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An Innovative Approach for Type 2 Diabetes Education

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Authors Note

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Abstract

Objective: To improve self-efficacy in patients with type 2 diabetes and a Hemoglobin A1c (HbA1c) of 8% (64 mmol/mol) or greater using an innovative education multidisciplinary approach in a group setting.

Research Design and Methods: Out of 248 patients that were contacted with type 2 diabetes, who had a HbA1c of 8% or greater, five patients from a large clinic in the Midwest agreed to participate in group education. The primary outcome of interest was lowering HbA1c levels to increase the number of patients with type 2 diabetes who meet the community standard of care.

Results: Patients who attended a scheduled group education session exhibited a positive response/increased learning to group education although not statistically significant ($p = 0.1239$).

Conclusions: This research using a Johns Hopkins Model for evaluating group education for patients with type 2 diabetes suggested the multidisciplinary approach with group education would lead to greater self-efficacy, better glycemic control, and improved patient outcomes offering lower costs overall to the patient and/or their family. Additional time is needed to evaluate the effects of the group education as well as further research in general.

Keywords: type 2 diabetes, A1c, hemoglobin A1c, Type 2 diabetes & A1c, A1c & hemoglobin A1c, type 2 diabetes, reduction of hemoglobin A1c, diabetes education and HgA1c, self-care and diabetes, diabetes and patient education, diabetes and group education, and patient compliance and diabetes.

Type 2 diabetes is the most common form of diabetes according to the American Diabetes Association (1) and is a result of the body not using insulin properly, therefore resulting in elevated blood glucose levels. According to the Center for Disease Control and Prevention [CDC](2), it was also the seventh leading cause of death for Americans in 2015. Hemoglobin A1c (HbA1c) is a blood test that measures the individual's average blood sugar over a 2-3-month period (3). Controlling the HbA1c levels and other health factors can reduce the individual's risk of serious medical complications affecting the eyes, kidneys, heart, and nervous system (4).

The multitude of health issues that can result from poorly managed diabetes can increase the cost of health care considerably. Managing diabetes results in a substantial cost savings to both healthcare and insurance industries, and the patient (5). The health risk factors that increase as a result of not managing type 2 diabetes can be devastating and disabling to the patient. Failure to manage type 2 diabetes often results in complications, which can lead to a loss of independence and increase burden on the family and the healthcare system.

Individuals with type 2 diabetes are at increased risk of cardiovascular issues, neuropathies, amputation, and blindness if they are not managing their glucose levels (3). Better glycemic control will result in fewer diabetic complications, better patient outcomes, and decreased costs associated with diabetes. Healthcare clinics in Minnesota have guidelines and standards they attempt to meet for improving patient outcomes (5). The primary objective of this project is to assess whether group education increases self-efficacy in patients with type 2 diabetes.

With type 2 diabetes as a national problem and health threat, the cost of caring for clients with the disease is increasing and healthcare facilities need innovative programs to support this population. The Minnesota D5 Community Measures (D5) is a measure of diabetes management

that includes five goals representing the standard of care for patients with type 2 diabetes (5). These five goals include controlling blood pressure at 139/89 or lower, statin use to lower low-density lipoprotein (LDL) to less than 100mg/dl, maintaining HbA1c of <8% (64 mmol/mol), living tobacco free, and daily aspirin use if indicated by the provider (5). Leadership in the clinic studied are supportive of change aimed at improving patient outcomes. The clinic studied had recently merged two health organizations into one. The D5 measures in this merged clinic are 43%, which is below the 52.7% state minimum and well below the top clinic in the state that has reached D5 measures with 68% of patients with type 2 diabetes (6).

Based on Medicare reimbursement, patients are allowed up to three hours of education on their initial diagnosis for the first year and then up to two hours each subsequent year for nutritional support and education regarding type 2 diabetes (7). Most insurance companies also have similar billing practices. With approximately 848 clients with type 2 diabetes cared for at the clinic, there is limited availability for patients to meet with the CDE. Appointment openings with the Certified Diabetes Educator (CDE) are limited to one day per week at this clinic and scheduling all type 2 diabetes patients yearly with the CDE is impossible. The CDE also educates other patients such as those with type 1 diabetes and gestational diabetes, further limiting appointment times for patients with type 2 diabetes. As a result, patients who have type 2 diabetes are not receiving the maximum educational benefits that insurance will cover. Providers at the clinic also identified that patients with type 2 diabetes were not making follow-up appointments as recommended by their provider. When discussing this with providers and the CDE, consensus seemed to be that some of this issue may be from the follow-up not being perceived as necessary by the patient unless they are having an actual problem with their diabetes health.

Preparation for Implementation

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model was used with the goal to ensure that patient care was guided by the latest research findings (8). It focuses on both internal and external factors as well as research to guide the creation of a practice question, to find the highest-quality evidence that answers the question, and then translate that evidence into practice. Through critical appraisal of the evidence, relevance for the issue can be examined and applied.

Based on recent literature, culturally appropriate health education with several interventions via a multidisciplinary approach had positive effects on glycemic control and on how patients manage their diabetes (9-10). The superior intervention noted that compliance with lifestyle modifications lead to the most success. The emphasis was placed on promoting self-management and self-efficacy through education (11-12). Education regarding type 2 diabetes and complications that could occur via the Certified Diabetes Educator (CDE), the on-site Pharmacist, a Community Health Worker (CHW), providers, and other nurses results in statistically significant reductions in HbA1c (13). Improving self-efficacy and self-management through a multidisciplinary approach via group education, was an overlying theme in the research for improving glucose regulation (14-18). After critically appraising the literature it was decided that this project would implement group education using a multidisciplinary approach. The project was reviewed and approved by the local university's institutional review board (IRB) as well as the clinic's medical director.

Project Design and Methods

The sample included male and female patients at a suburban clinic in the upper Midwest, who were ages 18 and older and had a diagnosis of type 2 diabetes and a HbA1c of 8% (64

mmol/mol) or higher. Patients were recruited via email through their charts and via United States Postal Service mail. A total of 248 patients were contacted out of the clinic's 848 patients with type 2 diabetes. Of the 248 patients, some of the patients could not be reached or did not respond (n=228), reported barriers such as time constraints (n=8), or indicated that they were not interested (n=4). Patients were contacted a second time via mail through the United States Postal Service. A total of eight patients made an appointment for one of the 18 group education classes offered, but three of these patients were excluded from the research results when the coronavirus disease 2019 (COVID-19) pandemic shutdown occurred and did not allow remaining classes to occur. Classes were taught by the project lead over a two-week time period and each of the patients (n=5) attended one session.

Study Design and Intervention

Group education using a multidisciplinary approach was used on one occasion for each patient with type 2 diabetes that had a HgA1c of 8% (64 mmol/mol) or higher. Input was used from the CDE, the on-site pharmacist, a Community Health Worker, healthcare providers, and leadership within the clinic to collaborate on the content of the class material. The Diabetes Empowerment Scale (DES) short form was used to compute a "Total Empowerment" score that displayed the pre- and post-responses of patients that received group education over the two-week period where classes were offered (see Figures A-C). An additional survey was provided to gauge participants' satisfaction with the course and to evaluate any further education that patients would like. All the patient surveys were anonymous.

Study participants completed the DES prior to the session. During the group education session, participants were encouraged to share their experiences whether positive or negative regarding their type 2 diabetes. Several handouts were provided for each participant. The first

handout detailed the different options that they had for meeting with a member of the clinic team regarding type 2 diabetes such as nurses, providers, the CDE, or CHW. The second handout outlined what the D5 measure was and why each criterion within it was important to their health. The third document included examples of recipes that they could choose from that were low in carbohydrates and included a grocery list. Participants were asked to share what they typically ate for breakfast to start a discussion on the various carbohydrate choices available to them and what those choices might do to their blood sugar level control. Self-efficacy was promoted throughout the sessions by providing appropriate feedback, encouraging learning strategies, and by establishing short-term goals with each patient. Participants were encouraged to discuss what their plan would be going forward regarding small changes they felt they would like to make, as well as additional appointments that are part of the plan of care for patients with type 2 diabetes, including an eye exam, foot exam, and office visits (or lab work) for HbA1c rechecks. The DES was completed post-session prior to participants leaving.

Results

Patients that participated in the study (n = 5), felt that the group education was beneficial to their self-efficacy. The total average empowerment scores showed an increase from 3.8 on a five-point Likert scale to 4.6 from pre- to post-education (p-value = 0.1239). In the post-education survey gauging patient satisfaction with the educational class, the responses varied from 4.2 to 5.0 on a five-point Likert scale with an average score of 4.73. Patient HbA1c levels were not assessed at this time due to COVID-19 constraints in the project.

Barriers

Several barriers were anticipated and then further identified throughout the project. Initially, many of the barriers surfaced in how the various disciplines communicated and

collaborated regarding patients with type 2 diabetes. Goals related to diet, activity, and medications, varied among members of the disciplinary team and were not transparent. Availability of the CDE created the biggest challenge as this professional was only available one day per week. Patients appeared to have misconceptions about their care, including the broad range of professionals they could meet with. Another barrier was varied provider preferences in the care of their patients.

The final and largest barrier to the project occurred with the COVID-19 state pandemic which included a shelter in place order placed by the governor. This dictated restrictions that limited the site's hours and methods of operation. Group education classes had to be cancelled, and the decision was made to end the project at that time with the potential of continuing the project as conditions allowed.

Limitations

Limitations with this project were greater than anticipated with the organizational changes that were occurring due to the three-year merger of two organizations. Leadership adjustments, clinic changes, and upper management forecasts led to additional unforeseen issues as well. In addition to this, patients remarked about time constraints with the offered class times. Some patients stated that it was difficult to come to classes that were offered between the clinic hours of 7am-5pm due to their work schedules. Lastly, limitations with the unprecedented Covid-19 pandemic removed all students from their educational settings beginning in March of 2020. Approximately half of the group education classes had to be cancelled with no possibility of coming back into the clinical setting for several months according to the organization and state-wide shutdown in Minnesota. The result of all of this was a small *n* number.

Conclusion

In individuals that attended group education, their total empowerment score post-education was higher than their pre-education total empowerment score. However, analysis of the statistical evidence did not find statistical significance in the benefits of group education to support the intervention. In a separate survey, patients gave favorable scores for the class content and group approach. The group setting model, through a multidisciplinary approach, appears to be an innovative way to deliver diabetes education. More research is needed with a larger population of patients to evaluate the benefits of group education to a patient's self-efficacy and possible positive effects on HbA1c levels for patients with type 2 diabetes.

Conflicts of Interest

The authors have no conflict of interest in the conduction of this study or the publication of outcomes.

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Figure A

Pretest:

Thank you for attending the Diabetes Education Class! Completion of this survey is voluntary and will be kept confidential. You do not need to place your name on the form.

Prior to the class, please read the following statements about diabetes. Each statement finishes the sentence "**In general, I believe that…**" The response categories are: Strongly Disagree, Somewhat Disagree, Neutral, Somewhat Agree, and Strongly Agree. Place an **X** in the column that correctly identifies how much you agree or disagree with the statement.

Attitudes Towards Diabetes – Diabetes Empowerment Scale (DES) Short Form (SF)

In general, I believe that I	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1...know what part(s) of taking care of my diabetes that I am dissatisfied with.					
2...am able to turn my diabetes goals into a workable plan.					
3...can try out different ways of overcoming barriers to my diabetes goals.					
4...can find ways to feel better about having diabetes.					
5...know the positive ways I cope with diabetes-related stress.					
6...can ask for support for having and caring for my diabetes when I need it.					
7...know what helps me stay motivated to care for my diabetes.					
8...know enough about myself as a person to make diabetes care choices that are right for me.					

Michigan Diabetes Research Center. Diabetes Empowerment Scale (DES) Short Form (SF). Retrieved from: http://diabetesresearch.med.umich.edu/Tools_SurveyInstruments.php#das

Please hand your survey in to the educator prior to the start of the class.

Thank you!

Figure B

Post-test:

Thank you for attending the Diabetes Education Class! Completion of this survey is voluntary and will be kept confidential. You do not need to place your name on the form.

At the completion of the class, please read the following statements about diabetes. Each statement finishes the sentence "**In general, I believe that…**" The response categories are: Strongly Disagree, Somewhat Disagree, Neutral, Somewhat Agree, and Strongly Agree. Place an **X** in the column that correctly identifies how much you agree or disagree with the statement.

Attitudes Towards Diabetes – Diabetes Empowerment Scale (DES) Short Form (SF)

In general, I believe that I	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1...know what part(s) of taking care of my diabetes that I am dissatisfied with.					
2...am able to turn my diabetes goals into a workable plan.					
3...can try out different ways of overcoming barriers to my diabetes goals.					
4...can find ways to feel better about having diabetes.					
5...know the positive ways I cope with diabetes-related stress.					
6...can ask for support for having and caring for my diabetes when I need it.					
7...know what helps me stay motivated to care for my diabetes.					
8...know enough about myself as a person to make diabetes care choices that are right for me.					

Michigan Diabetes Research Center. Diabetes Empowerment Scale (DES) Short Form (SF). Retrieved from: http://diabetesresearch.med.umich.edu/Tools_SurveyInstruments.php#das

Please turn the page over to complete this anonymous/confidential, short survey

Figure C

Survey:

We are interested to learn about your diabetes self-care management and your experience with the Group Diabetes Educational Session. Circle your answer to each question below. This will allow us to better serve you in the future!

In general:	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
I feel that my diabetes self-care could improve.					
I learned or received information that will help me better care for my diabetes.					
I felt comfortable asking questions about my diabetes and care.					
I learned more about my controlling my diabetes by hearing what others had to say about their situations.					
The instructor/group leader was knowledgeable about diabetes and ways to manage it.					
I am prepared to start making changes in my daily life to improve my diabetes.					
The instructor answered my questions during the session.					
I would like to attend Group Education classes again in the future.					
I am satisfied with the group education.					

What other information would you like to receive in future education classes?

_____

_____