

BMJ Open Adaptions to the National Diabetes Prevention Programme lifestyle change curriculum by Hawai'i Federally Qualified Health Centers: a qualitative descriptive study

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ABSTRACT

Objective The objective of this qualitative study was to describe the community-appropriate and culturally appropriate adaptations made by lifestyle change programme (LCP) coaches to the National Diabetes Prevention Programme curriculum for Federally Qualified Health Center (FQHC) patients in Hawai'i, an ethnically diverse state with a high proportion of Native Hawaiians and Pacific Islanders (NHPI).

Research design and methods We used a qualitative descriptive approach. First, we conducted a document review of existing programmatic notes and materials followed by video interview calls with 13 lifestyle coaches at 7 FQHCs implementing in-person LCPs. Lifestyle coaches catalogued, described and explained the rationale for adaptations. The research team counted adaptations if they met a specific adaptation definition derived from several sources. Community and cultural relevancy of adaptations were analysed using an existing framework for weight loss and diabetes prevention for NHPIs.

Results The average number of adaptations per FQHC was 8.61 (range: 4–16). Adaptations fell into 11 broad categories such as off-site community field trips, food-related and nutrition-related activities, and physical activity opportunities. Novel adaptations included goal setting with motivational interviewing and dyadic recruitment. Field trips and in-class food demonstrations addressed the most constructs related to weight loss and diabetes prevention for NHPI, including social and community barriers, familial barriers and barriers to self-efficacy.

Conclusions Lifestyle coaches were culturally attuned to the needs of LCP participants, particularly from NHPI communities. Policy-makers should recognise the extra work that LCP coaches do in order to increase enrollment and retention in these types of programmes.

BACKGROUND

In 2016, 14.5% of Native Hawaiian, 14.2% of Filipino and 9.3% of other Pacific Islander adults in Hawai'i were diagnosed with

Strengths and limitations of this study

- This qualitative study described adaptations to the National Diabetes Prevention Programme intended for priority populations, including Native Hawaiians and Pacific Islanders.
- We used an existing theoretical framework to identify and characterise adaptations to the National Diabetes Prevention Programme.
- Findings describe the innovations of seven Federally Qualified Health Centers in Hawai'i that serve diverse communities and patient populations at higher risk for diabetes.
- Adaptations were captured retrospectively from the perspectives of lifestyle coaches responsible for implementing the programme.
- The study was not designed to examine the effectiveness of adaptations at an individual or cohort level through weight loss or other indicators.

prediabetes.¹ An estimate of diabetes-related hospitalisations and emergency department costs in 2013 was \$97 billion in Hawai'i,² making prevention of diabetes all the more important. Instituting lifestyle change programmes (LCP) to prevent diabetes could save the state \$350 million and avert 11 000 new diabetes cases by 2023.² National Diabetes Prevention Programme and LCPs are an effective way to reduce diabetes incidence among those with prediabetes; sustained long-term risk reduction, over 10 years, has been observed among programme participants.^{3 4} In 2013, Congress authorised the US Centers for Disease Control and Prevention (CDC) to offer and lead the programme through partnerships with insurers, employers and health-care systems and organisations.⁵ In 2014, CDC funded health departments across the USA to reduce incidence of diabetes and required



grantees build support for LCPs.⁶ One grant recipient, the Hawai'i State Department of Health contracted the Hawai'i Primary Care Association (HPCA) and Federally Qualified Health Centers (FQHCs) across the state to implement the Prevent T2 (T2) curriculum, a CDC-approved LCP, via in-person group classes.

The T2 curriculum is based on findings from Diabetes Prevention Programme studies,^{7,8} which is found to be effective in reducing the incidence of diabetes.³ The year-long T2 programme has nearly weekly 'core sessions' covering 16 different topics in the first 6 months followed by 'maintenance sessions' in the second half of the year covering 10 topics with meetings once or two times a month. Each session scheduled to last for 60 min. Sites must deliver a minimum of 22 sessions: all 'core sessions' and a minimum of 6 'maintenance sessions'.⁹ Example curriculum modules include principles of physical activity, physical activity tracking, nutrition and coping mechanisms; the trainer's manual also provides suggested activities or resources which are fully described on the T2 curriculum website.¹⁰ To ensure programme fidelity, CDC programme recognition requires organisations to adhere to standards related to participant eligibility, staffing, lifestyle coach training and required curriculum content, among others⁹ and report data such as participant attendance, eligibility, weight, height, physical activity and age to CDC. While the programme requires following the CDC-approved programme design, lifestyle coaches are able to 'adapt sessions to match [a] group's background, interests, and needs'.¹¹

The landscape of adaptations among those using CDC-approved curricula is not well known, but is critical to understand for programme implementation, design and evaluation. One study of CDC-funded implementation sites discussed incorporating cultural themes, images and food preferences; delivery of sessions in languages other than English; and use of incentives, but did not discuss adaptations specifically.¹² In terms of research that reflects the diverse population of Hawai'i, studies include translation or adaptation of the National Diabetes Prevention Programme to the target population, resulting in the creation of new programme materials, shortening programme length or tailoring for setting through processes such as community-based participatory research¹³⁻¹⁷ rather than adaptations to existing and CDC-approved curricula. The purpose of this evaluation was to address this paucity of research and describe the quantity and types of adaptations made to CDC-approved LCPs in community settings. By examining the adaptations made by FQHC staff, this study sought to describe how Hawai'i FQHCs increased the relevance and cultural appropriateness of the evidence-based LCP for priority populations.

RESEARCH DESIGN AND METHODS

Study setting

FQHCs are community-based, non-profit healthcare organisations that provide primary and preventive

care and serve low-income and medically underserved populations. In Hawai'i, there are 15 FQHCs that serve 150 000 patients annually. In 2016, 78% of FQHC clients were racial and ethnic minorities (40% Native Hawaiian and Other Pacific Islanders, and 24% Asians) and 10% of clients were best served in a language other than English.¹⁸ In 2013, over half of state's FQHC patients used public insurance, and 76% had incomes below poverty level.¹⁹ In this study, the seven participating FQHCs worked with the HPCA to implement their programmes at no cost to participants. These sites were Wai'anae Coast Comprehensive Health Center, Kokua Kalihi Valley, Waikiki Health Center, Waimānalo Health Center and Ko'olauloa Health Center on the island of O'ahu, and Hamakua-Kohala Health Center and West Hawai'i Community Health Centre on the island of Hawai'i. Each FQHC supervised its own staff and programme recruitment methods varied. Many patients were recruited to participate after being identified as prediabetic, while other patients received outreach within their communities or referrals from previous programme participants.

Research design

This study used a qualitative descriptive approach²⁰ and was designed and carried out by a university-based evaluation team, with input from grant partners. The evaluation team consisted of three public health faculty members (one male: DS and two females: LBK and CP) with advanced academic degrees and varying levels of evaluation experience. DS and LBK were the primary evaluators over the entire multiyear grant, and thus had existing relationships with the grant partners at the time of the study. Study participants were aware of the grant evaluation requirements and informed of the study purpose prior to data collection.

The study consisted of two data collection phases. In March 2018, two evaluators (DS and LBK) conducted a document review of existing grant-related contemporaneous meeting notes, reports and programmatic materials provided by HPCA and the seven FQHCs delivering T2 to gather descriptions of programmatic adaptations the curriculum following recommended qualitative document review methods.^{21,22} Documents were reviewed in-person at HPCA and off-site via a secure cloud-based folder and data were abstracted into spreadsheets by site using Microsoft Excel that included fields for the adaptation or activity; a description of the activity; whether an adaptation was required or modified from the curriculum, created from scratch, or leveraged existing FQHC activities; why the adaptation was made; who delivered the activity; and successes from the adaptation.

The initial review showed the documents did not capture all adaptations or lacked information from some FQHCs completely. Evaluators then requested HPCA identify T2 implementation staff at FQHCs who could validate information already abstracted from available documents and provide additional adaptations not included in the document review. The purposeful sample consisted of lifestyle

coaches who had previously received 16 hours of intervention training by a CDC-contracted training organisation. One or two staff members per FQHC participated in the calls; no one declined to participate or dropped out of the study. In sum, 13 programme implementation staff across the 7 implementing sites participated and provided informed consent.

FQHC implementation staff were emailed their site-specific spreadsheet for reference, then asked to complete the spreadsheet collaboratively with an evaluator (DS) via video calls during September 2018. Interviews were guided by the questions in the columns of the worksheet (see online supplemental file 1), and the evaluator probed for additional adaptations. Once all information was captured and staff validated the worksheet, the call was complete. Calls lasted approximately 60 min and were not recorded.

Adaptation definition

Our definition of an adaptation was informed by two issues related to how adaptations are presented in the literature. The first issue is whether adapted evidence-based health interventions maintain fidelity to the original intervention design or whether adaptations made to evidence-based interventions constitute a brand new programme.²³ For example, recommendations for intervention adaptations usually include community engagement or assessments.²⁴ The second issue is that community-based implementers may not have the resources to perform such adaptation processes or may not be allowed to undergo an extensive adaptation process, such as in implementation of T2 curriculum, although the curriculum allows implementers to ‘adapt’ or add on activities and materials to match a community’s needs as appropriate, so long as the main parts of the programme are delivered the same way to assure fidelity.⁹ CDC provides generalised guidance for these modifications to increase retention,²⁵ though these are not culturally specific or community specific. Thus, implementation sites across the USA must maintain the programme’s internal validity while ensuring the programme is externally valid to the community it serves.²³

For this study, the definition of ‘adaptation’ used definitions culled from a recent systematic review on adjusting evidence-based interventions to respond to a number of factors, including participants’ backgrounds and needs to ensure participant retention against the backdrop of an organisation’s capacity and setting.²⁶ We defined an adaptation as the modification of an efficacious programme without adjustment to required curriculum components^{27 28} to address culture-based and community-based circumstances within communities served by implementation sites^{28 29} and organisational capacity to deliver the intervention to the targeted population.²⁸

Weight loss theoretical framework

To assess adaptation cultural fit to the communities predominantly served by Hawai’i FQHCs, we used an

Social and Community Influences	Family influences	Individual Influences
<ul style="list-style-type: none"> • Healthy food and physical activity options • Cost of food • Cultural eating expectations • Cultural activities • Community leaders and advocates 	<ul style="list-style-type: none"> • Stress and family dynamics • Family’s eating habits • Foods in the home • Family activities • Childcare • Income 	<ul style="list-style-type: none"> • Self-efficacy to lose weight • Past attempts at weight loss and expectations • Assertiveness • Stress • Time management

Figure 1 Mau and colleagues model of weight loss for Native Hawaiians and Pacific Islanders.¹⁷

existing theoretical framework for weight loss for Native Hawaiians and Pacific Islanders (NHPIs) developed via a community-based participatory research National Diabetes Prevention Programme study.¹⁷ The study identified relevant barriers and facilitators for weight loss, such as social and community influences, family influences and individual influences (see figure 1).¹⁷ Adaptations to T2 curriculum by FQHC implementers were compared with this existing model.

Analysis plan

Site-specific FQHC worksheets were aggregated for analysis in an Excel spreadsheet. The lead author (DS) first classified adaptations via thematic analysis³⁰ (eg, ‘food and nutrition’) and then provided a more specific descriptor (eg, ‘health centre gardens’). Three evaluators (LBK, CP and DS) then discussed whether each ‘adaptation’ met the definition above. If there was disagreement, evaluators discussed until consensus was reached. Adaptations were excluded if they pertained to standard FQHC hiring practices that differ from other large clinical providers (eg, hiring community health workers); online or telehealth classes; and marketing and outreach efforts as no standardised marketing and outreach materials exist targeting NHPIs.³¹ Modifications like using online videos were also excluded if they were suggested by the curriculum or were not to overcome a specific community-related, culturally related or linguistically related barrier (ie, videos/materials for limited English proficient participants). Multiple service sites were counted if FQHCs offered classes both in-clinic and at non-clinical community locations (as opposed to a second clinic location). Analysis took place from September through November 2018. We also present contextual data that were collected by the HPCA from implementation sites applying for CDC programme recognition.

Patient and public involvement

Patients were not involved in this study.

RESULTS

The number of participants across all sites ranged from 28 to 66 and the average number of participants per


Table 1 Participant demographics, sessions participation, weight loss and CDC programme recognition of Prevent T2 implementation sites in Hawai'i

Site	# enrolled	# of cohorts	Average enrollees per cohort	Average sessions attended	Average weight loss (%)	Average weight loss goal*	% participant who met weight loss goal*	% Asian participants*	% Pacific Islander participants*	Retention months: 1–6 (%)*	Retention months: 7–12 (%)*	# of lifestyle coaches	CDC recognition†
1	66	5	13.2	12.9	1.8	19	19	9	54	75	19	4	Pending
2	65	4	16.3	11	1.0	18	18	13	37	47	28	3	Preliminary
3	63	5	12.6	12	3.1	30	30	18	59	69	10	3	Full
4	57	7	8.1	15.5	4.1	41	41	33	35	72	51	2	Full
5	46	5	9.2									3	None
6	35	8	4.4	15.2	4.2	37	37	22	63	77	33	3	Full
7	28	2	14									4	None

Blank cells indicate no data available.

*All percentages rounded to nearest whole number except for average weight loss column.

†Refers to CDC recognition status at the end of the grant term.

CDC, Centers for Disease Control and Prevention.

cohort ranged from 4.4 to 16.3 (table 1). Three sites reported over half of their participants were of NHPI descent (overall range: 35%–63%). Between 18% and 41% of participants at each site reached the 5% weight loss goal. Sites also had varying levels of attrition across the year-long programme, with one site only retaining 10% of participants in the second half of the programme. Interviewees identified 96 adaptations to the T2 curriculum of which 61 met the criteria for inclusion in the current study (table 2). Reasons for exclusion included double counted activities or activities were required by the curriculum and not modified. Sites made between 4 and 16 total adaptations; the most popular were related to physical activity. We identified 11 broad categories and 21 subcategories of adaptations across (table 3). Adaptations are further described below.

Physical activity

Sites provided physical activity opportunities before, during, or after class and outside of class. Five out of seven sites included opportunities tied to class, including Zumba, using resistance bands, a ten-minute 'warm up' before class (initially led by lifestyle coaches, then taken over by participants), use of on-site gym which included sessions with a personal trainer, or added walking to help participants add minutes to their physical activity for the week. Opportunities outside of T2 classes included hula, tai chi, and Zumba. One clinic organised walking groups and partnered with a local organisation to put on group runs. A different clinic leveraged an existing 'Walk with a Doc' programme where participants were able to 'walk and talk' with a health centre doctor to ask treatment questions while adding physical activity.

Food and nutrition

To promote better eating in-class and address the cost or lack of nutritious food in the community, two sites had client food gardens (one of which was specially constructed for LCP participants). Another site modified the curriculum to include discussions of the foods commonly consumed in Hawai'i. Food demonstrations varied. One site with clients who often access food banks created demonstrations that incorporated items commonly available at the food bank (eg, 'food bank chili'). Other demonstrations included vegetarian snacks, hands-on food preparation, and modifications to recipes commonly used in Hawai'i, such as tofu *poke*. Another food demonstration was *poi* pounding, where participants learnt how to pound *kalo*, a traditional Hawaiian staple vegetable, into *poi*, a traditional Native Hawaiian food. This specific activity was also coded as physical activity due to its physical intensity.

Field trips

Field trips outside of class were related to food and nutrition activities or physical activity opportunities. Food and nutrition activities included grocery store tours combined with a label reading exercise. One lifestyle coach

Table 2 Number of adaptations by type and Prevent T2 implementation sites in Hawaii'i

Site	Physical activity	Food and nutrition	Field trips	Materials	DPP offerings	Support services	Stress management	Social support	Interpretation	Goal setting	Measurement	Total
1	5	1	2	1	2	1	1	1	1	1	1	16
2	1	1	1	2								5
3	3	3	3	2	2	2	2	1				16
4				2	1			1				4
5	1	1	1	1		1						5
6	1	3	2	1	1							8
7	2	1	9	9	2	2	1		1			7
Total	13	10	9	9	4	5	4	3	2	1	1	61

DPP, Diabetes Prevention Programme.

mentioned their participants did not cook for themselves, but also did not leave the neighbourhood to go to the full-service grocery store located in the adjacent neighbourhood. This coach scheduled a tour at the full-service supermarket, which had a variety of healthy prepared foods (eg, salad bar). Participants at a rural health centre were given gift certificates to local restaurants to purchase lower calorie meals and compare their findings with one another. The same site facilitated a farm tour for participants to learn how to grow their own food at home and were given starter plants. Other physical activity field trips included a beach cleanup at one site, and two other sites arranged bike rides.

Materials

To support retention and provide instrumental support to participants, sites provided incentives and other materials related to increasing programme success. To promote healthier eating habits, two sites provided the portion control tool MyPlate³² to all participants. When participants achieved certain goals (eg, 150 min of weekly physical activity), they would be awarded with a FitBit or pedometer to further promote and track physical activity. Alterations to tracking materials and templates were made: one site used pocket calendars for clients to track their activity. Another modified T2 tracking sheets for a low-literacy population, while another glued tracking sheets into composition books to assist clients who would misplace loose log sheets.

LCP timing and locations

Four FQHCs varied LCP cohort start date, class times, or class locations to accommodate community events/festivals or school schedules as appropriate. Two clinics held classes outside of the clinic settings, including at community centres, job-skills education sites, and a meeting site for persons with behavioural health issues to support participant comfort by meeting in a familiar place. Meeting the community 'where they are' helped alleviate participant issues related to transportation, family stress, and time management.

Supportive services

One clinic purposely scheduled its sessions to leverage an early childhood education programme co-occurring on-site, so parents could drop their children off to participate in learning activities while attending class. Two clinics provided external linkages to community resources for their participants, and another clinic invited a behavioural health specialist to assist participants set goals and overcome barriers and expert guest speakers so participants could ask deeper questions about their health. One clinic linked its participants to a community-sourced agriculture cooperative box programme, though relationship ended as clients were dissatisfied with the consistency and variety of produce, and the programme itself was costly and was accessed by less than a quarter of participants.

Table 3 Prevent T2 curriculum adaptation descriptions at Hawai'i implementation sites

Main adaptation	Subcategory	# FQHCs	# adaptations	Brief description
Physical activity	Opportunities tied to class	5	5	Physical activity before or after class or expanded optional activities from the curriculum (eg, Zumba, resistance bands and walking), poi pounding, lifestyle coach and community-led 'warm-ups' before each class, or on-site gym's LCP coaches make referrals to. One site adds four sessions with a trainer, while the other will provide some workout classes.
	Opportunities outside of class*	4	7	Examples include tai chi and Zumba classes at clinic sites or organised walking groups and a group run with an outside organisation for participants. Another example is hula, combining a culture and physical activity. Walking event with doctors combining physical activity and clinician advice on health problems.
Food and nutrition	Health centre gardens	2	2	On-site gardens for participants to access (one pre-existing and one built specifically for LCP).
	Cultural food discussions	1	1	Tailor the section on healthy food to include information about foods typically eaten in Hawaii (poi and sweet potatoes).
	Food demonstrations	6	7	Food demonstrations included poi pounding, recipe development from commonly found ingredients at food banks (eg, 'food bank chili'), vegetarian snacks and hands-on meal preparation. Most demonstrations included culturally or community appropriate foods.
Field trips	Food and nutrition	4	6	Sites created six field trip types related to food and nutrition, including looking for healthy items from fast food locations in community, grocery store tours with a label reading exercise and community farm tours.
	Physical activity opportunities outside of class*	3	3	Field trips out of class to promote physical activity through beach cleanup or organised bike riding.
Materials	Portion control	3	3	Use of MyPlate or existing materials tailored to Hawaii about selecting the healthiest items from local food vendors (eg, luau plates).
	Incentives	3	3	Incentives related to the course (eg, fitness bands, scales and FitBits) materials for the week or based on milestones (eg, weight loss and activity goals).
	Trackers and planners	3	3	Modified trackers for literacy level or created new trackers, provided composition books or modified data collection tool to make it easier for clients to track and lifestyle coaches to collect, or report group progress and aid in recruitment.
DPP offerings	Adjusted class times	4	4	Clinic sites found school schedules, community events and work schedules were barriers to class attendance and adjusted class time to accommodate participants.
	Multiple sites (non-clinic)	2	2	Classes in community venues to better access participants, including a work skills development site, a community centre for a Marshallese community with transport issues and on-site at a support programme for individuals with mental health issues.
Support services	ECE/Child care	1	1	Early childhood education or other activities for children of LCP participants during class time.
	Resource linkage	3	4	Provide additional linkages to resources in the clinic, including behavioural health appointments monthly for participants to work on goal setting or expert guest speakers on certain topics in class. Linkage to a CSA box programme.
Stress management	Art	2	2	Art (painting or colouring) to demonstrate stress management in class.
	<i>Lomi lomi</i>	1	1	Hawaiian massage (lomi lomi) for feet and legs, especially for feet and legs to promote healing and relaxation. Also related to Hawaiian culture.

Continued

Table 3 Continued

Main adaptation	Subcategory	# FQHCs	# adaptations	Brief description
	Meditation	1	1	Meditation and guided imagery for stress management
Social support	Dyad recruitment	3	3	Modification of recruitment strategy by asking primary programme enrollees to bring a friend or family member who would qualify for the programme (HbA1c or risk test) to build support and accountability among participants.
Interpretation	Interpretation and materials translation	2	2	Sight translation of programme materials into Marshallese or translation of curriculum into Chuukese.
Goal setting	Motivational Interviewing	1	1	Address organisational and staff capacity to help participants with goal setting.
Measurement	Additional measurements	1	1	Additional measurements (eg, blood glucose and waist size) to show participant progress when weight loss may not be occurring.

*Field trips involving physical activity were one-time special events that involved travel vs physical opportunities outside of classes that were regularly scheduled/offered.

CSA, community-sourced agriculture; LCP, lifestyle change programme.

Stress management

Stress management activities varied and included painting and colouring, guided imagery, and meditation. *Lomi lomi*, or Native Hawaiian massage, was another activity participants learnt to promote healing and relaxation.

Social support

Three sites modified recruitment for the programme by requesting participants invite a friend or family member at-risk for diabetes to join the programme with them. This dyadic recruitment built accountability within the pairs, especially if they lived together. For example, both participants would know what kinds of foods they should purchase to reduce the risk for diabetes.

Interpretation

Two sites provided translation of the LCP into other languages. One site provided simultaneous interpretation into Marshallese while the course was delivered in English. At another site, a lifestyle coach translated the written curriculum into Chuukese, a Pacific Island language, prior to each class, though participant course materials were provided in English.

Goal setting

One FQHC recognised the goal-setting portion of the LCP curriculum required expertise beyond the lifestyle coaches' previous training. This site organised motivational interviewing trainings for coaches to enhance their counselling capacity with participants and address barriers to weight loss.

Measurement

One site with a higher percentage of Asian participants found the programme target for 5% wt loss was not possible for some with low weight or body mass index. This was an issue for retention as participants did not feel they were reaching their goals. This site added additional

measures—blood glucose monitoring and waist circumference—to demonstrate positive changes happening for participants and to keep them motivated to continue the programme.

Cultural appropriateness of adaptations

Table 4 compares the adapted activities to the conceptual framework for weight loss for NHPI.¹⁷ Nine of the 21 different adaptations addressed healthy food and physical activity options in the community, such as client gardens, field trips to increase opportunities for physical activity, and trips to local stores or farms. Adaptations that addressed familial eating habits and food available in the home were closely aligned, and included food and nutrition related activities, field trips, food demonstrations, discussions of locally available or cultural foods, and discussions about portion control. Most adaptations addressed self-efficacy at the individual level. For instance, field trips enabled participants to learn about locally accessible resources like bike share or involved lessons that demonstrated nutrition label reading at grocery stores. Field trips and food demonstrations covered the most constructs across the model domains.

DISCUSSION

This study sought to understand the different ways staff at seven Hawai'i-based FQHCs made culturally- and community-appropriate adaptations to the T2 curriculum to help programme participants achieve their weight loss goals. We identified 61 separate adaptations across seven health centres and analysed these adaptations using an existing model of weight loss developed in Hawai'i, making these adaptations more salient to the local population, which is important to participant retention. We found adaptations were made to overcome barriers at the social and community level, within families, and to



Table 4 Comparison of Prevent T2 curriculum adaptations to the model of weight loss for native Hawaiian and Pacific Islanders¹⁷

Main adaptation	Subcategory	Social and community constructs*					Family constructs*					Individual constructs*					Total	
		A	B	C	D	E	A	B	C	D	E	F	A	B	C	D		E
Physical activity	Opportunities tied to class	X			X								X					3
	Opportunities available outside of class†	X			X	X												3
Food and nutrition	Client gardens	X	X		X								X					4
	Cultural food discussions	X	X	X				X	X			X						6
	Food demonstrations	X	X	X	X			X	X			X	X					8
Field trip	Food and nutrition	X	X	X				X	X			X	X			X		8
	Physical activity opportunities outside of class†	X				X						X						3
Materials	Portion control	X		X				X	X			X						5
	Incentives											X						1
	Trackers and planners											X						1
DPP Offerings	Multiple class offerings					X				X						X		3
	Multiple sites (non-clinic)							X								X		2
Support services	ECE/Child care							X			X					X		3
	Resource linkage	X	X	X														3
Stress management	Art																X	1
	<i>Lomi lomi</i> (Hawaiian massage)				X												X	2
	Meditation																X	1
Social support	Dyad recruitment							X	X	X	X							4
Interpretation	Interpretation and materials translation																	0
Goal setting	Motivational Interviewing												X		X			2
Measurement	Additional measurements														X			1
	Total	9	5	5	5	3	3	5	5	2	1	4	8	0	2	1	6	

*Social and community constructs: A. Healthy food and physical activity options and resources. B. Cost of healthy food options. C. Cultural eating expectations. D. Availability of cultural activities. E. Community leaders and advocates. Family constructs: A. Family dynamics and stress. B. Family eating habits. C. Availability of certain foods in home. D. Family activities. E. Child care. F. Household income. Individual constructs: A. Self-efficacy and locus of control. B. Past weight management attempts. C. Weight loss expectations. D. Assertiveness. E. Stress and time management.

†Field trips involving physical activity were one-time special events that involved travel vs physical opportunities outside of classes that were regularly scheduled/offered.

assist with participant's own self-efficacy. We also noted one adaptation, motivational interview training, specifically made in order to address organisational and staff capacity.

The frequency that health centres reported modifying activities to address food availability, cost, cultural eating expectations, food in the home, and family eating habits point to an important fact about Hawai'i's food environment. One study in Hawai'i found 58% of state residents lived within 1 kilometer of an unhealthy food outlet compared with 49% living to a healthy food outlet.³³ Some locally grown produce are more expensive³⁴; a lack of increased crop production combined with rapid commercial development of former farmlands³⁵ may further affect the pricing structure of locally produced

fresh fruits and vegetables. While promising interventions like increased access to farmers' markets for low-income persons are on the rise, there are still systemic barriers to accessing these services.³⁶ Food insecurity is related to increased odds of diabetes for NHPs living in Hawai'i,³⁷ making food-related adaptations to the T2 curriculum more salient. One food-related modification, community-sourced agricultural, was scuttled during the course programme. Novel additions such as this require more refinement to balance the taste of participants, cost of participation, and healthy food options.

Physical activity additions were the next most frequently cited adaptation. Health centres recognised environmental barriers that prevent their clients from participating in physical activity, aligning with the main model

construct discussing physical activity opportunities. Built environments that support physical activity may overcome low self-efficacy for physical activity.³⁸ However, communities with a higher proportion of NHPIs may lack physical activity resources (eg, parks and walking trails) and these resources may be in poorer condition.³⁹ One study found 66.1% of low-capacity roads in Hawai'i (those with one lane in each direction) lacked pedestrian facilities, such as sidewalks and crosswalks, especially in rural counties.⁴⁰ Field trips, linkages to physical activity resources in the local community, or the creation of physical activity opportunities for T2 participants addressed some barriers to self-efficacy. Policymakers should consider how to capitalise on FQHCs' own initiative to create physical activity opportunities at clinic sites, such as adding more sidewalks near clinics.

Aside from food and physical activity, FQHCs made a number of interesting adaptations for their clinic populations. Integrating blood glucose monitoring and waist circumference were novel ways to address the limited, but required, T2 measures. Dyadic recruitment was another novel strategy that created social support instantaneously and could address multiple weight loss domains (eg, food available at home, family eating habits) without putting additional pressure on participants to translate information to other household members. Adoption of incentives by FQHCs, an adaptation supported by the literature,^{41–43} was another novel way to enrol and retain members of 'hard-to-reach' populations. Further resource linkages to behavioural health specialists and the addition of guest speakers who have more knowledge than lifestyle coaches were important modifications.

LIMITATIONS

The main limitation to this study was the inability to correlate whether adaptations directly led to success for participants. We lacked the means to interview programme participants about how they rated the helpfulness of these adaptation towards their weight loss goals and were unable to collect data on which participants accessed these different adaptations. Because of these limitations, this evaluation presented which adaptations were made to the existing curriculum. Another limitation to this study concerns the retrospective nature of the document review process. We may have missed additional adaptations, and although we attempted to overcome this by validating the list of changes with lifestyle coaches, there was turnover among staff, meaning some adaptations may not have been captured during the validation interviews. Another challenge was classifying whether adaptations made by lifestyle coaches fit the operationalised 'adaptation' definition. The evaluation team had to decide what represented a 'best practice' rather than an adaptation (eg, hiring lifestyle coaches from within the community was not considered an adaptation) and what was considered a change specific for FQHC patient populations rather than changes that would suit

all participants generally in LCP (eg, showing YouTube videos explaining blood glucose). These judgement calls were made through discussion among three evaluators.

Lastly, 'adaptations' may be too broad a term to describe the work FQHCs engaged in for their diabetes prevention programmes. To understand how organisations might change programmes with highly rigorous standards for fidelity might increase the cultural or community relevancy for potential participants 'in real life,' other terms could be considered. For example, cultural attunement,⁴⁴ describes changes or additions to interventions without changing their core components in order to increase recruitment and participation of members of targeted cultural groups.⁴⁵ These include translation or delivery of interventions and their materials in-language, and inclusion of cultural values and contextual stressors to account for both the values of the cultural group and the social stressors they may encounter, including socioeconomic factors or migration status. Additionally, experts in developing the attunements are bicultural or bilingual professionals and community members,⁴⁴ which can help to describe and point to contextual stressors. Thus, cultural attunement provides a better way to describe how to increase participation and retention to programmes with both high levels of fidelity and cultural or community relevancy, in a way that is distinct from the traditional definition of an 'adaptation' in public health studies.

CONCLUSIONS

Hawai'i FQHCs were adept at creating adaptations to ensure that LCP programme recruitment and retention were mindful of local social and community norms and barriers, as well as familial and individual issues participants may experience throughout the programme. Lifestyle coaches were attuned to the needs of their communities and made appropriate adaptations. Policymakers should consider paying increased attention to the environmental barriers that diabetes prevention programme participants face, and further consider the extra time and creativity required by lifestyle coaches to ensure programme success when developing reimbursement mechanisms.

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