Fall 12-6-2020

Diabetes Education in the Emergency Department: Decreasing Repeat Visits and Admissions

Keith Hatfield
University of Texas at Tyler, khatfield2@patriots.uttyler.edu

Diabetes Education in the Emergency Department: Decreasing Repeat Visits and Admissions

A Paper Submitted in Partial Fulfillment of the Requirements

For NURS 5382: Capstone

In the School of Nursing

The University of Texas at Tyler

by

Keith Hatfield, RN

December 6, 2020

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Executive Summary

Parkland Memorial Hospital (PMH) has many patients with diabetes under its care (Parkland Health & Hospital System, 2019a). Lewis et al. (2015) found that most patients with diabetes seeking care in a large urban ED lacked the basic diabetes survival knowledge needed to stay healthy. Poor diabetes control leads to complications and illness, which leads to repeat ED visits and inpatient admissions. A further literature review supported providing patients with additional diabetes education to reduce admissions.

This project will train the ED Registered Nurses (RN) to provide additional diabetes education at discharge and provide the patient with educational materials to review later. Costs are expected to be minimal, around $320 in staff training and less than $2 per patient. It is estimated to prevent over 800 repeat ED visits and 84 diabetes-related admissions.

Diabetes Education in the Emergency Department: Decreasing Repeat Visits and Admissions

Rationale for the Project

The Centers for Disease Control (CDC) estimates that there were 30,200,000 Americans with diabetes in 2015, and that number grows each year (CDC, 2017). According to Ostling et al. (2017), adult patients discharged with a primary diagnosis of diabetes have a readmission rate of 40.5% compared to 11.9% for people without diabetes. Only 6.6% of these discharged patients attended scheduled outpatient diabetes education and care. Managing this increasing rate of diabetes and related complications and subsequent admissions can strain clinics, emergency departments, and hospital inpatient units.

Patients are commonly identified as having a diabetes-related knowledge deficit, which is problematic as most diabetes management is self-care (Arnold, et al., 2016). Based on current

clinical practice guidelines, patients should receive "diabetes survival-level" education (Arnold et al., 2016, p.334); this type of education is often overlooked in the ED. Lewis et al. (2015) found that over 65% of ED patients with diabetes did not use their glucose meters correctly before education. After receiving additional training in the ED, this rate dropped to almost 12%.

In 2019, the Parkland Memorial Hospital ED had 260,860 patient visits (Parkland Health & Hospital System, 2019b). The following year, it was reported that 65% of the ED discharges were for unfunded patients (Parkland Health & Hospital System, 2019a). The report also found that it had a total of 384,498 diabetes-related visits to its facilities. This identified lack of diabetes education and its impact on the PMH ED led to the following PICOT question: In patients with diabetes who are discharged from the Emergency Department (P), how does providing additional diabetes discharge education (C), affect the ED repeat visit and admission rates(T)?

Literature Synthesis.

A literature review was conducted several times from the Spring of 2019 to the Fall of 2020 using the CINHAL, Cochrane Review, and Medline databases. The search used a combination of the keywords: diabetes, education, diabetes education, emergency department, discharge, admission, and readmission. Abstracts were reviewed for relevance, and twelve articles were selected for further review. All of the included studies measured the impact of diabetes education on patient outcomes. The outcomes measured included: admission rates, Hemoglobin A1c (A1c) measurements, diabetes medication adherence, diabetes self-knowledge, and the length of stay for inpatient admissions. All studies found improved outcomes with diabetes education.

Additional diabetes education decreased the inpatient admission rates in six of the reviewed studies, and no studies out of the twelve found an increase in admission rates. Bansal et al. (2017) found that patients receiving specialized diabetes education reduced the 30-day admission rate by 30.5% and reduced the related inpatient-related diabetes costs. Healy et al. (2013) also found improvement in the 30-day admission rate after the additional education. Erku et al. (2017) provided education on diabetes medication and saw a reduction in the readmission rates. Patients admitted to an observation unit had decreased the readmission rates after consulting with a diabetes team (Ostling, et al., 2017).

Diabetes self-knowledge is critical for patients with diabetes to remain healthy and out of the hospital. Lewis et al. (2015) found that many ED patients lacked the knowledge to successfully use an insulin pen and a glucometer. After receiving education, all of the glucometer users were competent, and only 12% of the insulin pen users required additional instruction. It was identified by Koonce et al. (2015) that providing literacy level appropriate diabetes education materials increases the patient's diabetes-related knowledge. Marusic et al. (2018) found that additional education on diabetes medications led to an increased medication adherence rate. Erku et al. (2017) found that similar education increased medication adherence rates and decreased inpatient admission rates. These studies were supported by data from Murphy et al. (2020), who found that medication-focused diabetes education leads to a reduction in the 30-day re-admission rates.

An improvement in glycemic control leads to a reduction in diabetes-related complications; this can be measured by a glycated hemoglobin (A1c) level (Kohnert, et al., 2015). Both Gold et al. (2008) and Gucciardi et al. (2020) found that diabetes education led to decreased A1c levels. Whitehead et al. (2017) also identified an A1c improvement with

education but found that patients who received their education from a nurse had a lower A1c than those who did not receive nurse-led education. Patients who have the highest A1c levels tend to show the most improvement from education (Healy, et al., 2013).

Project Stakeholders

A reduction in admissions will significantly impact this project's primary stakeholders, including the federal, state, and local governments, Medicare and Medicaid, Parkland staff members, and the patients. At a facility level, unfunded admissions have a significant negative impact on the budget. Reducing the number of unfunded admissions will result in savings for the federal, state, and local taxpayers. All nursing staff will be affected by the project, from the Chief Nursing Officer, to the directors, to the managers, to the charge nurses, all the way to the staff RNs at the unit level. The nurses, providers, respiratory therapists, support staff, and the entire intradisciplinary team will see the positive results from a reduced patient census. The nursing education department will help with implementation and is also a major stakeholder. The patients will benefit from improved outcomes and will spend less time in the hospital. From a funding standpoint, the payers will pay less in expenses due to reduced diabetes costs. The pharmaceutical industry may be impacted by lower medication sales, as an improved diet and increased exercise will decrease the need for anti-diabetic medications.

Implementation Plan

Previously a PICOT question was developed and a literature review was completed. The full implementation of this project has been delayed due to the COVID-19 pandemic.

In order to evaluate the current practice and gather baseline data, two reports will be required from ED leadership to evaluate the data from the current practice. The first is a report providing

the number of ED patients with diabetes who are discharged and subsequently return to the ED within 30, 60, or 90 days. The second will provide the subsequent admission rates for the same patients over the same period of time. After the current practice is evaluated, it will be necessary to obtain approval from the gatekeepers on the ED leadership team before continuing.

Once approval is received, the educational materials must be selected. The ED is a busy place, and there isn't much time to provide additional discharge education; therefore, the instruction must be focused on exactly what the patient needs to know. Feedback will be obtained from an interdisciplinary team on the most important topics to include in the educational materials. This will require assistance from the medical staff, pharmacy, the dietitians, and other nursing units, all of whom can help select the discharge education materials. PMH has many different diabetes education resources in print and video options that have already been designed, approved, and printed or published online and are ready to be used now. These materials are available for different literacy levels, as suggested by Koonce et al. (2015). The literature review identified the relationship between medication adherence and pharmacological education; therefore, all discharge medications will be included in the diabetes education. The medication information will be included in the discharge summary that is generated by the EMR. The final educational plan will then be presented to the ED leadership team for final approval.

After obtaining final approval, the diabetes champions will be selected from a group of ED staff nurse volunteers. The champions will be responsible for delivering the project education to the ED staff RNs. They will attend a 1-hour meeting to discuss the topics and will be given copies of the educational materials and will discuss discharge medications and common questions the patients may ask.

Training will be provided to the ED RNs during their regularly scheduled shift by the rounding diabetes champion RNs. The champions will discuss the educational materials and the topics that need to be covered in the discharge education and answer any staff questions. Subjects to be included will be determined after the project is approved and feedback is obtained from others on the team. After the staff is trained, a go-live date will be selected, and the project will commence. The ED RNs will then be expected to spend ten to twenty minutes educating the patient prior to discharge. After the implementation, the project's data will be evaluated on a regularly as described later in the evaluation plan.

Timetable/Flowchart

The initial steps of the project have been completed. The project is currently on hold. The next step will be to generate the reports necessary to evaluate the department's current practice. Obtaining approval from PMH will take a month. Selecting educational materials will take a week and gathering feedback from the interdisciplinary team will take approximately four weeks. The selection of materials will be fast, taking less than one week. The materials and final plan will be presented to the ED leadership team the following week. Immediately following the final approval, the champions will be selected over a two-week period and then trained in the next two weeks. Staff training will be conducted during the shifts and will take 4 weeks. After the staff is trained the educational project can start. While the staff is being trained, a report needs to be built in the EMR to gather tracking data. This is expected to take two weeks. Every quarter the results will be reanalyzed, and improvements made to the program. See flowchart in Appendix B.

Data Collection Methods

Data will be gathered from the EMR to count the number of ED visits for people with diabetes and the number of subsequent repeat ED visits or admissions at the thirty, sixty, and ninety-day point after the first ED visit. The same data will also be gathered for patients who receive additional diabetes education. Reports will be built into the EMR to simplify the data collection. The mean number of repeat visits and admissions for each group will be tested with an independent t-test and then a p-value would be calculated. To be considered statically significant, the p-value should be equal to or less than 0.05. The ED leadership team will be responsible for gathering the data through reports.

As this project has not yet been implemented, there has yet to be an evaluation. The ED leadership team has been supportive and understands the benefits to the facility, the staff, and the patients. One ED senior leader has been identified as a champion and has committed to assisting with the implementation and eventual evaluation.

Cost/Benefit Discussion

There will be a small cost associated with the educational materials provided to the patients at discharge; it is estimated that the written materials will cost approximately $2.00 per patient. It will take approximately 1 hour to train the staff diabetes champions. If ten champions are selected, it would cost approximately $320 in staff wages, calculated at an average of $32 per hour. No additional staff costs will incur after the training of the champions. All staff training will occur during their regularly scheduled hours by the rounding champions. The program's evaluation and ongoing status updates will also be conducted during regular working hours and incur no additional costs.

The benefits of this program will be ongoing. PMH was unable to provide the exact number of diabetes-related ED visits or the costs associated with the ED visits or the inpatient

admissions; thus, some estimates were used in the benefit calculations. The Center for Disease Control and Prevention (CDC, 2020) estimates that 13% of US adults have diabetes. Parkland reported 260,860 ED visits in 2019 (Parkland Health & Hospital System, 2019b). Applying the CDC estimate to the number of Parkland ED visits would mean that approximately 33,900 people with diabetes visit the PMH ED yearly. With an initial goal of 25% education for patients with diabetes, this would result in 8,477 patients receiving the instruction. The literature review found a reduction of 10-50% of admissions for patients who received diabetes education. If this were applied to ED visits using a conservative 10% rate, this would result in 847 fewer ED visits per year. PMH was unable to provide the average cost per ED visit, so the actual savings cannot be calculated at this time. The CDC (2017) estimated that 10% of ED visits lead to admissions. This would result in 84 diabetes-related admissions per year; considering that PMH has a 40% uninsured rate, this would result in 33 unfunded diabetes-related admissions per year (Parkland Health & Hospital District, 2019a). Freeman et al. (2018) estimate that the mean cost per admission is $11,700; preventing 33 unfunded diabetes admissions could save $386,100 per year.

The reduction in the number of patients will reduce the nursing staff's workload. Nurses who have a lighter workload have been found to have higher job satisfaction and are less likely to burnout (Carayon & Gurses, 2008). A numeric value cannot be placed on the many benefits of improving morale.

Discussion of Results

Due to the current strain COVID-19 has placed on the facility and the Emergency Department, this project's implementation has been delayed. Staffing levels have been negatively impacted due to furloughs due to illness or COVID exposure. The number of patients

with potentially communicable illnesses have also increased and have a higher-than-normal acuity. Implementation at this time could potentially be detrimental to the facility, the staff, and other patients.

Based on the reviewed literature, a 10% reduction in ED visits and admissions related to diabetes should be achieved. The calculations are contained in the cost/benefit discussion. This could result in 847 fewer ED visits per year and 84 preventable admissions.

Conclusions/Recommendations

It is recommended to implement discharge diabetes education in the ED as soon as feasible. At present, an exact implementation date cannot be determined due to the uncertainty of the pandemic. The PMH ED leadership team has agreed to review the project again as soon as the current situation stabilizes.

After implementation, the results will be compared to the admission rates prior to the project start date. Changes will be made to the education plan to optimize the results for the facility, staff, and the resulting patient outcomes. The staff and leadership will be updated on the project's results quarterly to provide continued motivation and to seek feedback for potential changes. The staff RNs will also need to receive additional diabetes education on a quarterly basis. If the numbers do not initially drop as expected, leadership will round with staff to find the barrier that is preventing the successful implementation and address any problems that are found.

Long term, it would be beneficial for the patients to receive additional diabetes education on an outpatient status. There are resources available for ED nurses to refer patients to a diabetes educator, but there is a lack of knowledge about this resource. The staff should be educated on these resources in the future. It would also be beneficial to track the A1c of the patients and compare the data to determine if the education has an impact on this glycemic metric.

If the number of admissions drops as expected, it would be beneficial for the leadership team to explore other chronic conditions appropriate for additional education in the Emergency Department. Koonce et al. (2015) suggest that the diabetes education model is transferable between other chronic conditions. Parkland reported that as of 2018, almost 100,000 patients have Congestive Heart Failure, Chronic Kidney Disease, and hypertension (Parkland Health & Hospital System, 2019a).

References

Arnold, P., Scheurer, D., Dake, A. W., Hedgpeth, A., Hutto, A., Colquitt, C., & Hermayer, K. L. (2016). Hospital guidelines for diabetes management and the Joint Commission-American Diabetes Association inpatient diabetes certification. *The American Journal of the Medical Sciences, 351*(4), 333-340. http://doi.org/10.1016/j.amjms.2015.11.024

Freeman, W., Weiss, A. J, & Heslin, K. C. (2018). *Overview of U.S. hospital stays in 2016: Variation by geographic region*. Agency for Healthcare Research and Quality. https://www.hcup-us.ahrq.gov/reports/statbriefs/sb246-Geographic-Variation-Hospital-Stays.jsp

Bansal, V., Mottalib, A., Pawar, T. K., Abbasakoor, N., Chuang, E., Chaudhry, A., Sakr, M., Gabbay, R. A., & Hamdy, O. (2018). Inpatient diabetes management by specialized diabetes team versus primary service team in non-critical care units: Impact on 30-day readmission rate and hospital cost. *BMJ Open Diabetes Research & Care 6*(460), 1-8. http://doi.org/10.1136/bmjdrc-2017-000460

Carayon, P., & Gurses, A. P. (2008). Nursing workload and patient safety – a human factors and engineering perspective. In Hughes, R. G. (Ed.), *Patient safety and quality: An evidence-based handbook for nurses.* (pp. 203-216). Agency for Healthcare Research and Quality. https://www.ncbi.nlm.nih.gov/books/NBK2657/

Center for Disease Control and Prevention. (2017). *National hospital ambulatory medical care survey: 2017 emergency department summary tables.* https://www.cdc.gov/nchs/data/nhamcs/web_tables/2017_ed_web_tables-508.pdf

Center for Disease Control and Prevention. (2020). *National diabetes statistics report 2020 estimates of diabetes and its burden in the United States.* https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf

Erku, D. A., Ayele, A. A., Mekuria, A. B., Belachew, S. A., Hailemeskel, B., & Tegegn, H. G. (2017). The impact of pharmacist-led medication therapy management on medication adherence in patients with type 2 diabetes mellitus: A randomized controlled study. *Pharmacy Practice, 15*(3), 1-7. http://doi.org/10.18549/PharmPract.2017.03.1026

Gold, R., Yu, K., Liang, L., Adler, F., Balingit, P., Luc, P., Hernandez, J., Toro, Y., & Modilevsky, T. (2018). Synchronous provider visit and self-management education improves glycemic control in Hispanic patients with long-standing type 2 diabetes. *The Diabetes Educator*, *34*(6), 990-995. http://doi.org/10.1177/0145721708323744

Gucciardi, E., Changchang, X., Vitale, M., Lou, W., Horodezny, S., Dorado, L., Sidani, S., & Shah, B. R. (2020). Evaluating the impact of onsite diabetes education teams in primary care on clinical outcomes. *BMC Family Practice, 21*(48). http://doi.org/10.1186/s12875-020-01111-2

Healy, S. J., Black, D., Harris, C., Lorenz, A., & Dungan, K. M. (2013). Inpatient diabetes education is associated with less frequent hospital readmission among patients with poor glycemic control. *Diabetes Care*, *36*, 2960-2967. http://doi.org/10.2337/dc13-0108

Jayakody, A., Bryant, J., Carey, M., Hobden, B., Dodd, N., & Sanson-Fisher, R. (2016). Effectiveness of interventions utilizing telephone follow up in reducing hospital readmission within 30 days for individuals with chronic disease: A systematic review. *BMC Health Services Research*, *16*(403), 1-9. http://doi.org/10.1186/s12913-016-1650-9

Kohnert, K., Hinke, P., Vogt, L., & Salzsieder, E. (2015). Utility of different control metrics for optimizing management of diabetes. *World Journal of Diabetes, 6*(1), 17-29. http://doi.org//10.4239/wjd.v6.i1.17

Koonce, T. Y., Giuse, N. B., Kusnoor, S. V., Hurley, S., & Ye, F. (2015). A personalized approach to deliver health care information to diabetic patients in community care clinics. *Journal of the Medical Library Association 103*(3), 123-130. http://doi.org/10.3163/1536-5050.103.3.004

Lewis, V. R., Benda, N., Nassar, C., & Magee, M. (2015). Successful patient diabetes education in the emergency department. *The Diabetes Educator*, *41*(3), 343-350. http://doi.org/10.1177/0145721715577484

Marusic, S., Melis, P., Lucijanic, M., Grgurevic, I., Turcic, P., Neto, P. R., & Bilic-Curcic, I. (2018). Impact of pharmacotherapeutic education on medication adherence and adverse outcomes in patients with type 2 diabetes mellitus: A prospective, randomized study. *Croatian Medical Journal, 59*(7), 290-297. http://doi.org/10.3325/cmj.2018.59.290

Murphy, J. A., Schroeder, M. N., Ridner, A. T., Gregory, M. E., Whitner, J. B., & Hackett, S. G. (2020). Impact of a pharmacy-initiated inpatient diabetes patient education program on 30-day readmission rates. *Journal of Pharmacy Practice, 33*(6), 754-759. http://doi.org/10.1177/0897190019833217

National Center for Chronic Disease Prevention and Health Promotion: Division of Diabetes Translation – Center for Disease Control. (2017). *National diabetes statistics report, 2017: Estimates of diabetes and its burden in the United States*. https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf

Ostling, S., Wyckoff, J., Ciarkowski, S. L., Pai, C., Choe, H. M., Bahl, V., & Gianchandani, R. (2017). The relationship between diabetes mellitus and 30-day readmission rates. *Clinical Diabetes and Endocrinology, 3*(3). http://doi.org/10.1186/s40842-016-0040-x

Parkland Health & Hospital System. (2019a). Dallas County community health needs assessment 2019. https://www.parklandhospital.com/Uploads/Public/Documents/PDFs/Health-\\\\\\\\\\\\\\\\\\\\\\Dashboard/CHNA%202019.pdf

Parkland Health & Hospital System. (2019b). Independent auditor's report and financial statements. https://www.parklandhospital.com/Uploads/public/documents/PDFs/Reports-Discolures/Parkland%20Financial%20Statements%202019.pdf

Whitehead, L. C., Crowe, M. T., Carter, J. D., Maskill, V. R., Carlyle, D., Bugge, C., & Frampton, C. M. (2017). A nurse-led education and cognitive behavior therapy-based intervention among adults with uncontrolled type 2 diabetes: A randomized controlled trial. *Journal of Evaluation in Clinical Practice, 23,* 821-829. http://doi.org/10.1111/jcp.12725

Appendix A

Synthesis Table

PICOT Question:
In patients with diabetes wo are discharged from the Emergency Department (P), how does providing additional diabetes discharge education (C), affect the ED repeat visit and readmission rates(T)?

Evidence Synthesis Table

Studies	Design	Sample	Intervention	Outcome
A	Quasi-Experimental Study	n=262	DED	DED reduced AR DED reduced LOS
B	Randomized Controlled Trial	n=127	DED	DED reduced AR DED increased DMA
C	Evidence Based Practice/Quality Improvement Project	n=44	DED	DED reduced A1c
D	Cohort	n=771	DED	DED reduced A1c
E	Cohort	n=2,265 (30 day) n=2,069 (180 day)	DED	DED reduced 30 day and 180 day AR
F	Systematic Review	n=10	DED	DED reduced AR
G	Randomized Controlled Trial	n=160	DED	DED increased DSMK
H	Randomized Controlled Trial	n=51	DED	DED increased DSKM
I	Randomized Controlled Trial	n=130	DED	DED increased DMA
J	Cohort	n=513	DED	DED reduced AR

				DED reduced LOS
K	Cohort	n=37,702	DED	DED reduced ED and Observation AR
L	Randomized Controlled Trial	n=157	DED – nurse led	DED reduced A1c

Legend: A = Bansal, B = Erku, C = Gold, D = Gucciardi, E = Healy, F = Jayakody, G = Koonce, H = Lewis, I = Marusic, J = Murphy, K= Ostling, L = Whiterhead,

AR = Admission rate, , A1c = Hemoglobin A1c, DED= Diabetes education, DMA – Diabetes medication adherence rate, DSMK = Diabetes self-knowledge, LOS = Length of Stay

.Outcomes Table: Effect of diabetes education on related outcomes

	A	B ♦	C	D	E	F ♦	G ♦	H ♦	I ♦	J	K	L ♦
AR	↓ *	↓ *			↓ *	↓				↓ *	↓ *	
A1c			↓ *	↓ *								↓ *
DMA		↑ *							↑ *			
DSMK							↑ *	↑ *				
LOS	↓ *									↓ *		

Legend: A = Bansal, B = Erku, C = Gold, D = Gucciardi, E = Healy, F = Jayakody, G = Koonce, H = Lewis, I = Marusic, J = Murphy, K= Ostling, L = Whiterhead,

* = statistically significant findings

♦ = higher level evidence

Appendix B

Flowchart