

# Conversation Maps and Diabetes Education Groups: An Evaluation at an Australian Rural Health Service

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## ■ ABSTRACT

**Objective.** The rural Central Gippsland Health Service (CGHS) assists patients with diabetes through the provision of diabetes education. The purpose of this study was to compare and evaluate the CGHS 5-week didactic program and a modified group-participatory Conversation Maps diabetes education program.

**Method.** A pre- and post-program survey was conducted of clients who attended the two different diabetes education programs. The survey consisted of a self-constructed demographic questionnaire, the Diabetes Knowledge Test, the Diabetes Empowerment Scale, and the Diabetes Self-Care Activities Measure.

**Results.** For the CGHS program, there were no differences between pre- and post-program surveys in knowledge scores ( $11.05 \pm 3.56$  vs.  $12.75 \pm 4.19$ ,  $P = 0.0883$ ,  $n = 20$ ), self-care activities ( $4.46 \pm 1.11$  vs.  $4.83 \pm 0.68$ ,  $P = 0.0832$ ,  $n = 12$ ), or empowerment scores ( $7.16 \pm 1.60$  vs.  $7.92 \pm 1.26$ ,  $P = 0.0540$ ,  $n = 17$ ).

For the modified Conversation Maps program, there were significant improvements between pre- and post-program surveys in knowledge scores ( $12.42 \pm 4.15$  vs.  $15.54 \pm 3.79$ ,  $P = 0.0004$ ,  $n = 26$ ), self-care activities ( $4.74 \pm 1.09$  vs.  $5.32 \pm 0.80$ ,  $P = 0.0139$ ,  $n = 24$ ), and empowerment scores ( $6.56 \pm 2.19$  vs.  $8.11 \pm 1.46$ ,  $P = 0.0016$ ,  $n = 21$ ).

The greatest difference between the two programs was observed in knowledge gain ( $P = 0.0178$ ). Overall, participants were satisfied with both programs, with no difference seen in satisfaction levels ( $P = 0.9763$ ). A1C results improved in both programs to a mean of 6.7% ( $P = 0.0071$  for CGHS and  $P = 0.0092$  for Conversation Maps).

**Conclusion.** The modified Conversation Maps program resulted in significant improvements for rural participants.

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DOI: 10.2337/diaspect.29.1.32

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Diabetes is one of the most common noncommunicable diseases globally. It is the fourth-leading cause of death (1) and is an epidemic in many economically developing countries. The International Diabetes Federation estimates that 366 million people had diabetes in 2011 and that, by 2030, the number of people with diabetes will rise to 552 million (1). Magliano et al. (2) estimated that type 2 diabetes

will affect 2–3 million Australians by 2025. The recorded number of people with diabetes in rural Gippsland, Australia, has increased dramatically, with the shire of Wellington having one of the highest diabetes incidence rates in Victoria (6.5%), compared to the national average of 5.6% (3). Research also demonstrates that people who live in rural and regional areas have poorer health outcomes, lower levels of education, lower incomes,

and more chronic disease risk factors than those residing in major cities (4). Phillips (5) also found that type 2 diabetes contributes to the higher death rate in Australian regional areas compared to major cities.

Health services struggle to cope with the demand to manage this chronic disease, particularly in regional and remote Australia. Located in Victoria's Wellington Shire, the Central Gippsland Health Service (CGHS) assists patients with diabetes in managing their blood glucose levels through the provision of diabetes education. Evidence indicates that, if patients can keep their blood glucose levels low, the incidence of complications can be reduced, resulting in reduced hospital interventions and reduced health care system costs. For example, the U.K. Prospective Diabetes Study (6,7) found that the occurrence or degree of retinopathy, nephropathy, and possibly neuropathy were reduced by lowering blood glucose levels through intensive therapy in patients with type 2 diabetes. Also, a Cochrane review (8) found that people with type 2 diabetes who participated in group-based programs showed an improvement in diabetes control and knowledge and had a reduced need for medication, reduced systolic blood pressure, and reduced weight.

To date, there has been no formal objective evaluation of the existing CGHS diabetes education program to assess its efficacy or suitability for the target clientele. In an effort to update the program, the CGHS has considered shifting the program's emphasis from the current traditional didactic delivery to a more group-participatory, self-management approach. The notion to shift the emphasis to a group-based program is supported in the research literature. Kulzer et al. (9) discussed three different approaches to type 2 diabetes education tested in a randomized trial. The efficacy of a didactic-oriented program, a self-management-oriented program, and an individualized approach were

compared. They found that group sessions were more effective than an individual approach to education and also that self-management training had higher medium-term efficacy than didactic education.

### **The CGHS Diabetes Education Program**

The existing CGHS diabetes education program runs for groups of 3–10 participants for 5 weeks and is based on the following core elements:

- Didactic presentation of content through the use of lectures, DVDs, and discussion groups. Content is delivered by health professionals, including diabetes educators, dietitians, pharmacists, exercise therapists, and social workers.
- A supermarket tour through which clients are taken to local supermarkets and are shown how to read food labels on a range of common food products.
- "Bodylinks," a colorful wooden human body with moveable pieces to help educate participants about the impact of diabetes. Clients use their visual and tactile senses, as well as auditory senses, to encourage interaction and facilitate learning.

The program is delivered by trained CGHS staff to newly diagnosed clients with type 2 diabetes, clients who wish to refresh their knowledge, and those starting insulin therapy. The program is comprehensive and may be best suited for this rural community.

### **The Modified Conversation Maps Diabetes Education Program**

The Conversation Maps tool was adapted in 2007 in the United States, through collaboration with the American Diabetes Association, for use in group-based diabetes education. The Conversation Maps tool combines several education theories (10) and has been shown to be an effective diabetes self-management education tool internationally (11–15).

A typical Conversation Maps program runs for 5 weeks. The course is conducted in the following manner. Four to six large colorful maps are the central focus of the program. Each week, participants are seated around a map. They navigate their way around sign posts and pictures on the maps. The participants are invited to volunteer to read out cards to highlight issues about diabetes at the different sign posts. The maps are designed to engage a group of 3–10 people to discuss diabetes. A group conversation focused on diabetes management is guided by a trained facilitator. Participants are encouraged to fully engage in the discussions and may contribute up to 80% of the content of the program. Participants learn from their engagement and become empowered to make decisions by setting their own goals and completing their own action plans.

At CGHS, the supermarket tour and "Bodylinks" components of the CGHS diabetes education program were added to the standard Conversation Maps program format.

### **Purpose**

Based on existing evidence in support of Conversation Maps interventions, the purpose of this study was to assess the performance of the existing CGHS diabetes education program compared to the performance of a modified Conversation Maps group-participatory program. Both programs assessed participants' knowledge of diabetes, degree of self-care, and degree of empowerment in managing their disease before and after the program. Participants' level of satisfaction with their program was assessed, and changes in their A1C levels were obtained.

### **Hypothesis**

Participants in the CGHS 5-week diabetes program will have greater improvements in diabetes knowledge, self-care, empowerment, and A1C than those in the modified Conversation Maps diabetes program.

## Research Design and Methods

### Study Design, Sample, and Procedures

This was a quasi-experimental study comparing two diabetes education approaches. Participants self-selected which program they would participate in because randomization was not possible due to ethical considerations. The main concern was denying participants the standard care and possibly increasing the length of time they had to wait to access a diabetes education program. To alleviate these concerns, participants self-selected, normally to the next available education program.

All participants who attended either program were invited to complete a pre-program survey at the beginning of the first session and a post-program survey at the end of the last session; however, only data from participants who completed the full program were included in the analysis. Program facilitators were not present when participants completed the surveys. The surveys were voluntary, and clients could take part in the education programs without being part of the research study. The surveys were anonymous; to maintain participants' anonymity, a unique identification code was used to match their pre- and post-program survey data. The unique identification code was developed by each participant.

Approval to conduct this research was obtained from the Monash University Human Research Ethics Committee.

### Evaluation Instruments

The pre- and post-program survey consisted of a self-constructed demographic questionnaire and three validated instruments: the Diabetes Knowledge Test (16), the Diabetes Empowerment Assessment Scale (17), and the Diabetes Self-Care Activities Measure (18). In addition, participants' level of satisfaction with the program was assessed.

Participants A1C was measured before the program began and again

at 3- and 6-month intervals after program completion. The data collected from the surveys and A1C results were then analyzed.

The self-constructed demographic questionnaire requested information such as age, sex, diagnoses of type 2 diabetes, cultural background, languages spoken, highest level of education, marital status, and previous diabetes education undertaken.

The Diabetes Knowledge Test (16) is a 23-item multiple-choice questionnaire developed by the University of Michigan Diabetes Research and Training Center in Ann Arbor. It measures knowledge of diet and low-fat and carbohydrate choices, as well as hypoglycemia, hyperglycemia, blood glucose monitoring, foot care, and use of insulin. Minor changes to a small number of the names of products were made to reflect the Australian audience.

The Diabetes Empowerment Assessment Scale (17) uses an 11-point Likert scale. Participants could select from 28 statements relating to goal-setting, motivation, ability to care for their diabetes, and the effects of stress on diabetes management. This scale also assesses the level of support respondents have and need to manage their diabetes.

The Diabetes Self-Care Activities Measure (18) uses an 8-point Likert scale and includes 11 questions about how often in the past week respondents have engaged in activities such as smoking, exercise, healthy eating, medication-taking, blood glucose monitoring, and foot care procedures.

The satisfaction survey was mainly procedural and included 11 questions related to participants' satisfaction with the venue, cost, speakers, type and level of information provided, length and timing of sessions, and activities provided. The satisfaction survey was completed at the end of the program.

A1C was measured with a venous sample collected by trained staff from two local pathology companies who both used the Roche Cobas Integra

800 (Roche Diagnostics, Mannheim, Germany) immunoturbidimetric method, standardized against the International Federation of Clinical Chemistry (IFCC) reference/method traceable to the Diabetes Control and Complications Trial and then National Glycohemoglobin Standardization Program.

### Statistical Analysis

Data derived from the surveys were analyzed using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, N.Y.). For the Diabetes Self-Care Activities measure and the empowerment scale, average scores were determined for each participant and analyzed. Data from paired pre- and post-program surveys was analyzed using a paired *t* test. Post-program data from the two programs were compared using an independent *t* test. A1C data were analyzed using a repeated-measures analysis of variance followed by a Bonferroni post hoc test. Statistical significance was accepted at *P* < 0.05. Data are presented as mean ± SD.

### Results

A total of 67 people with diabetes >18 of age years completed one of the programs and consented to taking part in the research. These participants (31 men and 36 women) were given questionnaires to complete, and their A1C results were obtained from the health service. From this group, 61 completed part or all of the pre-program survey (30 for the CGHS program and 31 for the Conversation Maps program). However, only 46 matched participants completed part or all of the post-program survey (20 from the CGHS program and 26 from the Conversation Maps program).

Although participants self-selected their program, there were no significant differences between the pre-program surveys or pre-program A1C values for participants of the two programs. Pre-program surveys were also tested for reliability with this participant group. All three validated surveys showed good reliability in this cohort, with Kuder-Richardson formula 20

analysis for the Diabetes Knowledge Test producing a coefficient of 0.7899. Similarly, Cronbach's  $\alpha$  analysis of the Diabetes Self-Care Activities tool (negative questions were reversed) and the Diabetes Empowerment Scale produced coefficients of 0.777 and 0.947, respectively.

Participants included people who were newly diagnosed with type 2 diabetes, those who had been previously diagnosed but their diabetes was not controlled, and people with impaired glucose tolerance. Some were not on any medication, whereas others required oral hypoglycemic agents or insulin. This sample was a heterogeneous group typical of diabetes education in this setting.

### Results from the CGHS Diabetes Education Program

The CGHS program showed no significant differences between pre- and post-program surveys in knowledge ( $11.05 \pm 3.56$  vs.  $12.75 \pm 4.19$ ,  $P = 0.070$ ,  $n = 20$ ); self-care activities ( $4.46 \pm 1.11$  vs.  $4.58 \pm 0.86$ ,  $P = 0.166$ ,  $n = 12$ ); and empowerment ( $7.16 \pm 1.60$  vs.  $7.92 \pm 1.26$ ,  $P = 0.063$ ,  $n = 17$ ) (Figure 1). There was, however, a statistical decrease in A1C results. The average A1C was 7.85% (62 mmol/mol) pre-program and 7.76% (61 mmol/mol) at 3 months post-program, but decreased to 6.85% (51 mmol/mol) by 6 months post-program (Figure 2).

### Results from the Modified Conversation Maps Program

The analysis of the modified Conversation Maps program indicated statistically significant improvements in all areas. There were significant improvements between pre- and post-program results regarding knowledge ( $12.44 \pm 4.23$  vs.  $15.24 \pm 3.54$ ,  $P < 0.0005$ ,  $n = 26$ ), self-care activities ( $4.73 \pm 1.14$  vs.  $5.27 \pm 0.81$ ,  $P = 0.027$ ,  $n = 24$ ), and empowerment ( $6.80 \pm 2.04$  vs.  $8.05 \pm 1.52$ ,  $P = 0.005$ ,  $n = 21$ ) (Figure 1). There was a statistical decrease in A1C results. Average A1C results decreased from 8.83% (73 mmol/mol) pre-

program to 6.62% (49 mmol/mol) at 6 months post-program (Figure 2).

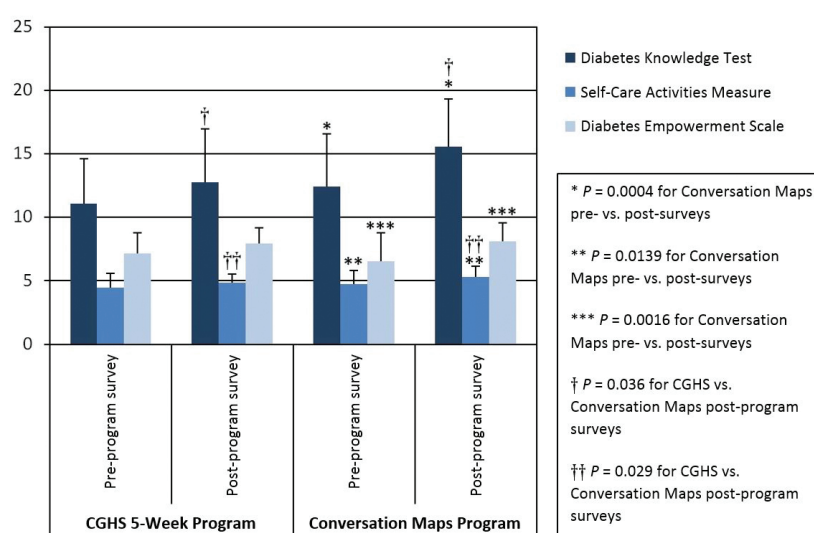
### Comparison of Programs

When comparing the post-program survey results, the participants of the modified Conversation Maps program demonstrated significantly higher scores on the diabetes knowledge ( $P = 0.036$ ) and self-care activity measures ( $P = 0.029$ ) (Figure 1), although there was no difference in A1C results between the two groups (Figure 2). Participants were satisfied with both

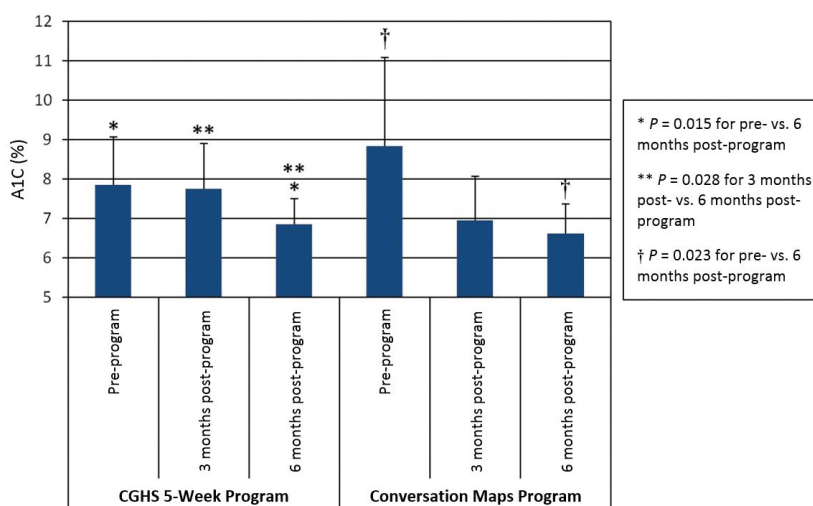
programs, and both yielded significant reductions in A1C levels post-program.

### Discussion

The CGHS 5-week diabetes education program did not show significant improvements in knowledge, self-care activities, or empowerment, whereas the modified Conversation Maps program showed significant improvement in all areas measured. Participants were satisfied with both programs, and participants in both groups showed significant reductions in A1C post-program. Therefore, despite the clients



■ FIGURE 1. Pre- and post-program survey results for the CGHS 5-week and Conversation Maps programs.



■ FIGURE 2. A1C levels compared for participants in the two diabetes education programs.



doing most of the talking during the Conversation Maps program, they learned more in that setting.

The results demonstrate that the content-oriented, didactic lectures had a lesser impact than the group-participatory Conversation Maps approach in assisting participants to gain diabetes knowledge, self-care skills, and empowerment. The benefits found with the Conversation Maps program are in keeping with current literature, with recent international studies finding that Conversation Maps are a useful tool in educating patients with diabetes to self-manage their condition and an effective method of improving clinical and behavioral outcomes in adults with diabetes (11–15).

Importantly, this study has shown that an overseas program (Conversation Maps) could be successfully modified and implemented to be well suited to a rural Australian community. Equally, such group-participatory diabetes education programs can improve knowledge, self-care activities, empowerment, and blood glucose control. Therefore, such diabetes education programs have the potential to lead to ongoing better health outcomes for people with diabetes and should reduce hospital admissions for diabetes and diabetes-related complications.

## Implications and Recommendations

Running the modified Conversations Maps program provided several other service delivery benefits in that this program required fewer staff members and less equipment. At a minimum, only a diabetes educator or dietitian was required to run each session, which made staffing the program easier than staffing the CGHS didactic program. Also, because there were fewer equipment needs, less staff time was required to set up equipment and there were lower equipment maintenance costs. Overall, the modified Conversations Maps program was less expensive and more convenient to run, which is crucial to rural health services

that are resource poor and are facing rural health workforce shortages.

Of the two programs, the modified Conversation Maps program will be adopted as the preferred diabetes education program to be delivered at CGHS. This modified Conversation Maps program should also be considered for use by other centers to improved diabetes education and the health of people with diabetes.

Future research should be conducted in other communities and on other continents to determine the effectiveness of Conversation Maps and the additive value of our modifications (i.e., addition of the “Bodylinks” and supermarket tour components).

## Limitations

Ideally, participants should have been randomly selected for participation in one of the two groups. However, ethical considerations prevented the use of such a study design. Also, this study cannot show whether the Conversation Maps program alone would have had an impact on A1C levels given that participants also took part in a supermarket tour and the “Bodylinks” (the experiential components of the CGHS program).

## Acknowledgments

This work was supported by a grant from the Australian government through the Primary Health Care Research, Evaluation, and Development strategy.

## Duality of Interest

No potential conflicts of interest relevant to this article were reported.

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