Impact of a Short-term Community Health Worker Intervention Program on Diabetes Control in American Samoa

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Background

Diabetes Care in American Samoa (DCAS) was a randomized controlled trial of a 12-month community health worker (CHW)-facilitated intervention which demonstrated improved HbA1c levels compared to usual care. These results add to growing evidence supporting the role of community health workers in diabetes care. However, most CHW programs are time-limited, and few pursue long-term follow-up of participants. Little is known about whether short-term CHW programs achieve sustained improvements in diabetes control over time. We hypothesized that HbA1c would increase over time in the experimental group of DCAS after CHW intervention completion. In the waitlist usual care group, which received the intervention at the end of DCAS, we expected HbA1c to decrease during the intervention and increase after completion.

Methods

We retrospectively collected HbA1c measurements from medical records of DCAS participants (n=268). We used mixed-effects regression models to assess change in HbA1c over time in each trial arm for 3 time periods: DCAS (intervention in experimental group), 1 year after DCAS (intervention in waitlist group), and 1 to 2 years after DCAS. Models were adjusted for baseline characteristics measured during DCAS.

Results

In the experimental group, HbA1c did not significantly change over time during DCAS (intervention period), but decreased by 0.88/year (95% CI -1.31, -0.45) during the 1 year after intervention completion (Table). No significant change was observed the following year. In the waitlist group, HbA1c did not significantly change during DCAS (usual care) but decreased by 1.31/year (-1.72, -0.91) during the intervention. During the 1 year after intervention completion, HbA1c increased by 1.18/year (0.42, 1.93).

Conclusion

Both trial arms experienced initial improvements in glycemic control, but HbA1c later plateaued or increased. These results suggest that time-limited CHW programs may have short-term effects on diabetes control, but standing programs may be needed for sustained impact.

References: DePue JD, Dunsiger S, Seiden AD, Blume J, Rosen RK, Goldstein MG, et al. Nurse-community health worker team improves diabetes care in American Samoa: results of a randomized controlled trial. Diabetes Care 2013; 36(7): 1947–1953.

Table 1. Regression coefficients from mixed-effects regression models for HbA1c over time.

Variable	Model, experimental group			Model, waitlist group		
	DCAS study period (intervention)[a]	First year after intervention completion[b]	Second year after intervention completion	DCAS study period (usual care)[a]	Intervention period[b]	First year after intervention completion
n participants in model (n HbA1c measurements)	96 (271)	90 (162)	52 (91)	159 (414)	143 (286)	71 (113)
Intercept, β (95% CI)	3.67 (0.09, 7.23)	4.95 (2.02, 7.88)	12.47 (4.03, 20.91)	2.11 (0.24, 3.98)	0.11 (-1.89, 2.10)	8.47 (4.76, 12.18)
Time (years), β (95% CI)	-0.28 (-0.64, 0.07)	-0.88 (-1.31, -0.45)	0.18 (-0.77, 1.13)	0.01 (-0.24, 0.26)	-1.31 (-1.72, -0.91)	1.18 (0.42, 1.93)
Age, β (95% CI)[c]	-0.02 (-0.04, -0.01)	-0.01 (-0.02, 0.01)	-0.07 (-0.10, -0.04)	-0.01 (-0.02, 0.004)	-0.004 (-0.02, 0.01)	-0.02 (-0.05, 0.004)
Church attendance in opposite village, β (95% CI)[c]	0.12 (-0.37, 0.61)	-0.23 (-0.58, 0.12)	-0.62 (-1.64, 0.40)	0.10 (-0.17, 0.37)	0.07 (-0.24, 0.38)	0.53 (-0.04, 1.09)
Baseline HbA1c, β (95% CI)[d]	0.64 (0.48, 0.80)	0.72 (0.61, 0.82)	0.66 (0.38, 0.94)	0.77 (0.67, 0.87)	0.80 (0.71, 0.90)	0.38 (0.22, 0.55)
Low risk, β (95% CI)[c]	-0.04 (-1.01, 0.92)	-0.27 (-0.87, 0.32)	-0.27 (-1.66, 1.11)	-0.17 (-0.85, 0.51)	-0.05 (-0.63, 0.52)	-0.99 (-2.11, 0.13)
Moderate risk, β (95% CI)[c]	0.13 (-0.48, 0.74)	-0.16 (-0.49, 0.18)	0.05 (-0.83, 0.94)	-0.06 (-0.53, 0.40)	-0.01 (-0.44, 0.42)	-0.94 (-1.70, -0.18)
Primary care visits, β (95% CI)[e]	-0.02 (-0.08, 0.03)	-0.01 (-0.04, 0.01)	-0.01 (-0.07, 0.05)	-0.01 (-0.05, 0.03)	0.01 (-0.04, 0.05)	-0.10 (-0.19, -0.02)
BMI, β (95% CI)[d]	-0.001 (-0.04, 0.04)	0.003 (-0.03, 0.03)	-0.08 (-0.17, 0.01)	-0.02 (-0.04, 0.001)	0.001 (-0.02, 0.03)	0.07 (0.03, 0.11)
Diastolic blood pressure, β (95% CI)[d]	0.01 (-0.01, 0.04)	-0.003 (-0.02, 0.01)	-0.02 (-0.06, 0.02)	0.01 (-0.01, 0.02)	-0.004 (-0.02, 0.01)	-0.03 (-0.06, 0.0004)
Waist circumference, β (95% CI)[d]	-0.004 (-0.02, 0.01)	-0.01 (-0.03, 0.01)	-0.01 (-0.06, 0.05	0.01 (-0.01, 0.02)	0.01 (-0.01, 0.02)	-0.02 (-0.04, 0.01)
Any comorbid condition, β (95% CI)[c]	0.41 (-0.13, 0.95)	-0.17 (-0.57, 0.22)	-0.25 (-1.51, 1.00)	0.21 (-0.28, 0.70)	0.46 (-0.05, 0.96)	0.58 (-0.21, 1.36)

HbA1c: a measure reflecting average blood glucose; DCAS: Diabetes Care in American Samoa; β: regression coefficient; CI: confidence interval.
[a] Includes baseline and 12 month follow-up DCAS study HbA1c measurements.
[b] Includes 12 month follow-up DCAS study HbA1c measurements.
[c] Measured at DCAS enrollment.
[d] DCAS enrollment measurement included in DCAS study period models. DCAS 12-month follow-up measurement included in subsequent models.
[e] Number of primary care visits during one year prior to DCAS enrollment used in DCAS study period model. Number of primary care visits during DCAS study period used in subsequent models

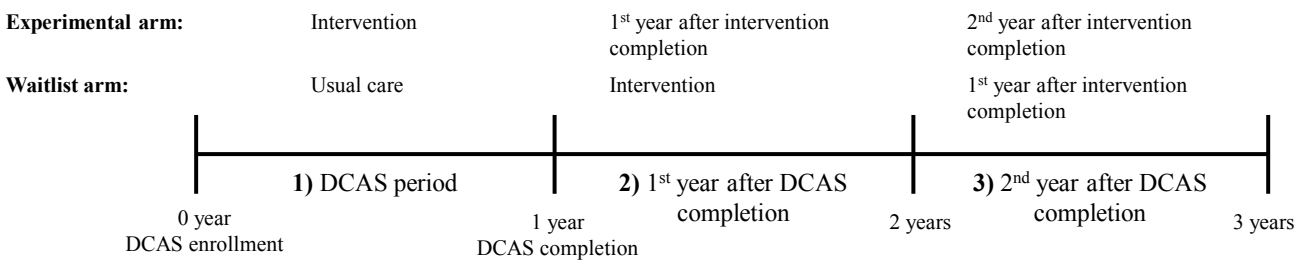

Figure 1. Timeline of study analysis. Change in HbA1c over time was evaluated by trial arm for three consecutive one-year time periods: 1) DCAS period, 2) 1st year after DCAS completion, and 3) 2nd year after DCAS completion.

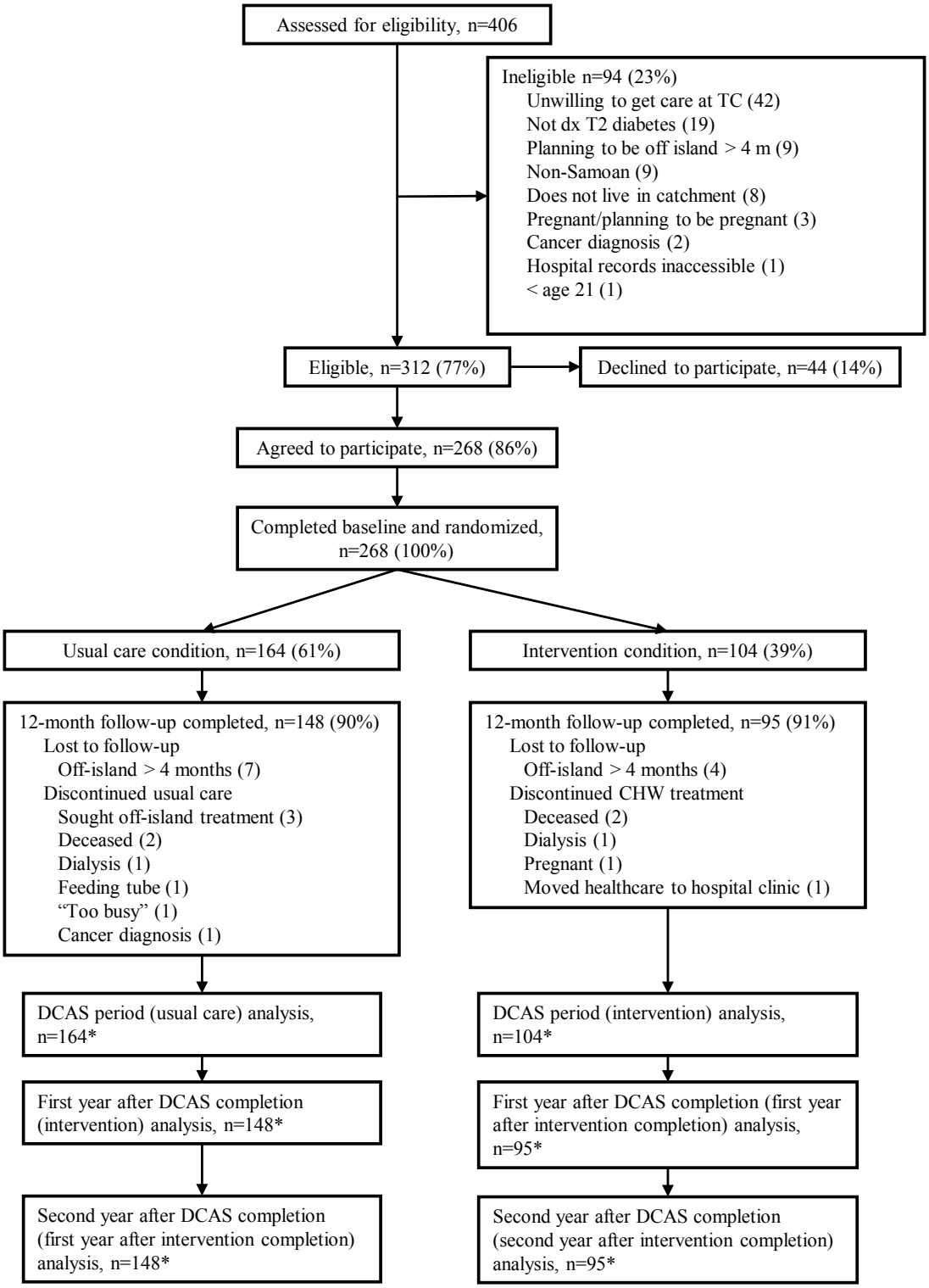

Figure 2. CONSORT diagram of recruitment

* Intent-to-treat analysis; participants who did not complete 12-month follow-up were included in analysis until date of ineligibility.