previously you felt as if you were on your own with your diabetes. But here we all were and we were all quite open about things like um, you know medication, the exercise part, I went in there thinking well I am here for exercise, so for the three quarters of an hour we were to exercise I made a really good attempt. and I did enjoy that. … And we were all, I think by the end of the programme to, one of the biggest benefits was actually, the comradery that you had with everybody ….. all you know, hi [attendee name] how are you today and you were the same, kind of got to know people a bit and thoroughly enjoyed that. And that probably was um, took me going back, [attendee name] and I kept us going back on the maintenance programme. (A324) |
| HCP: **A valuable resource**<br><br>(Relative advantage; Design quality & packaging; Cost) | I think, personally, really important. I think it's something that could grow and develop and be a real resource.<br><br>I think it's amazing. I think it's fantastic. We really refer an awful lot of people to the DCEP just simply because I feel really confident because I know the expertise that are there, so that's always a great starting point. If you refer people you need to be confident that they're going to be in good hands. Obviously, particularly if they've got diabetes and other health related problems, that they are going to be cared for and put through a programme that's specially designed for them and that's really, really, really valuable, I think. The other thing that it is, there is no cost apart from the donation which is really valuable as well and just being able to refer people to a community service. |
| Attendees: **Acceptable and valued**<br><br>(Evidence strength & quality) | Well if it was, if you know doctors could refer people that are border line diabetic or people that are type 2 and have ended up on insulin and it was just a good way to you know, find out about things. Because if you just go for one day, you know all those questions, but over 12 weeks there is different things that crop up that you are able to ask. So just on one day you might not think of everything, but with 12 weeks, yeah. And like with having like the dietician and the |

| | |
|---|---|
| | pharmacists and all those different people, you know, you kind of thought of something and other people asks questions as well, and you think, oh yeah, I had been wondering about that. (A920)<br><br>So it's been a um, yeh it's been a tough couple of years but for us the DCEP has been an important part, a positive part. It's been a real support in terms, as I say both a health and psychical fitness point of view. ….. So we're very grateful for the programme and we found it really worthwhile. |
| HCP: **Perhaps too social**, and thus not enough exercise.<br><br>(Relative advantage) | I've had a couple of patients that have come in, not for the maintenance programme, they've just come to have their blood pressure taken ….. so they haven't done any exercise in the maintenance, and they haven't done anything other than pop in to have their blood pressures taken. ……. actually, some of them don't even exercise.<br><br>They come to the class, and that's the big thing. They come to class to socialise, and the exercise is like a side issue. And for the exercise purists, this is challenging. And I'm constantly challenged by this. And I've got to constantly stand by it. And my line will go something like, typically, you're working with the sedentary population, who do next to no physical activity, who will get the maximum bang for buck from going doing no physical activity to doing some physical activity. So, if they're motivated to come because they feel comfortable and not judged, and accepted, and they can just do what they can manage, then that's more important than anything else. |
| Attendees: **Not enough exercise**<br><br>(Adaptability) | The maintenance class, the only thing I'm finding, this is the only negative I have about the whole thing, alright? You know how we used to just do forty minutes to forty-five minutes of exercise? And it was fine. Well, when I went to the maintenance class and you can do it an hour, and I want to do the hour, there's not enough variety to be able to do to fill in the hour. I started to find I was getting a bit bored. …… you have to keep looking to see if the machine you wanted was free so that you, you know or go to something else. (A238)<br><br>One lady, all she did was walk around a couple of laps and then sat down for the most of the time and talked and all that. It was um, a get out of home activity for her and she did you know a few wee laps and that was it for her. You know, that was better than sitting at home just doing nothing, that was her exercise you know, it was catered for everybody. It really was. (A887) |
| Attendees: **Tailored person-centred approach**<br><br>(Adaptability; Design quality & packaging) | There's a number of things I can't do because of my hip. My hip's down to bone on bone so it's kind of discomfort. I'm on fairly high levels of pain relief um, and I take a whole bottle of [pain medication] to get here. So, yes, they've helped me and pointed me in the right direction to give me the strengths in the areas I will need to have it when I come out of theatre and move onto stage, the next stage in life. (A205) |

| | |
|---|---|
| | I think it makes you more comfortable the fact that you've got the nurse there and the physio there. Like um, for me, um, like having them there to guide you and support you … show you like, [Physio] would show me like she would sort of challenge me, like um, and she's like "Oh, I think that's too easy for you. So we're going to do this." And I was like… "Oh, do we have, you know, do we have to?" And she's like, "You're doing that too easy, we're going to do this." (A238)<br><br>I am 13 months out of a triple bypass ah so I have a few issues with my chest. So, [Physio] has been working with me to exercise and strengthen chest muscles. And this is something that would never have happened if I hadn't had been involved in this, you know. (A373) |
| HCP: **Importance of relationships and communication**<br><br>(Relative advantage) | It is better in terms of relationship building if we're there doing the exercises with them… I definitely think there's advantages to working amongst the people ... for building rapport and trust. My first session I went to, I rolled up in my work gear, and they were all, like, "where's your gears?" And, so, for my second session, I was, like, "right, well, I'm coming prepared then." "I'm coming in my lycra"! "Activate your tights." Then it just, kind of, it felt a bit more comfortable, um, in terms of… they just seemed to be a bit more… relaxed.<br><br>I try and engage with people, like um, like I try and engage with everyone to start with and I make time to block out, so what I tend to do is when people are you know doing their thing I'll walk around and chat and I'll do that connection so I am working on a kind of personal connection, not just a I'm your physio kind of connection but actually kind of finding out a bit about them and oh you know, "What do you do," and this, that, I'll share a little bit about myself and so I sort of engage them from there and then I tend to like, particularly the bikes, when the bikes are together and things like that, you end up having a conversation with two people at the same time and they end up talking and you kind of move on [laughs]. |
| Attendees: **Social atmosphere**<br><br>(Evidence strength & quality; Relative advantage) | I have quite enjoyed it, um, we have had a really good mix of a good bunch of ah people in it, and I thought, like Lena has been wonderful and so have the nursed that have come along. So, it has really been good that way. And, I have enjoyed most, most of the um, classes that I have afterwards, I have learnt a hell of a lot more from that. … you spend three quarters of an hour each lesson on a particular subject and you have got interaction of the other people so it is really good. (A373)<br><br>Do I enjoy it here? I love it. Are the people great? Fantastic. And the group is fantastic, we've made new friends um, and they're all respective of one another, but they all have ideas and laugh and joke amongst themselves. The majority are women, but that means absolutely nothing, it |

| | |
|---|---|
| | just means that they drew that envelope. It could've gone the other way just as easily. Do I have any, no I have no regrets. Am I going to carry on? Hell yeah! (A205) |
| Attendees: **Unpretentious environment**<br><br>(Adaptability) | I think um, family inclusion is good, um, especially like the meal preparations and all that sort of thing and why it is important to go for a walk after dinner and how it is nice if you can have someone walking with you, and all that sort of thing. Um, so I think that is really beneficial to have um, a significant other as part of the programme. (A639)<br><br>I brought hubby along when he had a week off. I said come along, so he came along and did a few exercises and listened, it was a good talk that day and he gained valuable information, that day, through diet and all that. (A887)<br><br>And, you know, I mean, we don't, it's like, when people go to the gym, they've got all the flash gears on, you know, just to be looked at, that's what I think. We can go there how we are, we're taken how we are, and get on with it. ….. which is good, you know, those are the sorts of people you want, and they don't use big, like, um, flash words. They use language that we understand. (A21)<br><br>Encouragement, you know talking amongst yourself. A lot of humour quite a bit of hilarity you know. Oh, we have had some good laughs, yeah. And that, I guess that was one of the reasons why we kept going back to, um, because we had some laughs and because we were comfortable. (A639) |
| Attendees: **Beneficial**<br><br>(Evidence strength & quality; Relative advantage) | I have quite enjoyed it, um, we have had a really good mix of a good bunch of ah people in it, and I thought, like [Physio] has been wonderful and so have the nurses that have come along. So, it has really been good that way. And, I have enjoyed most, most of the um, classes that I have afterwards, I have learnt a hell of a lot more from that. In fact, I would say that I have learnt more from that, I did the Desmond ah, course and ah, I have found this more beneficial than the Desmond. The Desmond was too much to try and squeeze in over a six-hour period, you know …. and to try and take in all the information that they give you in such a short time it is really hard. Whereas where you spend three quarters of an hour each lesson on a particular subject and you have got interaction of the other people so it is really good. (A373)<br><br>Well, I can just show you. Like, if you start at my book. Like you see, my, on the 24th of the 4th, my blood pressure was 160 over 190 which is quite high. … And then, as we keep going down, it went down to 140 over 90….. And then it went to 132 over 82. Um and then towards the end, like I was getting 124 over 82. Ah, my blood sugars range between 8.4 and 4.7. …And like when I, I got my certificate up on the bookshelf up there, and when I got it, I came home and put it on Facebook and all the um, I got all these comments about it and everything. (A238) |

| | |
|---|---|
| Attendees: **Advice confusion**<br><br>(Design quality & packaging) | I got really confused about what it right and what is not right. I had started on a diet control management of diabetes and it was working for me and they were telling me something different. They were telling me about whole grain breads and pastas were ok and rice and all that, and yet in my diet I had none of that. (A639) |
| Attendees: **Costs**<br><br>(Evidence strength & quality; Relative advantage; Design quality & packaging; Cost) | I really liked the venue and I was quite surprised um, about the equipment that was available. So, walking into the [venue] where I had been several times before for different things and seeing it all set up where there is a gym was quite cool. … I like working out and I like doing that and I even like it better when I am doing it for free. (A639)<br><br>It is unique because it is an exercise programme that doesn't cost us anything, it is very local. Um, it is utilising a business locally. And it is free. (A887)<br><br>I enjoyed it. I'm not an exercise… I'm an active person, but I have to be doing something constructive, like shifting the sheep or doing something like that. Whereas, um, to go, say, to the gym… and that's the other thing, gyms are so expensive to go to, and when you're on a pension or something like that, um, yeah, it's one of those things that get left behind. The fact that it was free, it was good. (A280)<br><br>… because of the cost of petrol and everything, twice a week getting to the other side of town is um. … It is a bit too much. (A159)<br><br>(Interviewer: Yeah, like if you had to pay for it.) I probably wouldn't go then. Yeah, I don't think, there would be a handful of people that were there wouldn't be able to afford that either. Yeah. A couple of them on their, well that is only my opinion of looking at them, I don't think they would come if there was a fee to it. (A639) |
| HCP: **Timing of the classes**<br><br>(Adaptability) | The middle of day obviously excludes a large portion of people from being able to participate. Um, and it makes it exponentially more complicated. But, having something that's available as, like, an after-work type option… you know, some of the patients are working 2 jobs. … type 2 diabetic working, like you say, more than one job, limits their exercise opportunities, plus they're stressed, probably eating at their desk and not eating great.<br><br>I think that having that availability, that flex, I think yeh definitely long term going forward recognising that people who are working get diabetes. (HCP) |
| Attendees: **Timing of the classes** | I don't know. I think basically it depends on where people are in their lives. I mean I was lucky in that I'm retired, so I took retirement early so as a result of that I made a point of using that as |

| | |
|---|---|
| (Adaptability) | part of my physical exercise programme, to actually take part. I think a lot of the people that were there were working people. And so I think it was harder for them to actually, to come once the actual programme started and I think it's, while they could probably get it off for 12 weeks, having it, continuing that over a year period probably became a little bit more difficult. So yeh, so my, yeh, my feelings are that it probably was the fact that some are working. Some of them, I have seen some of them who will be in the group doing exercise, like walking out and about. So some of them obviously have carried on their exercise but they haven't obviously wanted to do it in an organised setting, that's down for a particular time of the week. And so it gives them a bit more flexibility if they're doing it themselves, so that would probably be my take on it. |
| HCP: **Good venues**<br><br>(Complexity) | Community halls, and went to scout halls, in the end. And… things that were important to look for were: access, as in accessible for, sometimes, older, frailer people with physical disabilities; good parking, ideally, free parking, so you didn't have to search for 10 minutes to find a park or pay for expensive parking, trying to break down the barriers, any barriers to access; and maybe in a good location, as in, um, closer to the high-needs communities where we wanted to work in, with the people with a high incidence of type 2 diabetes. And then it was a venue that was big enough to house up to 25 people, with bathroom, kitchen… a sound system or something like that. Yep, affordable. And, um, but also, that the exercise equipment… 'cause we've got some exercycles on wheels, some mats, some benches-type things or steps, and some rowing machines. Which are all portable but require storage space. So, not only did the venue need to be able to fit that exercise equipment in, if it was a multi-purpose, it needed to have a storage space where you could store that space also. |
| HCP: **Importance of relationships and communication**<br><br>(Relative advantage) | It is better in terms of relationship building if we're there doing the exercises with them… I definitely think there's advantages to working amongst the people ... for building rapport and trust. My first session I went to, I rolled up in my work gear, and they were all, like, "where's your gears?" And, so, for my second session, I was, like, "right, well, I'm coming prepared then." "I'm coming in my lycra"! "Activate your tights." Then it just, kind of, it felt a bit more comfortable, um, in terms of… they just seemed to be a bit more… relaxed.<br><br>I try and engage with people, like um, like I try and engage with everyone to start with and I make time to block out, so what I tend to do is when people are you know doing their thing I'll walk around and chat and I'll do that connection so I am working on a kind of personal connection, not just a I'm your physio kind of connection but actually kind of finding out a bit about them and oh you know, "What do you do," and this, that, I'll share a little bit about myself and so I sort of engage them from there and then I tend to like, particularly the bikes, when the bikes are together and things like that, you end up |

| | |
|---|---|
| | having a conversation with two people at the same time and they end up talking and you kind of move on [laughs]. |
| **Outer setting** | |
| HCP: **Ongoing funding**<br><br>(External policy & incentives) | Well, I think, I think, from an investment point of view, you cannot underestimate the investment in preventative kind of work. It needs, you know, these patients, so, even the social aspect of them being engaged socially has to have good patient outcomes. And benefits. And then, um, doing an exercise programme in a supported way, it has to make a difference to people's kind of, where they're heading and what they're doing with their long-term condition. So, yeah, I think it's a valuable investment to make. Um, just that, who's going to make that investment, and where does that sit? And that's why I think it needs to be a collaborative, kind of, community investment. Because no, our health system here is strapped financially. (HCP)<br><br>There is going to be no shortage of people that will benefit for the foreseeable future. Um, so, I think there needs to be options like this. Like, it's kind of a step up from Green Prescriptions. It's a more costly intervention, absolutely. But the cost of managing people with multiple long-term conditions as they age just exponentially goes real high. (HCP) |
| HCP: **Engagement with communities**<br><br>(Patient needs & resources) | Just around engagement with the community, and how you approach community, especially Māori community, rather than approach Māori participants. It's not a usual programme, but it's great to see that. They've had a good focus. It's, it, and I've also seen benefit…, and I like the idea of that, some of the programme, they're inviting whānau too. So, it's not just about one patient with diabetes, it's about a whānau, can go too. …… It's a no-brainer. (HCP) |
| **Inner setting** | |
| HCP: **Importance of administration**<br><br>(Networks and communications) | And the same like thinking about what else is going on in the community so we had a number, particularly in this last group we had quite a lot of people that were involved in outdoor bowls and once outdoor bowls season clicked in, our numbers went down [laughs] it's on same day so yeh having a little think about what else is in the community, what else that might those people be involved in as well I guess, and that's going to be really hard to work around from a bigger group perspective. I think if you had a bigger group it probably wouldn't be that noticeable but um, certainly if you're in a smaller community, having a think about what else are those people involved in because with timing those groups around that. Um access and stuff here was fine. Like parking was really easy, everyone was like you can park straight outside the door, yeh it was good. Bus stop not that far away. (HCP) |

| | |
|---|---|
| HCP: **Issues with training**<br><br>(Implementation climate: Learning climate) | Just going over the motivational interviewing, lots of practical sort of stuff like we did the other day would've been good and where we got to practice it on, you know pair up and practice doing that discussion<br><br>Like looking at blood sugar levels if you're at 17 then it's actually a little bit risky to exercise … yeh just that safety stuff. Um and just kind of having that team, let's the whole team know that this is when it's unsafe or this is what we do so kind of know 'cause like there was a couple of times we had, particularly the first group we had a lady who threw some really high blood pressures and so we had this kind of team management approach around her, you know? "You're not allowed to exercise until you go get your blood pressure done," and then the nurse would sort of say yes or no.<br><br>Yeh, is there anything else that you feel is important to mention about the programme going forward like you know, this is going to be written up into a package to that anyone should be able to read and be able to roll out in any community. Like cultural appropriateness or something we haven't talked about, and health literacy and talking to people that maybe don't have the same language around health issues. |
| HCP: Nursing **staff changeover** was particularly high<br><br>(Implementation climate: Goals & feedback; Available resources) | I think from a staffing perspective again just having the ability for people to take leave 'cause you know like we have had pretty much the year and a half of just nonstop and apart from that break over Christmas it's, we've been here every week and I think ongoing that would be… I think you need more than just the two people that are running it, I think you need to have a bit of a team.<br><br>Mainly, that is probably due to our kind of staff turnover. And keeping the communication flowing when there's new staff, um, between the research project, us and, um, trying to orientate new staff members to the programme, the intention and what it's doing, and how it, kind of, the operational components of what they need to do. |
| HCP: **Attributes and skills of staff**<br><br>(Culture) | Partnership acceptance, compassion are, ultimately, helpfulness. How can I work with you to be helpful? Um, and so, that attitude was core. Non-judgemental, accepting, come from that place and that space because too many people don't necessarily have, unfortunately, healthcare experiences that they really enjoy. Particularly people with multiple, long-term health conditions. They see numerous healthcare professionals, numerous times, and are told, "do this, do this, and do this." And not many people are particularly good at 'doing this, doing this, doing this', hence they keep on presenting with continuously deteriorating health concerns. So, it's trying to develop trusting, meaningful relationships with these people. Don't judge them, accept them. And, actually, often, they open up to you a bit more. And you can find out more, what's actually going on with them. |

| | |
|---|---|
| | Certainly someone who can engage easier with people is quite important in this space where you've got all these random people that don't know each other and you need to engage with them and then try and get them to engage with each other, it's um, I think that's quite key to how it runs as well. |
| Attendees: **Good staff**<br><br>(Culture) | I think it is fantastic. I think it should be, you can't make exercise compulsory, we are adults we won't be dictated to. Therefore, it should be encouraged to the maximum. It takes a special type of person to lead it and I think Lena and Michelle were wonderful. Um, there will be other people out there that are of a similar approach as they are, they have, I think their term is bedside manner. They have got a fantastic approach and way with people. They never at any point and time made you feel a lesser person or embarrassed or, I don't know what I am looking for, but there was nothing that they ever said that put you down in any shape or form. They were full of encouragement all the way. (A205) |
| **Characteristics of individuals** | |
| Attendees: **DCEP enhanced attendees' self-efficacy**<br><br>(Self-efficacy) | But, as it moved on you know, we walked in and straight away we were over to get our blood pressure done. We are lining up there, we want our blood pressure done before we go ahead and do any exercise, so that we can, well, so that I can see how it is going and all that, you, know from day to day …… Um, I always check my labels when I buy food, I always do. I take so long at the supermarket; it drives him nuts. (A887)<br><br>And I take, I took my um, notebook to the doctor's appointment that I went to and showed him…everything. And I'll take it to, like the dietician and stuff like that just to, so they can see what, what's been happening over the last few months. 'Cos I've got it all there on paper. (A238)<br><br>But something the programme has encouraged me to do and I do it almost every day is actually to before I have any um, cup of tea, or first thing in the morning before I have anything, I will sit down and do my blood sugar test, which I haven't been doing very regularly before …… Since we started the programme, um, we have actually purchased exercise equipment, we brought um, the rower and the exercycle and mini trampoline and so we actually are using those at home. (A324) |
| Attendees: **Reduced anxiety**<br><br>(Individual stage of change) | The first day of the programme I was probably a little bit anxious about it. Like not sure what you were going to, what was going to happen or what you were going, or what it was going to be like? And what, and what the people were going to be like. Because it's a, it's a big thing to put yourself into that sort of … situation. Um, and but then, as the, as the weeks went on, you just |

| | |
|---|---|
| | got more comfortable with everybody. With [physiotherapist], with the people, with yourself. (A238) |

HCP: Healthcare professional