

# The Effects of a Diabetes Self-Management Education Program Among American Indian Adults with Type 2 Diabetes Identified in the Emergency Department

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## Introduction

Despite increased disease awareness and developments in disease management, diabetes continues to reach epidemic proportions among American Indians/Alaska Natives (AI/AN). Initiating culturally adapted diabetes self-management education (DSME) prior to emergency department (ED) discharge presents a unique opportunity to improve glycemic control and further reduce the risk of diabetes-related complications among AI/AN adults with uncontrolled type 2 diabetes mellitus (T2DM).

## Objectives

Determine the effects of a culturally sensitive evidence-based DSME program, initiated in the ED, on improving the severity of disease in AI/AN adults with uncontrolled T2DM.

**Aim 1:** Decrease serum glycated hemoglobin (A1C) measurements measured at baseline and a 90-day period.

**Aim 2:** Improve diabetes self-care activities associated with glycemic control using the Diabetes Self-Management Questionnaire (DSMQ) measured at baseline and a 90-day period.

**Aim 3:** Decrease body mass index (BMI) measured at baseline and a 90-day period.

## Methods

### Study Design

One-group pretest–posttest design.

### Setting

Critical access hospital in the rural Southwest United States on an AI/AN reservation that involved the ED and outpatient diabetes clinic.

### Sample

Convenience sampling recruited 26 participants in the ED over a two-week period. Out of the 26 recruited participants, 10 (38.4%) completed the DSME program. Data from the final intervention sample (n=10) was used for analyses. Baseline characteristics of the final study sample are depicted in Table 1.

Characteristic	Total (N=10) % (n)
<b>Sociodemographic</b>	
Sex, % (n)	
Female	50 (5)
Male	50 (5)
Mean age ± SD (years), (n)	47.3 ± 14.5 (10)
Mean years ± SD since T2DM <sup>a</sup> diagnosis (n)	9.3 ± 6.0 (10)
Insulin dependency, % (n)	
Dependent	30 (3)
Non-dependent	70 (7)
History of DSME <sup>b</sup> exposure, % (n)	
No	100.0 (10)
<b>Biomedical data at baseline</b>	
Mean A1C ± SD (%), (n)	11.1 ± 1.3 (10)
Mean BMI ± SD (kg/m <sup>2</sup> ), (n)	29.5 ± 3.5 (10)

Note. <sup>a</sup>Type II Diabetes Mellitus. <sup>b</sup>Diabetes Self-Management Education.

### Study Variables

The dependent variables for study analysis were pre-post intervention measurements of:

- Serum A1C
- Self-care behavior scores using the validated DSMQ tool. The DSMQ instrument is a validated assessment tool of self-care behaviors associated with glycemic control. It consists of sixteen 3-point Likert scale questions and has an internal consistency of 0.84 (Cronbach's alpha).
- BMI

### Intervention

The hospital DSME program curriculum was derived from *Balancing Your Life and Diabetes*, a culturally appropriate and evidence-based curriculum created by the Indian Health Service Division of Diabetes Treatment and Prevention. The program consisted of five weekly face-to-face group sessions in the the hospital education room covering cultural diet consistent with the dietary guidelines of the American Diabetes Association (ADA), physical activity, preventing complications associated with DM and diabetes self-care.

	Pre-Intervention	Post-Intervention	P-value
A1C, % (n)	11.1% (10)	10.6% (10)	.005
BMI, kg/m <sup>2</sup> (n)	28.5 (10)	28.0 (10)	.066
Total DSMQ scores <sup>a</sup> (n)	3.9 (10)	4.8 (10)	.011

Note. Wilcoxon-Signed Rank Test analyses performed to compare medians pre-and post-intervention. <sup>a</sup>Total DSMQ scores are on a '0-10' scale, with '0' indicating behaviors associated with poor glycemic control and '10' indicating behaviors associated with good disease control.

Education sessions were led by a certified diabetes educator. Subsequent telephone coaching sessions were conducted by a board-certified family nurse practitioner.

### Statistical Analysis

Analyses were performed using IBM SPSS® Statistics software. A dependent/paired t-test was planned to compare means of serum A1C, DSMQ scores and BMI measurements for pre- and post-intervention. However due to a low final sample size (n=10), analyses were conducted using the Wilcoxon-Signed Ranks Test to compare sample medians.

## Results

Comparative median analyses are shown in Table 2 for all three study variables. Although the difference in BMI measurements were not statistically significant (p=.066), significant improvement was demonstrated between pre-post A1C measurements (p=.005) and total DSMQ scores (p=.011).

Statistical significance was also detected in behaviors related to dietary control (p=.019), healthcare use (p=.018) and glucose management (p=.050). No significant change was detected in the subscale of physical activity (3.3, 3.3, p=1.0). These trends can be visualized in Figure 1.

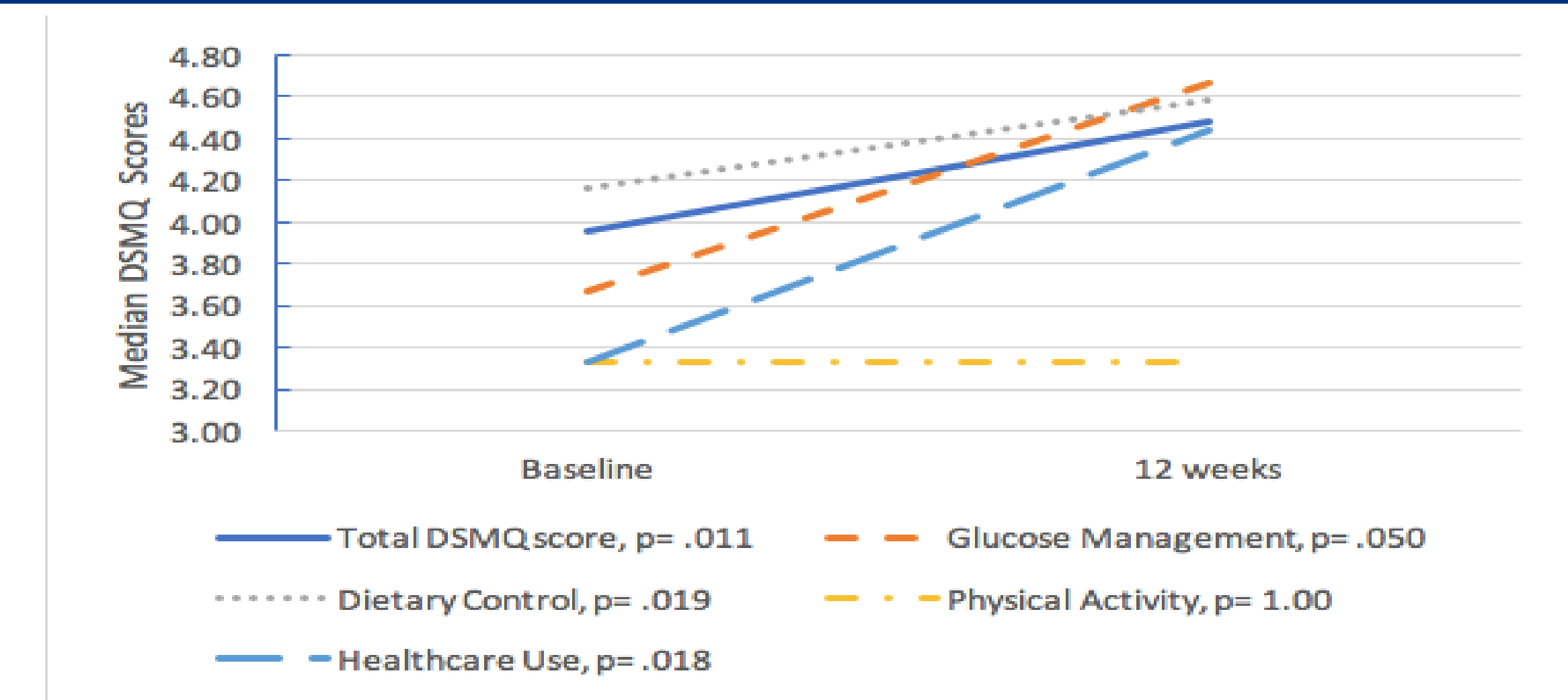


Figure 1. Diabetes Self-Management Questionnaire Scores over a Twelve-week Period.

## Summary

- Serum A1C measurements among AI/AN adults with uncontrolled T2DM improved after completing a culturally-adapted DSME program.
- Findings showed significant improvement of overall disease self-efficacy and the specific self-care behavior categories of dietary control, healthcare utilization and glucose management.
- BMI measurements approached significance post-DSME exposure.
- Findings are consistent with studies that have shown disease knowledge and self-care behaviors are closely related, and often result in improved glycemic control.
- This study also provides evidence that T2DM can be addressed prior to ED discharge among AI/AN adults with uncontrolled T2DM. By assessing disease knowledge base in the ED, the clinician can better understand gaps in knowledge and skills that could result in dangerous metabolic processes or progress into end-organ damage.
- This study went beyond the acute glucose control that normally occurs in the ED by using assessment and interdisciplinary collaboration to address the complicated metabolic chronicity of T2DM prior to ED discharge.

## Conclusions

To treat the growing epidemic of diabetes among AI/AN communities, culturally-adapted DSME is an important component of improving glycemic control and preventing the complications associated with chronic hyperglycemia. This pilot study found that beyond immediate control of hyperglycemia in the ED, discussion of chronic disease management, establishing follow-up with a diabetes education clinician and enrollment into a DSME program prior to discharge significantly improved self-care behaviors associated with glycemic control and serum A1C measurements.



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