

Intervention IP-057: Diabetes Care in American Samoa (DCAS)

Summary

This intervention aims to improve diabetes management among adult American Samoans with type 2 diabetes. Participants were randomized to receive either the culturally-adapted intervention led by a primary care team, including a nurse and community health worker (CHW), or usual care treatment, which was based on algorithms using patient information to develop risk profiles, which determined frequency and intensity of patient care provided in the intervention. Participants who received the culturally-adapted intervention had lower HbA1c at 12 months than participants who received usual care.

Overview

Purpose of Intervention:

Utilize a culturally-adapted nurse and community health worker team primary-care based approach to improve diabetes management among adult Samoans in American Samoa

Intervention Type:

Research-Tested — *Interventions with strong methodological rigor that have demonstrated short-term or long-term positive effects on one or more targeted health outcomes to improve minority health and/or health disparities through quantitative measures; Studies have a control or comparison group and are published in a peer-review journal; No pilot, demonstration or feasibility studies.*

Intervention Details

Intervention was Primarily Driven, Led, or Managed by:

Academic/Clinical Researchers Only

Citations:

- DePue JD, Rosen RK, Seiden A, Bereolos N, Chima ML, Goldstein MG, Nu'usolia O, Tuitele J, McGarvey ST. Implementation of a culturally tailored diabetes intervention with community health workers in American Samoa. *The Diabetes educator*. 2013 Nov-Dec;39(6):761-71. Epub 2013 Sep 19. Relevance: Main Intervention
- DePue JD, Dunsiger S, Seiden AD, Blume J, Rosen RK, Goldstein MG, Nu'usolia O, Tuitele J, McGarvey ST. Nurse-community health worker team improves diabetes care in American Samoa: results of a

randomized controlled trial. Diabetes care. 2013 Jul;36(7):1947-53. Epub 2013 Feb 7.

Relevance: Post-Intervention Outcomes

- Hamid S, Dunsiger S, Seiden A, Nu'usolia O, Tuitele J, DePue JD, McGarvey ST. Impact of a diabetes control and management intervention on health care utilization in American Samoa. Chronic illness. 2014 Jun;10(2):122-34. Epub 2013 Oct 1.

Relevance: Evaluations and Assessments

Adaptation of Another Research-based Intervention:

Yes

Name of Original Intervention:

Project Sugar (PS)

Name of Original Intervention Author:

Tiffany L. Gary tgary@pitt.edu

URL to original Intervention:

<https://wiki.duke.edu/download/attachments/14125183/Project%20Sugar.pdf>

Citations:

- Gary TL, Batts-Turner M, Bone LR, Yeh HC, Wang NY, Hill-Briggs F, Levine DM, Powe NR, Hill MN, Saudek C, McGuire M, Brancati FL. A randomized controlled trial of the effects of nurse case manager and community health worker team interventions in urban African-Americans with type 2 diabetes. Controlled clinical trials. 2004 Feb;25(1):53-66.

Intervention Primary Outcomes were comparable to the original:

Yes

Contact Information

Primary Contact Name:

Stephen T McGarvey

Primary Contact Affiliation:

Department of Epidemiology and International Health Institute, Brown University School of Public Health Preventive Medicine, the Miriam Hospital, Providence, Rhode Island, USA & Alpert Medical School at Brown University, Providence, Rhode Island, USA

Intervention URL:

Not available

Primary Contact Email:

stephen_mcgarvey@brown.edu

Primary Contact Phone Number:

Results

Intention

Improve minority health or the health of other populations with health disparities (e.g. rural populations, populations with low SES)

Intervention Primary Outcome:

HbA1c level

Intervention Secondary Outcome:

Health care utilization

Key Findings:

HbA1c was 0.53% lower among CHW participants at the end of treatment than among the usual care group, controlling for confounders ($b = -0.53$; $SE = 0.21$; $P = 0.03$). Those in the CHW group had twice the odds of making a clinically significant improvement in HbA1c of at least 0.5% compared to those in usual care ($OR = 2.07$; 95% CI, 1.00–4.34).

The adjusted incidence rate ratio (RR) for primary care visits was higher in the CHW group relative to the usual care group ($RR=1.71$; 95% CI, 1.25–2.33). The number of ED visits in the prior year modified the intervention effect on ED visits during the intervention ($p=0.18$). There were fewer ED visits among the CHW subgroup who had more ED visits in the prior year. Each additional ED visit in the prior year was associated with a 20% (95% CI: 12%, 26%) reduction in the relative risk of ED visits during the intervention year. Increased primary care physician utilization was associated with greater decreases in HbA1c ($b= -0.10$, $SE=0.04$, $p=0.01$).

Statistical Method Used:

Mixed effects longitudinal regression models, intent to treat analyses, and longitudinal regression model with generalized estimating equations accounting for clustering.

Was statistical method used to analyze data from original Intervention comparable to the original:

Yes

Evaluations and Assessments

Were Any of the Following Assessments Conducted (Economic Evaluation, Needs Assessment, Process Evaluation)?:

Yes

- **Economic Evaluation:** We assessed cost-effectiveness of the CHW intervention against usual care by collecting clinical, utilization and cost data over two years, and modelling quality-adjusted life years (QALYs) gained based on HbA1c improvements in the CHW group. The CHW group mean increase was \$594, but 0.05 QALYs. The incremental cost-effectiveness ratio (ICER) for CHW group compared to

usual care control was \$1,121 per percentage point HbA1c reduced and \$13,191 per QALY gained; intervention was cost-effective.

- **Process Evaluation:** While developing intervention materials and training of the CHWs, we held frequent informal discussions about approach and intervention language, goals and illustrations. We tested CHWs diabetes knowledge, measurements and techniques and trained project staff. Progress notes were approved by the Nurse for entry into participants' chart. A focus group with CHWs and a nurse was done at end of intervention along with discussions with hospital and health center staff on what did or did not work.

Demographic and Implementation Description

Diseases, Disorders, or Conditions:

Type 2 Diabetes

Race/Ethnicity:

Native Hawaiian or other Pacific Islander

Populations with Health Disparities:

People with Lower Socioeconomic Status (SES), Racial and Ethnic Minority Populations, Underserved Rural Communities

Age:

Adults

Socio-demographics / Population Characteristics

Community Type:

Rural, Villages on the main island of Tutuila, American Samoa

Other Populations with Health Disparities:

People with Low Education

Geographic Location:

American Samoa

Socio-Economic Status:

Low SES

Minority Health and Health Disparities Research Framework

		Levels of Influence			
		Individual	Interpersonal	Community	Societal
Determinant Types	Biological				
	Behavioral	✓	✓		
	Physical / Built Environment				
	Sociocultural Environment				
	Health Care System	✓	✓	✓	

Community Involvement

The community's role in different areas of the Intervention (Choices are "No Role", "Participation", and "Leadership"):

Design:

Participation

Dissemination:

Participation

Evaluation:

Participation

Implementation:

Participation

Outreach:

Participation

Planning :

Participation

Recruitment:

Participation

Sustainability:

Participation

Characteristics and Implementation

Intervention Focus Area:

Behavior Change, Patient-Clinician Communication

Disease Continuum:

Tertiary Prevention

Delivery Setting:

Clinic / Health Care Facility, Home

Mode of Delivery:

In-person

Who delivered the Intervention?:

Community Health Worker/Promoters, Healthcare Professional (Physician, Nurse, Technician)

Conceptual Framework

Intervention Theory:

Precede-Proceed model

Intervention Framework:

PRECEDE-PROCEED

Implementation

Intervention Study Design:

Cluster Randomized Controlled Trial

Targeted Intervention Sample Size:

268

Actual Intervention Sample Size:

268

Start Year:

2009

End Year:

2011

Intervention Exposures

Duration of Intervention/How Long it Lasted:

10-12 months

Frequency of Intervention Delivery:

Frequency depended on risk profile of participants, ranging from every week to every three months (answer also applies to #13; number of sessions varies)

Number of Sessions/Meetings/Visits/Interactions:

More than 10 Sessions

Average Length of Each Session/Meeting/Visit/Interaction:

1-2 Hours

Format of Delivery:

Dyad/Group of two (e.g. participant & partner; mother & child), Group (e.g. Community leaders), Individual

Highest Reading Level of Intervention Materials Provided to Participants:

Grade 4-5

Adaptations and Modifications

Were modifications made?

Intervention Elements	Modified
Content	Yes
Context	Yes
Implementation	Yes
Funding	Yes
Organization	No
Participants	No
Providers	No
Sociopolitical	No
Stages of Occurrence	Yes

Modification Details

	Explanation
Content	
Adding Elements	<p>To facilitate CHWs' teaching, the project team developed flip charts, modeled on the National Diabetes Education Program flipcharts for diabetes prevention and adapted for the 8 topics listed previously. The CHW flipchart pages included background information, talking points, and a small view of the corresponding participant's page, while the participants' flipcharts included parallel pages with bigger images and minimal text. Although project staff and many Samoans are bilingual, flipcharts included both languages, as many speakers shift from one language to the other.</p> <p>Cultural features identified during the formative research were incorporated, such as motivational quotes from focus groups, healthy local foods and exercise, examples of barriers to medication taking, sources of stress, and effective coping strategies. Group visits also utilized flipchart content, as well as other teaching aids in Samoan language.</p>
Context	
Format, Personnel, Setting	<p>We adapted the Project Sugar intervention to the local Samoan social, cultural and economic context. This required broadening the range of people selected and trained to be CHWs, the reality of how Samoan physicians and nurses cared for people with diabetes, and the level of health literacy about type 2 diabetes among the participants.</p>
Implementation	
Delivery	<p>More frequent visits were planned for those with higher HbA1c levels, due to the range of HbA1c levels we found among those with a diagnosis of type 2 diabetes. This was implemented with a clearly defined algorithm as explained in full detail in our publications.</p>
Funding	
Federal Government	<p>We were able to receive an administrative supplement from NIH/NIDDK that allowed us to take longer to perform the formative work and then adapt the intervention to the Samoan context.</p>
Stages of Occurrence	
Planning/Pre-implementation/Pilot	<p>We performed detailed and lengthy formative work using qualitative methods of focus groups with type 2 diabetes patients and families, in-depth individual interviews with some patients, and with health care providers, a certified Samoan diabetes educator, and nutritionists in American Samoa. This research led us to adapt and expand, and more thoroughly deepen the context of the intervention for the sociocultural and economic context of American Samoa.</p>

Impact, Lessons, Components

Produced an impact or change beyond the primary or secondary outcome:

Yes

The American Samoa Dept of Health was able to hire two of our CHWs and the nurse to positions as outreach workers. They were able to influence others about diabetes care and educate patients in the community.

Essential Aspects for Success:

Individual CHW visits to patients' homes and detailed and flexible goal setting conversations during the intervention

Intervention Impact:

The American Samoa Dept of Health was able to hire two of our CHWs and the nurse to positions as outreach workers. They were able to influence others about diabetes care and educate patients in the community.

Lessons Learned

Key Lessons Learned and/or Things That Could be Changed or Done Differently:

1. Flexibility of scheduling individual visits was necessary especially for the high-risk participants.
2. Health literacy must be assessed more clearly to maximize the intervention.
3. Goal setting between CHWs and patients was crucial.

Insights Gained During Implementation

Insight Category	Insight Description
Cost of Implementing or Sustaining	The local Dept of Health was not able to sustain the intervention due to insufficient buy-in from leadership due to competing budget demands.
Equipment / Technologies	We were unprepared for the difficulty that participants had in purchasing portable glucometers and test strips.
Training / Technical Assistance	In the formative stage, we met with local diabetes care providers and offered updated training about the levels of blood glucose they should try to achieve with their patients. There is a need for regular continuing medical education for local diabetes care providers.
Staffing	We found that motivated individuals can be CHWs regardless of prior formal education and health training.

Intervention Components

Intervention Has Multiple Components:

Yes

Assessed Each Unique Contribution:

No

Products, Materials, and Funding

Expertise, Partnerships, and Funding Sources

	Used for Implementation	Needed for Sustainability
Expertise		
Clinical Care	Yes	Unknown
Patient Navigation	Yes	Unknown
Health Education / Health Literacy	Yes	Unknown
Community mobilization, community organization/coalition building	Yes	Unknown
Key informants, Tribal leaders, Community gatekeepers	Yes	Unknown
Research/Data science	Yes	Unknown
Behavior Change Theory & Practice	Yes	Unknown
Qualitative Formative Research	Yes	Unknown
Epidemiology and Anthropology among Samoans	Yes	Unknown
Chronic Care Model & Patient-doctor communications	Yes	Unknown
Partnerships		
Health care facilities (local clinics)	Yes	Unknown
Government agencies (city/state/county health department, law enforcement/criminal justice agencies)	Yes	Unknown
Community groups (e.g. faith-based organizations, barbershops, beauty-salons, laundromats, food markets, community centers, cultural associations, tribal groups)	Yes	Unknown
Political leaders	Yes	Unknown
Universities	Yes	Unknown
Funding Sources		

	Used for Implementation	Needed for Sustainability
Public funding (e.g., federal, state or local government)	Yes	Unknown
Private funding (e.g., foundations, corporations, institutions, facilities)	Yes	Unknown

Product/Material/Tools

	Tailored For Language	Language(s) if other than English	Material
Brochures/Factsheets/Pamphlets	Yes	Samoan	Attachment available for request at the bottom of the page.
Brochures/Factsheets/Pamphlets	Yes	Samoan	Attachment available for request at the bottom of the page.
Measurement Tools			
Non-Standardized Instruments/Surveys/Questionnaires	Yes	Samoan	Attachment available for request at the bottom of the page.
Non-Standardized Instruments/Surveys/Questionnaires	Yes	Samoan	Attachment available for request at the bottom of the page.

Implementation Materials and Products

	Material
Implementation/Delivery Materials	
CHW Manual topics 2 Healthy eating	Attachment available for request at the bottom of the page.
CHW Manual topic 3 being active	Attachment available for request at the bottom of the page.
CHW Manual topic 4 Monitoring	Attachment available for request at the bottom of the page.
CHW Manual topic 5 Taking medication	Attachment available for request at the bottom of the page.
CHW Manual topic 6 Reducing risks	Attachment available for request at the bottom of the page.
CHW Manual topic 7 Healthy coping	Attachment available for request at the bottom of the page.
CHW Manual topic 8 Problem solving	Attachment available for request at the bottom of the page.
Training/Operations manual	Attachment available for request at the bottom of the page.
Implementation/Output Materials	
No Implementation/Output Materials provided.	

Articles Related to Submitted Intervention

	Article
Reports/Monographs	
Final Project Report to NIH for grant award period	Attachment available for request at the bottom of the page.
Additional Articles	
social context	Attachment available for request at the bottom of the page.
Evaluation	https://diabetesjournals.org/care/article/36/7/1947/32971/Nurse-Community-Health-Worker-Team-Improves
Methodology	Attachment available for request at the bottom of the page.
Cost-related	Attachment available for request at the bottom of the page.
Qualitative findings	Attachment available for request at the bottom of the page.
Qualitative findings	Attachment available for request at the bottom of the page.
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Qualitative findings	Attachment available for request at the bottom of the page.
Evaluation	Attachment available for request at the bottom of the page.
Evaluation	Attachment available for request at the bottom of the page.

Materials Available for Request

- Script for Radio Spot April 29 08.doc
- Recruitment Script for Calling Subjects April 30 2008.doc
- Brown & AS IRB apprvd Consent Main study transl 6-25-08.doc
- NDEP-67 Four steps to control your diabetes for life in Samoan language.pdf
- flip chart #1 intro pt pages.ppt
- flip chart #2 healthy eating pt pages.ppt
- flip chart #3 Being Active pt pages.ppt
- flip chart #4 monitoring pt pages.ppt
- flip chart #5 taking medication pt pages.ppt
- flip chart #6 reducing risk pt pages.ppt
- flip chart #7 healthy coping pt pages.ppt
- flip chart #8 problem solving- patient.ppt
- Baseline Interview 4-1-09 Final version.docx

- 12-Mo Follow-up Interview final.doc
- DCAS Flip Chart CHW Topic 2 Healthy eating.ppt
- DCAS Flip Chart CHW Topic 3 Being active.ppt
- DCAS Flip Chart CHW Topic 4 Monitoring.ppt
- DCAS Flip Chart CHW Topic 5 Taking medication.ppt
- DCAS Flip Chart CHW Topic 6 Reducing risks.ppt
- DCAS Flip Chart CHW Topic 7 Healthy coping.ppt
- DCAS Flip Chart CHW Topic 8 Problem solving.ppt
- DCAS Flip Chart CHW Topic 1 Intro.ppt
- Final Progress Report Sept 2013 DCAS 9-20-13.doc
- AJPH DePue et al DCAS Nov 2010 print.PDF
- The Diabetes Educator-DCAS Implementation DePue et al print pub 12-20-13.pdf
- CEA Samoan T2DM CHW intrvntn publshd 3-5-19.pdf
- Stewart et al Medication taking beliefs print pub Mar 2013.pdf
- Held et al depression & diabetes pub Nov 2010.pdf
- Elstad et al 2008 living w ma'i suka Prev Chron Dis.pdf
- Rosen Anthro Perspectives on Diabetes & Obesity from CHW intervention May 2013.pdf
- DCAS Utilization print pub Chronic Illness 5-13-14.pdf
- DCAS long-term diabetes control e pub Preventing Chronic Disease 10-26-15.pdf

Request Materials

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