A mixed-methods evaluation of an urban Aboriginal diabetes lifestyle program

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Abstract

Objective: The objective of this study was to evaluate an Aboriginal-led diabetes lifestyle program catering to urban Aboriginal people in an Aboriginal organisation.

Methods: Mixed-methods study that employed routinely collected physiological data and audio-recorded focus group sessions. Physiological data were analysed using a multi-level model to account for participant clustering. Qualitative data were subject to thematic analysis.

Results: Participants were overwhelmingly positive about the program. They lost weight and improved their diastolic blood pressure and glycaemic control; however, it was the feelings of belonging and optimism about their ability to improve their health that they most valued. Qualitative analysis revealed three main themes. These were: 'With the Mob', 'For the Mob' and 'Program Elements. The strengths of the program lay in its indigeneity, low-cost and easy-to-prepare diet, and cultural and communication skills of the director.

Conclusions: Recommendations for improvement included educating participants on the pathophysiology of diabetes, the refinement of online elements and the introduction of face-to-face group exercise.

Implications for public health: Programs of this nature should be expanded and evaluated longitudinally with multiple cohorts.

Key words: diabetes mellitus, type 2; healthy lifestyle; Aboriginal peoples; program evaluation

Aboriginal and Torres Strait Islander Peoples in Australia are disproportionately affected by type 2 diabetes mellitus (T2DM).[1] They are diagnosed with T2DM at a much younger age and at three times the rate of non-Indigenous people and are hospitalised for diabetes-related reasons at 4.8 times the rate.[2] In 2018, diabetes was the second leading cause of death of Aboriginal and Torres Strait Islander people.[3]

Stemming from colonisation, racism, oppression, past government policies and social disadvantage,[4,5] inequity in healthcare for Aboriginal and Torres Strait Islander people living with diabetes is a social justice issue. The disproportionate rates of diabetes, diabetes risk factors, associated complications and inter-generational impacts demonstrate ongoing inequity in health outcomes.[6,7]

Despite 81% of Aboriginal and Torres Strait Islander people living in urban areas,[8] there is a lack of research exploring urban Aboriginal and Torres Strait Islander peoples' health and health needs.[9] There is even less insight into urban Aboriginal and Torres Strait Islander-focused chronic condition self-management programs.[10,11] In a recent scoping review, only 18 Aboriginal and Torres Strait Islander-focused health promotion programs were based in a major city.[12] However, of these urban programs, none were specifically focused on improving glycaemic control for people living with diabetes, although several addressed nutrition,[13-15] general healthy lifestyle, weight loss and/or cardiovascular outcomes.[16-20]

We acknowledge the Dharug People upon whose ancestral lands this study took place. We pay our respects to Elders past and present, recognising them as the traditional custodians of knowledge for this land.

To address this gap in the literature, this paper reports on a study that aimed to evaluate outcomes and participant perceptions of a 10-week, Aboriginal-led healthy lifestyle program called 'Too Deadly for Diabetes', which was hosted in an urban Aboriginal organisation. The program involved participants following a very simple, unprocessed diet of inexpensive but nutritious and easily prepared meals. The diet evolved across the program as participants became accustomed to portion sizes and working with recipes. Recipes and cooking demonstrations were accessed via an online program, where participants could track their weight loss and enter food and exercise into a personal diary. Printed copies of materials were provided to participants who were without access to technology or the internet.

A flexible exercise program was also provided and links to YouTube videos were sent to participants each week through a short message service (SMS). The exercises relied on bodyweight resistance so required no equipment and increased in intensity across the program. Health literacy was addressed through a series of 3–4-minute YouTube videos. The videos explored the common obstacles most people come across when

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trying to lose weight. Participants received one a day for the first 10 days and then one every 2–3 days. To maintain momentum, participants also received an SMS with a link to a 30–90-second YouTube motivational video every morning at 7.00am.

Participants attended an initial information session followed by weekly group attendance. At each visit, they were weighed and had a random blood glucose reading and their blood pressure recorded. Participants were asked to attend their usual healthcare provider to have their glycated haemoglobin (HbA1c) measured before commencement and on conclusion of the program.

The aims of the program were for participants to achieve: an HbA1c <7% (6.5–7% is considered adequate control for people living with diabetes); weight loss of 5%–10% of initial body weight; systolic blood pressure <140 mmHg and diastolic blood pressure <95 mmHg; a reduction in medications; and enhanced self-management.

Terminology

None of the participants in this study identified as Torres Strait Islanders. Therefore, when referring to participants, the word Aboriginal is used. Aboriginal colloquialisms are used throughout this paper. 'Deadly' means really good or excellent; 'Mob' refers to a person's family, community, or Aboriginal country; 'Cuz' is an abbreviated version of cousin; and 'Blackfulla' is a term Aboriginal people use to describe themselves.

Method

Methodology

This study adopted a pragmatic, convergent mixed-methods approach as data consisted of different but complementary data sources.[21]

Setting

This study was undertaken within a single postcode in an Australian capital city. In the 2016 census, 6.8% of the population of this postcode identified as Aboriginal and/or Torres Strait Islander, which is more than double the national population percentage (2.8%).[22] The program was held at the Marrin Weejali Aboriginal Corporation who provide a range of culturally safe health programs to the local Aboriginal community. The CEO of Marrin Weejali supplied written approval of the study methods and allowed data to be collected on-site.

Recruitment

A convenience sample of participants signing up for the program was recruited into the study through flyers located within the foyer of the Marrin Weejali Aboriginal Corporation and through snowballing. To build rapport prior to data collection, the first author (TP), who is a doctorally prepared senior research fellow, diabetes educator and Wiradjuri woman, attended weekly program meetings and yarned with the participants about the study and her reasons for undertaking it. During these yarns, she sought written permission from them to obtain their physiological data from the director and alerted people to the upcoming focus group sessions. She was previously unknown to the participants and is not affiliated with the program.

Participants

Although the inclusion criteria were Aboriginal people aged over 18 years with T2DM, to avoid offence, other Aboriginal people who expressed interest in being involved were not turned away. Twenty-two people participated in the program and agreed to have their physiological data included in the study. Of these, 17 agreed to participate in a focus group. Sixteen participants had T2DM, four had pre-diabetes and one had type 1 diabetes. Another participant who was not diabetic joined to support her husband (see Table 1).

Table 1: Type of Diabetes.

Pseudonym	Type of Diabetes
Anna*	Pre-diabetes
Ben	Type 2 diabetes
Briana	Type 2 diabetes
Brooke	Type 2 diabetes
Carolyn	Type 2 diabetes
Cassie	Type 2 diabetes
Dale	Type 2 diabetes
Dean	Pre-diabetes
Denise	Pre-diabetes
Diane	Type 2 diabetes
Douglas	Type 2 diabetes
Gloria	Type 2 diabetes
Janelle	Type 1 diabetes
Josie	None
Karina	Type 2 diabetes
Kate	Pre-diabetes
Kylie	Type 2 diabetes
Mary	Type 2 diabetes
Melanie	Type 2 diabetes
Samantha	Type 2 diabetes
Sarah	Type 2 diabetes
Susan	Type 2 diabetes

Note:
** Pseudonym in bold indicates the person also participated in a focus group.*

Data collection

Weight and blood pressure were recorded weekly by the program director, who is a Kamilaroi man and accredited exercise physiologist, and a non-Indigenous local pharmacist who altruistically assisted with running the program. Some participants missed having their HbA1c measured pre-program and/or post-program and some missed the initial or final meeting, so their blood pressure was not able to be recorded on these occasions. This has resulted in an incomplete data set.

In the final week of the program, using an interview guide, the first author (TP) held audio-recorded focus groups in a Marrin Weejali group room. Each focus group lasted approximately an hour. Focus groups were chosen to reduce the burden on the participants and negate the need for them to return to the organisation after the program was complete.

Data analysis

Physiological data were analysed using a multi-level model to account for participant clustering. Audio recordings were transcribed and subject to thematic analysis using Braun, Clarke, Hayfield and Terry's[23] six-step method. Independent analysis was undertaken by experienced qualitative researchers (TP and DJ). TP and DJ met to reconcile emerging themes after which the whole team met to discuss and finalise. Themes were inductively derived from the data.

Ethics

Ethical approval was granted by the university's Human Research Ethics Committee and the Aboriginal Health and Medical Research Council Ethics Committee. Participants provided written informed consent. Those who participated in a focus group were compensated for their time with a $30 (AUD) grocery gift voucher. Real names have been substituted with pseudonyms to protect participant privacy.

Results

Quantitative findings

At the completion of the program, there was a significant weight loss of 7.46kg, a reduction of HbA1c of 1.68%, and lowered systolic blood pressure of 8.88 mmHg ($p<0.001$), as shown in Table 2. However, diastolic blood pressure was not significantly reduced ($p=0.079$).

Table 2: Pre and post measurements.

	Start of the program (Mean±SD)	End of the program (Mean±SD)	Change	*p*-value
Weight (kg)	112.61±26.49	105.15±24.38	-7.46	<0.001
Hba1c (%)	8.14±1.61	6.29±1.04	-1.68	<0.001
Systolic blood pressure (mmHg)	135.00±14.75	126.00±13.71	-8.88	<0.001
Diastolic blood pressure (mmHg)	86.38±14.48	80.42±9.76	-4.69	0.079

Qualitative findings

Participants were overwhelmingly positive about the program. The program accommodated cultural determinants of health such as connection to kinship and community, Aboriginal identity, self-determination and wellbeing through it being an Aboriginal-led program, for Aboriginal people, conducted in a place of Aboriginal authority and cultural safety.[24] The program also accommodated inequity in the social determinants of health for Aboriginal people through prescribing affordable, unprocessed, easy-to-prepare food that could feed large numbers of family members. Analysis revealed three main themes supported by sub-themes. These were 'With the Mob', 'For the Mob', and 'Program Elements'.

With the Mob

'Cuz, I'm joining you!'

Participants found out about the program in several ways. Brooke, like several of the other participants, had already met the program director when he was participating as a team manager for a different government community health program:

> *I got onto the Closing the Gap people and they got me into the [different program] and I met [program owner] and he was telling me about this [program] and then my friends joined up too.*

Others had been referred by Marrin Weejali staff where the program was held. However, many participants reported looking the program up after seeing positive results achieved by family, friends and community members. For example, Briana joined the program after seeing 'before and after' pictures of one of her cousins: "I seen this picture and I thought oh my God, he looked so good … and I said, 'Cuz, I'm joining you!'"

Concerned about her husband Dale who had type 2 diabetes, and inspired by results of family and friends, Josie signed both herself and her husband up to the program:

> *Looking at my cousin, and knowing he was actually on one of those ride-on carts and now he can physically get around by himself. And reading about another lady we know, who entirely went off her diabetes meds.*

A few participants joined in desperation as they had tried other avenues for weight loss and were beginning to give up or had few other options. Josie reported trying a commercial weight loss program, Dale had tried a soup-only diet, and both Kate and Susan had tried to lose weight using meal replacement shakes. Dean was originally sceptical and was on a long waiting list for a gastric sleeve operation:

> *I didn't have the money to pay for any weight loss programs or surgery so what have I got to lose? But then I lost three and a half kilos in the first week.*

'People like me'

Motivation to attend the program went beyond a desire to lose weight, manage blood glucose or avoid premature death. Some of the major benefits reported by participants were developing new friendships and feeling supported by others. As Dale said, "We [Aboriginal people] do better together". The increased social contact was also attributed with motivating people to attend the program. Samantha shared:

> *It's made so much difference and it's made me want to do something when you're with other people, whereas if I'm left alone to do something for myself, I won't do it. It was good because everybody was very friendly. It did make a difference. Sometimes I don't like being with a lot of people, but I've found coming here has been good.*

Brooke discussed at length how isolated she felt prior to starting the program:

> *Cause it's not just about the program, it's about meeting up with all the other people and not being so shy. I used to be too shy to even talk to people.*

For Mary, joining the program was an opportunity to reconnect with old friends and make new ones:

> *I think I feel more comfortable being around people who are exactly like me and who think like me and how we all feel the same way, pretty much. Here, I'm with people I know, my friends from before. Then I met all these other lovely ladies and these blokes that I didn't even know from our community.*

For the Mob

'By a Blackfulla for Blackfullas'

There was consensus that the program was a success because it was run by an Aboriginal man, in a place of Aboriginal authority and for Aboriginal people. As Dale said, "This program works cause our mob put it on". Brooke agreed, stating: "It's run by a Blackfulla for Blackfullas". Although she added that she thought non-Indigenous people would benefit from the program as well. Participants also approved of the name of the program, which used Aboriginal slang: "I like the sound of Too Deadly for Diabetes. I love that saying. I love it. Yes, it's really good" (Kylie).

Participants found having a program specifically for and by Aboriginal people empowering. As Gloria said:

> *I think it's fantastic because it gets the Aboriginal community in. We're always put on a back burner, or that's how we're made to feel. But when something like this comes up and it's just going to be the Aboriginal community. To me it just made me feel more comfortable.*

Having the program run out of an Aboriginal organisation was perceived as another benefit. As Kate said, "I feel comfortable here, we belong". Samantha agreed, "I think that's why it's very successful". Mary added, "I just feel more comfortable. Because it's more of a safe place for me, than going somewhere else that I don't really know anybody".

Feeling safe in the space was an idea repeated by several participants who'd had different experiences trying other mainstream health programs. Reflecting on her previous weight loss attempts, Josie mused, "I've done [two different commercial weight loss programs], but nothing like this. And I actually wonder whether it's because it's Blackfullas".

'He speaks the lingo'

This program was essentially run by one person. This allowed the program director to develop individual relationships with participants. As Kate shared,

> *The difference is he actually takes the time to contact you and look in on you, and he's really passionate. It's not just about making money for himself.*

This personal touch translated into participants trusting him and the program. Kate continued:

> *It gives you the ability to be really open with him and not be scared to say, if I haven't had a great week. You can just be honest with him and he doesn't dismiss you.*

Nearly all of the participants discussed the program director's communication skills, as Brooke said, "He's down to earth and he doesn't talk with big flash words … he speaks like we do". Samantha attributed his skill at communicating to possessing cultural knowledge stating, "He understands the people. He can speak the lingo". She also pointed out how accessible he was saying, "He does say if you're struggling or you feel alone to call him". One of the communication skills valued by several participants was his ability to translate complex concepts. Dean shared:

> *If you don't understand the first time, he says it again for you or says it in a different way until you do understand. The way he speaks to you is like a person. Not a client, you're a person.*

This open, accepting communication style also allowed for a pragmatic approach to getting people to adhere to the program. Having developed a trusting relationship, participants accepted 'tough love' from the program director in a way they might not have from a different health professional. As Sarah recalled:

> *Once when I said, "Oh, I miss potatoes", he said, "Yeah, but how would you feel if you miss a toe?" So, he's straight forward and that's true. I mean coming from a doctor like that I'd be thinking, oh, you're a bit straight out, but with him I suppose he's seen it all.*

Likewise, reflecting on her autonomy, Katie shared:

> *He's brutally honest as well, he'll say these are the reasons why, and this is how you're going to help yourself and these are your choices, you either do it or don't do it. Like he said to me the other day, "You're 130 kilos, do you want to be 140 kilos?" And I was like no, and it made me wise up, and I know what I need to do and I'll try again.*

Participants also discussed feeling comforted by the director's ability to discuss the disease in terms of putting it into remission. This is counter to the narrative people often hear about diabetes being an inevitably progressive disease. The idea that it could be put into remission was motivating for Kylie:

> *Because I've never met anybody that knew that much about diabetes and how you can reverse it until I met him. If he's saying that it can be reversed, then I want it out of my body.*

However, several participants also expressed a desire to increase their own knowledge of diabetes and potential complications. Mary's mother had just died from renal failure and Mary was upset that no health professionals had ever helped her make the connection between poorly controlled diabetes and potentially fatal complications.

> *Why didn't anybody in that stupid renal failure bloody section tell us that? They keep it all secret until it's actually happened to you. Then you're thinking, but you've never told us that's what's going to happen to you … That's one thing that I thought the program missed. I reckon he should have had somebody showing us diagrams and showing us what diabetes is. The information about what's really going to happen to you.*

Program elements

'This is an easy diet'

One of the most successful elements of this program was reported to be the simple, affordable diet people were asked to follow. As Dean described:

> *The diet is very simple. All you gotta do is buy a packet of mixed veggies, cook up a bit of chicken breast and put it on it and there's your dinner ... Now I've noticed I'm spending less on food.*

Gloria agreed, stating:

> *I find that this is an easy diet. The things are accessible. A lot of diets that you do, you've got to buy all these different things that are expensive.*

The simplicity of the diet also had people recalling foods from their childhoods. Brooke fondly remembered:

> *We used to live on a riverbank and Mum would cook on a 44-gallon drum. That's why I love stews and soups and when I got onto these soups, I loved them.*

Participants also discussed introducing their families to these simple and healthy recipes, as Sarah said:

> *My granddaughter eats it, she's seven. It took her two weeks to get used to it [the plainer diet]. She's really good with it. Especially when I eat fish, it's like, oh, Nan, can we have that fish again?*

Likewise, Susan shared, "The whole family, I've put them all on it".

Participants also reported the recipes being simple enough that their children were also enjoying cooking, as Brianna said,

> *But now, my kids cook the recipes from the program after I've made them once. I cooked that grilled chicken and my daughter said, "Aw this is awesome, Mum", so she'll cook it now.*

Several participants equated the diet with the type of food Aboriginal people might have eaten prior to colonisation. As Josie explained, "Our diets over many thousands of years was just fresh plants and fresh meat. Nothing was processed, everything was organic". Kate agreed, stating, "Carbs are not good for people with diabetes and Indigenous people in general". Briana added, "We were paleo people, we need to starve a bit and feast a bit".

Many participants discussed their palates changing over the course of the program. Kate told a story of eating out with friends:

> *At first you think simple veggies, simple salads, plain old chicken, plain old fish, plain old beef … but when you get to where I am now, your palate has adjusted to what you're eating. Like, we went for Chinese a couple of weeks ago and I ordered a soup, but all I could taste was the salt in the soup.*

Kate also discussed how preparing the food had increased her interest and skill in cooking, stating:

> *And you learn how to develop the flavours too, because when you make the soup, you make your own stock … and when you let that simmer for hours and hours, yum. It's different to the one you buy off the shelf. I never imagined there would be a time I would be making my own stock!*

'A fitness thing together'

Although the program has an online exercise element, many participants were not engaged with it. Several discussed counting everyday incidental activities such as housework as exercise. Some of those who had participated in the Health Challenge still attended the gym, but this was not for everyone. Ben (who admitted to not engaging with the program very well) reported privately joining the gym stating:

> *I remember the first time I joined the gym, I got a backpack. My wife said, "That's the most*

expensive backpack you'll ever buy". Because I was in the gym for 12 months and it's like $1200, and I didn't really go.

Having enjoyed meeting up each week so much, many participants expressed a desire for a face-to-face exercise program to be incorporated. Gloria: "A program, where everybody came in together, then you don't feel so isolated," and Samantha: "You know how some of them were saying they go to the gym and that, I was wondering if within the program down the track maybe everybody could do a fitness thing together?"

'I love them messages'

Each morning of the program, participants received an SMS message including a link to a YouTube clip. The YouTube clips discussed various elements of diet, exercise and motivation. The SMS messages and YouTube clips were well received by participants, and could be engaged with or not, as Brooke shared:

I love them messages. They crack me up. Seven-o-clock on the dot your phone goes off. And he talks to you, but he's not pushing you, he's giving you the choice to make your own decisions and that's what I like.

Despite being generic, timed-release messages, participants perceived them as personal. Dean commented: "It's good how they make sense at the time, they're almost speaking to you directly". Like Dean, Samantha, found the messages well-timed and mentioned how she felt they were almost prophetic in nature: "One was – are you struggling? And I'm thinking, 'How do you know?'"

Being online, the YouTube clips provided participants the option of revisiting the content if they were struggling with adherence, Kim shared: "You know, some of the YouTubes, you go back and you look at them, and you do ask yourself, are you cheating yourself?"

'There's an app ... But it's clunky'

Participants had various experiences using the online application (app), where they were asked to record their weight, diet and exercise and could access recipes. Navigating the site was an issue for those who were not computer literate, like Josie:

I'm not very good with the computer and sometimes I had trouble getting the recipes. And if you miss putting something into the app and you want to go back, you can't, it runs in time order.

Even computer-literate participants like Kate sometimes found it difficult: "There's an online app … but it's clunky … sometimes it was hard to follow which week the recipes were for". This caused some participants like Mary to request hard copy versions: "I could never log into it. So, I never had it. So, I just got the recipes because it was better to just get it printed out". However, Mary attributed having paper copies with increased engagement with the diet: "Because when you get a piece of paper, it sinks into your head. When it's on a computer, it's like, oh, don't worry about it. But I've got all my recipes on my table".

Discussion

Findings from this study revealed the successes of personal outcomes and the program were attributed to the cultural acceptability and community connectedness the program created. Many participants spoke of joining the program because of the visible results family and friends were achieving. The importance of creating a sense of belonging and connectedness to other participants assisted with self-determination and accountability, and along with the ease of cooking the meals and the affordability of food, participants were able to achieve personal goals and better manage their diabetes. As these findings highlight and as previous literature has suggested, the success of Aboriginal health promotion programs lies in adhering to 'best practice principles in Aboriginal health promotion' including having a focus on community-based group education in culturally safe spaces; targeting, specific skill and knowledge deficits including basic cooking skills; and a pragmatic approach that includes simple, low-cost foods.[13,25-29]

Given the powerful nature of word-of-mouth recruitment, it would be useful to promote previously successful participants as evidence of success. Other research in the same geographical area has produced similar suggestions, recommending local people with good glycaemic control be promoted as role models to help counter fatalism about T2DM always resulting in complications and premature death.[30]

Evidence also suggests that for Aboriginal community programs to be effective several other factors need to be included within programs. Among these factors are community control and ownership, Aboriginal staff involvement and the establishment of trusting partnerships.[31,32] As the findings of this study highlighted, a vital element of this program was the Aboriginal development, governance and control. As asserted through the participants narratives, having a facilitator that spoke like them and shared, and understood their Aboriginality facilitated engagement and program participation. This is supported by other literature that has identified that one of the most important elements of programs focused on nutritional and diet-related health outcomes is community development and implementation.[25] Additionally, the building of trusting relationships between program facilitators and between participants supports the co-creation and authorship of personal health goals aligned with culture and identity, which can foster self-determination.[33]

Key principles of self-determination and the establishment of healthy behaviours are reliant on motivation, autonomy, and confidence and the ability to make lifestyle and health changes.[34] Aboriginal people have experienced multiple barriers to mainstream healthcare services including services not being culturally appropriate and not considering individualised needs.[35] Ensuring the cultural appropriateness of programs and tailoring program elements to individualised needs is essential to create healthy lifestyle changes. Like the findings of this study, a key component of another study focused on diabetes in the Aboriginal community found that developing content that met healthcare and cultural needs could increase knowledge and screening for diabetic retinopathy.[36]

The fact that the diet was acceptable and accessible to participants families is of particular significance as it is known that if family members are unsupportive of dietary modifications, it can be a barrier to sustaining a healthy diet and implementing lifestyle changes.[13] The importance of healthy food being affordable enough to feed large numbers of extended family and easy to prepare was found similarly in an ethnographic study of urban Aboriginal women's insights into preparing food for their families.[15] Foley[15] concluded that nutrition promotion in Aboriginal communities should be framed around the household rather than an individual. It is a strength of the program that the prescribed diet was cheap and easy to prepare, given the intractable social and environmental factors inherent in the postcode area, which was a known low-socioeconomic and 'diabetogenic' area

characterised by low walkability, easy access to fast food, and low access to healthy food.[30]

Sustaining a healthy diet is enhanced by the communal nature of group education that has proven to be a strength of this and similar programs.[13,37] Furthermore, the collective efficacy developed through Aboriginal group education can contribute to strengthening individual resolve and thus self-determination and sustained behavioural changes.[37,38]

Unlike a previous study in the same postcode area[30] where participants were fatalistic about disease progression, people in this group had hope for the future and believed they could beat the legacy of ill health. A lack of knowledge and education associated with diabetes can increase the risk of undiagnosed cases, illness progression and comorbidities through lack of screening and detection. However, this can be overcome through increased knowledge and changes in health beliefs that support healthy lifestyle changes, as found in this study and others.[39]

Prior to developing and implementing health education programs, knowledge and literacy needs should be assessed to ensure community needs can be met. Future programs and evaluation research should also consider refining online components for participation and having alternative options to meet individual needs. This was especially evident in the desire for a group exercise program. Furthermore, for health education to be effective in Aboriginal communities, culturally appropriate approaches are important, with 'visual, hands-on resources' (preferably co-designed) being more likely to be effective in Aboriginal health promotion programs.[40,41]

Strengths and limitations

This study reports on a single cohort of 22 Aboriginal people participating in the Too Deadly for Diabetes program. As such, it is limited by its small sample size, gender imbalance and incomplete quantitative data set. Furthermore, we did not collect demographic data including age, highest level of education and socioeconomic situation. However, to our knowledge, a strength of the study is its innovation in that it is the first evaluation of an Aboriginal-led program focused on improving glycaemic control in a cohort of urban Aboriginal people.

Conclusion

Overall, participants had positive health outcomes from being involved in the program. Participants involved in the focus group also discussed benefits beyond weight loss or improvement in glycaemic control, such as feelings of belonging and a belief that they could improve their health and wellbeing. Much of the value of the program was found in it being run by an Aboriginal person, for Aboriginal people and in an Aboriginal organisation.

Participants desire for more education on what diabetes is, how carbohydrates affect blood glucose, potential complications and potential for remission would also be of use in this community. Overwhelmingly, participants expressed a desire to stay connected and spend more time in the group. Developing a group exercise program would facilitate this. Upgrading and refining the online elements of the program would improve the experience for participants.

One significant consideration going forward will be the capacity to successfully expand the program, given that a lot of its success was predicated on the cultural knowledge, pragmatic approach, communication skills and cultural acceptability of the program director.

Implications for public health

Given the epidemic of T2DM in the Aboriginal community in Australia, Aboriginal-led programs that are embraced by the community like the 'Too Deadly for Diabetes' program should be expanded and evaluated with multiple cohorts longitudinally to determine if lifestyle changes are maintained. The collection of demographic data such as age, level of educational attainment and socioeconomic status would further enhance understanding.

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