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Development and Implementation of a Diabetes Management Flow Sheet in a Primary Care Practice: A Quality Improvement Project.

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DEVELOPMENT AND IMPLEMENTATION OF A DIABETES MANAGEMENT FLOW
SHEET IN A PRIMARY CARE PRACTICE:
A QUALITY IMPROVEMENT PROJECT

by

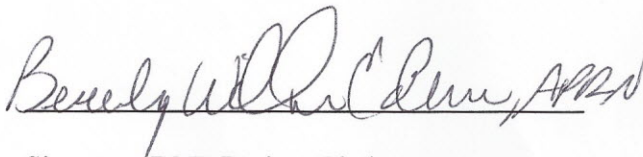
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requirements for the degree of

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Signature DNP Project Chair

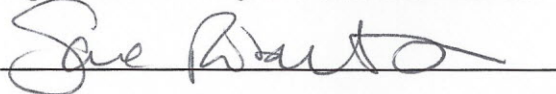
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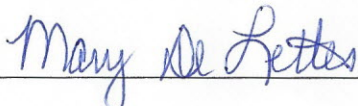
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Dedication

I dedicate this manuscript to my parents, Carolyn and in loving memory of Anthony, children, Chandler and Laila, sisters Toni and Erin, and family, Ramon, Raymond, and Candace Nieves, for their encouragement, motivation, and blessings.

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Abstract

Primary care practices that do not utilize electronic medical records (EMR) could pose difficulty in adhering to clinical guidelines for diabetic patients. Diabetes flow sheets are a one page document that includes current practice guideline recommendations for easy access of results to promote comprehensive care. The main objective of this project was to promote adherence to diabetes guidelines with the use of a diabetes flow sheet for providers that do not utilize an EMR. Plan-Do-Study-Act was the design for this project. A total of 50 medical records were randomly selected at a primary care office. A pre and post-implementation of the diabetes flow sheet was audited for documentation of clinical practice guidelines (CPG). A post implementation evaluation was administered for the feasibility of the flow sheet and for evaluation. The results of the diabetes flow sheet to promote better adherence to CPG were significant. The total scores of the pre and post documentation mean (M) and standard deviation (SD) increased significantly from pre-implementation ($M = 11.67$, $SD = 1.06$) to post-implementation ($M = 13.67$, $SD = 1.34$), $t(42) = 8.26$, $p < .0000$. The mean differences in pre-implementation and post-implementation of diabetes flow sheet was ($M = 2.00$, $SD = 1.59$) with a 95% CI ranging from [1.51 to 2.48]. Maintaining a diabetes flow sheet in the front of the paper medical record is imperative so PCPs can utilize the process of the flow sheets to establish adequate care management for health outcomes for type 2 diabetes.

Key words: diabetes management; diabetes flow sheet; clinical practice guidelines; diabetes algorithm; adherence to guidelines

Development and Implementation of a Diabetes Management Flow Sheet in a Primary Care
Practice: A Quality Improvement Project

Type 2 diabetes mellitus (DM) is a chronic medical condition that impacts the health status of populations medically and financially. More than 30 million Americans have diabetes (about 1 in 10), and 90% to 95% of them have type 2 diabetes (Centers for Disease Control and Prevention [CDC], 2018). Diabetes is the 7th leading cause of death in the United States (CDC). As of 2017, Kentucky is ranked 7th in the United States for diabetes (State of Obesity, 2018). The total estimated cost of diagnosed diabetes in 2017 is \$327 billion, including \$237 billion in direct medical costs and \$90 billion in reduced productivity (American Diabetes Association [ADA], 2018).

Diabetes is the number one cause of kidney failure, lower limb amputations and adult onset of blindness (CDC, 2018). With more than 84 million U.S. adults with prediabetes, 90% of them do not know they have it (CDC, 2018). These statistics demonstrate the necessity for diabetes management with the use of CPG. An aim for greater adherence to current diabetes management is imperative for the health and well-being of the U.S. population.

Background

Diabetes is defined as a complex group of diseases marked by high blood glucose due to the body's inability to make or use insulin adequately (National Committee for Quality Assurance [NCQA], 2018). Diabetes has associated comorbidities of cardiovascular disease, stroke, hypertension, obesity, kidney disease, nerve damage, and foot and eye complications. In the last 20 years, the number of adults diagnosed with diabetes has more than tripled as the American population has aged and become more overweight or obese (CDC, 2018). Type 2

diabetes most often develops in people over age 45, but more and more children, teens, and young adults are also developing it (CDC, 2018).

Risk factors that contribute to diabetes include: race, smoking, overweight/obesity, physical inactivity, high blood pressure, high cholesterol, and hyperglycemia (CDC, 2018). Modifiable risk factors include: low socioeconomic status, barriers to healthcare access, underutilization of healthcare resources, lower rates of insurance coverage, and lack of health literacy (Brown, Garcia, Zuniga, & Lewis, 2018). According to the National Diabetes Statistic Report (2017), overall prevalence was among American Indians/Alaska Natives (15.1%), non-Hispanic blacks (12.7%), and people of Hispanic ethnicity (12.1%) than among non-Hispanic whites (7.4%) and Asians (8.0%) (CDC, 2017). The State of Obesity (2018), revealed the adult obesity rate was at or above 35% in seven states and at least 30% in 29 states. Proper diabetes management is essential to control blood glucose, reduce risks for complications and prolong life (NCQA, 2018). With support from health care providers, patients can manage their diabetes with self-care, taking medications as instructed, eating a healthy diet, being physically active and quitting smoking (NCQA, 2018).

According to Kentucky Diabetes Prevention and Control Program [KDPCP] (2017), Kentucky has the 4th highest diabetes mortality rate in the U.S. As of 2017, Kentucky's current adult diabetes rate is 12.9 % and ranked 7th in the U.S. (State of Obesity, 2018). It is estimated that one in three Kentucky adults are prediabetic (37% or 1.1 million) (KDPCP, 2017). At the current pace, projected cases of diabetes in 2030 is estimated at 594,058 (66%) (State of Obesity, 2018).

National organizations such as ADA and NCQA have addressed the management of the prevalence of diabetes and its comorbidities with CPG and recommendations. The American

Diabetes Association has established Standards of Medical Care in Diabetes 2019. The Standards include the most current evidence-based recommendations for diagnosing and treating adults and children with all forms of diabetes (ADA, 2019). The National Committee for Quality Assurance (2018) created standards and guidelines to measure performance. The practice guidelines and recommendations for diabetes care are components that can be integrated into a diabetes flow sheet. The flow sheets are utilized in healthcare practices that do not use EMR. Diabetes flow sheets are one page forms that tracks lipids, cholesterol, glycated hemoglobin (A1C), urinalysis, blood pressure, fundal examination, weight and body mass index (BMI) and blood pressure medications (Williams & Curtis, 2015).

Problem Statement

Hashmi and Khan (2016) reported that the management of diabetes mellitus is often difficult to coordinate and requires structured plans to adequately control this multisystem disease and prevent associated morbidity. In addition, these authors reported implementing structured plans has been shown to improve overall diabetes management. However, evidence has shown inadequate adherence of the recommended diabetes guidelines among healthcare providers for diabetes care management (Hashmi & Khan, 2016). Consequently, for primary care practices that do not utilize EMR could pose difficulty in adhering to clinical guidelines for diabetic patients. According to de Belvis, Pelone, Biasco, Ricciardi, & Volpe (2009), although algorithms exist for diabetes care, lack of information systems often fail to achieve predefined standards. Also, evidence has shown that improved data monitoring systems are important to achieve good quality of diabetic care by physicians (Hashmi & Khan, 2016). Thus, a tracking tool like a diabetes flow sheet can assist with the management of diabetes care. The one page

form can assist healthcare providers with updated results of type 2 DM management without having to search through the chart to obtain health status results.

The primary care clinic was selected for this project related to the identification of evidence that supports the inconsistent clinical practice guideline adherence. For example, the lack of EMR, which evidence has shown that improved data monitoring systems are important to achieve good quality of diabetic care by physicians (Hashmi & Khan, 2016). There are currently no interventions or tools used at this clinic to support the adherence of CPG. Due to the increased prevalence of DM, it is important to evaluate the screening patterns of diabetes associated health problems in primary care clinics (Albarrak et al., 2018). Physicians and primary care clinics have been noted to use clinical guidelines inconsistently and variably (Hashmi & Khan, 2016; Moharram & Farhat, 2008; Patasi & Conway, 2008). A 208.6 million dollar cost incurred by people with diabetes in a primary care office (American Diabetes Association, 2018). Furthermore, research has shown that more of type 2 diabetes care conditions are managed in primary care clinics (Albarrak et al., 2018; de Belvis et al., 2009; Patasi & Conway, 2008).

Theoretical Framework

The Knowles Adult Learning Theory served as theoretical framework for this project (see Appendix A). This framework was chosen because of the education, knowledge, and experience bases of teaching adults about new or existing concepts. Malcolm Knowles (1913-1997), an American educator, first used the term Andragogy in the United States (Knowles, Holton, & Swanson, 2012). Andragogy is defined as a set of core adult learning principles that apply to all adult learning situations (Knowles et al., 2012). Four assumptions are specific for adult learners such as: changes in self-concept, role of experience, readiness to learn, and orientation to learning of problem centered (Knowles, 1973). The adult learners were the PCPs and all office

staff for their participation in the education and evaluation of this project. The changes in self-concept involved increasing self-direction of described tasks during the project. The role of experience involved using their past experiences as a resource for learning new ideas. Readiness to learn involved the participants timing to learn new concepts based on their current role or position. Lastly, problem centered focused on the importance of the process improvement with the diabetes flow sheet that led to enhancement of health outcomes of diabetes care.

Setting and Organizational Assessment

The clinical agency is an urban family medicine practice that provides primary care services to approximately 400 patients monthly. Services include, chronic disease management, preventative care, sick visits, and annual checkups. The primary care clinic is a private practice with a physician with 32 years of experience and a nurse practitioner with a year and a half of experience. This clinic accepts patients with private insurance, Medicaid, Medicare, and no health insurance. Lab services are located next door to the facility. The facility is located in an urban area in Southeastern United States. Permission by the facility for the implementation of the project was granted on March 11, 2019.

Purpose

The purpose of this project was to develop and implement a diabetes flow sheet to include the components of the CPG set forth by the ADA 2019 and NCQA 2018 for providers that do not utilize an EMR. The aim is to measure the adherence of the providers with the diabetes flow sheet. The use of the diabetes flow sheet will increase the provider's adherence of CPG, assessment for close monitoring, and adjustments to care.

Intervention

The intervention for the project was based on the plan-do-study-act (PDSA) design and was conducted in four phases (See Appendix B). The intervention team consisted of a primary care physician, nurse practitioner, medical assistant, and a front office receptionist. A meeting was scheduled for an in-service of the project that detailed the background, evidence, process, training of diabetes flow sheet, and evaluation.

Phase One

The DNP student obtained baseline data from a pre-implementation chart review. This included a simple random sample of 50 medical records of diabetic patients during the measurement year of January 1, 2018 to December 31, 2018. Data was abstracted from the medical record to include: (a) height, weight, BMI; (b) blood pressure; (c) HbA1C; (d) nephropathy (spot urine test for albumin or protein, or angiotensin converting enzyme [ACE] inhibitor or angiotensin receptor blocker [ARB] medication prescribed) or currently being taken; (e) eye exam; and (f) foot exam (ADA, 2019; NCQA, 2018).

Phase Two

The Primary care providers (PCPs), a medical assistant, and the receptionist at the front office were provided with a 15 minute PowerPoint in-service on significance of diabetes in Kentucky, the utility and feasibility of the diabetes flow sheet, and the CPG for diabetes. Documentation reminder flyers were posted in the triage area, front desk, and all patient rooms to remind staff and PCPs of the importance of diabetes flow sheets (see Appendix C). Placement of reminders in relation to decision making about the care practices are essential (Melnyk & Fineout-Overholt, 2015). The DNP student obtained a list of patients with a scheduled appointment and a diagnosis of type 2 diabetes from the front office receptionist (see Appendix

D for responsibility matrix). The front office receptionist and medical assistant retrieved the charts of the type 2 diabetic patients that were scheduled for the week. The DNP student placed a diabetes flow sheet in the front of the chart. In the event of walk in patients, the front office receptionist made a copy of the diabetes flow sheet and placed it in the patient's chart. The medical assistant documented on the diabetes flow sheet of the patient's results of height, weight, BMI, blood pressure, and any available lab values during triage. The PCP reviewed the results and assessed the patient for further evaluation or treatment. The PCP documented any needed referrals. The medical assistant made arrangement for any necessary referrals.

Phase Three

Once a week, the DNP student checked the medical records of patients seen in the practice to see if the diabetes flow sheet was completed. The DNP student transposed the data entered on the diabetes flow sheet to the chart audit form (see Appendix E). A post-implementation chart review was conducted. Data was based on the ADA 2019 and NCQA 2018 guidelines and recommendations to include: (a) height, weight, BMI; (b) blood pressure; (c) HbA1C; (d) nephropathy (spot urine test for albumin or protein or ACE or ARB); (e) eye exam; and (f) foot exam (ADA, 2019; NCQA, 2018).

Phase Four

After the completion of the data abstraction, the DNP student evaluated the results of the documentation process. This included, the baseline data from the pre-implementation chart review, data from the flow sheet during the post-implementation chart review, and any documented referrals. In addition, a staff evaluation survey was administered to the participants of the project for feasibility of the diabetes flow sheet, the process, and feedback. Dissemination of the results of the project and evaluation survey will be provided to the staff and PCPs.

Strength, Weakness, Opportunities, Threats

A Strength, Weakness, Opportunities, and Threats (SWOT) analysis demonstrated areas internally and externally that negatively and positively affected the quality improvement project (see Appendix F). The strength identified was the assistance and support of the primary care providers and clinical staff for their participation in the project. The weakness identified was the lack of documentation on the diabetes flow sheet and no use of EMR. The opportunities included the utilization of the diabetes flow sheet as a reminder for CPG, increase referrals for better diabetes management, and greater progress monitoring. The threat was identified as the DNP student inability to visit more frequently to ensure documentation of the flow sheets were completed.

Participants

The participants of the project and inclusion criteria included (a) primary care physician ($n = 1$); (b) nurse practitioner ($n = 1$); (c) medical assistant ($n = 1$); and (d) front office receptionist ($n = 1$). The exclusion criteria for the project included (a) temporary staff, and (b) nurse practitioner students. The consent process included a consent form that was presented during the in-service training. Consent was voluntary with the option to no longer participate at any point during the project. The office manager was omitted from the project voluntarily. The University Institutional Review Board (IRB) approval was submitted for approval prior to implementing the quality improvement project.

Data Collection

A pre-implementation chart review included a random selection of 50 medical records of diabetic patients during the measurement year of January 1, 2018 to December 31, 2018. This

included the flow sheet measures as baseline data. Data was collected to verify, yes or no that they were assessed in each medical record.

A post-implementation chart review included 50 random medical records of patients diagnosed with Type 2 diabetes six weeks after the implementation phase. Data was collected based on the medical records that contained the diabetes flow sheet. The data from the flow sheet during the post-implementation chart review was compared to the baseline data from the pre-implementation chart review.

The data from the staff evaluation survey was collected and analyzed. The questions from the staff evaluation survey was summed and divided into percentages. Measuring the compliance usage of the diabetes flow sheet as well as the usefulness was performed during the post-implementation phase (see Appendix J, K, and L).

Ethical Considerations

The plan for maintenance and security of the data was accessed only in the office. De-identified data was abstracted from the medical record during the pre and post chart review and kept in a locked filing cabinet in the office manager's office. The medical record confidentiality was protected by the Health Information Portability and Accountability Act of 1996 (HIPAA). The project data was only accessible to the DNP student.

Referral Plan

If a referral was warranted (specialist, podiatry, optometrist, registered dietitian), the PCP documented on the flow sheet and provided the medical assistant with the needed information for the patient referral. A referral is important and necessary in diabetic patients due to other comorbidities conditions to see any specialist other than primary care physician (Albarrak et al., 2018).

Measurement

The DNP student implemented the quality improvement project which included development and implementation of a diabetes flow sheet as a measurement tool (see Appendix G). The tool is a one page document that consist of recommendations from the Standards of Medical Care in Diabetes from the ADA 2019 and measurement guidelines from NCQA 2018. Flow sheets are tools for managing and measuring processes of care, using them increases the chance of adhering to assessment guidelines (Hahn et al., 2008). The ADA 2019 components were chosen based on the grading of A or B recommendation and NCQA components were chosen from the 2018 comprehensive diabetes care (see Appendix H). The A ratings are selected based on studies from clinical control trials and B ratings are from cohort studies (ADA, 2019).

An evaluation of the quality improvement project was used to evaluate the feasibility of the diabetes flow sheet (see Appendix I). This survey is descriptive and contains three, five point Likert style questions from strongly disagree, disagree, neither disagree or agree, agree, or strongly agree. According to Joshi, Kale, Chandel, & Pal (2015), a Likert scale is a set of statements or items where participants are asked to show their level of agreement on a metric scale. Likert style questions were chosen because the scale was devised in order to measure attitude in a scientifically accepted and validated manner since 1932 (Joshi et al., 2015). The evaluation contains (a) professional role; (b) did you view the diabetes flow sheets in the chart; (c) did you complete any components of the diabetes flow chart; (d) how did you find the usefulness of the diabetes flow sheet; (e) did the diabetes flow sheet save you time; (f) was the diabetes flow sheet easy to follow; (g) list reasons of why you are or not satisfied; and (h) any suggestions for improvement.

The medical record review data was analyzed based on descriptive statistics, frequencies, percentages, and a paired T- test using the Statistical Package for Social Sciences (SPSS).

Results

A total of 50 medical records were audited for the pre-implementation of the diabetes flow sheet. A total of 43 out of 50 (86%) medical records were audited post-implementation. A paired samples t-test was conducted to evaluate the documentation of the diabetes flow sheet to promote better adherence to CPG. The use of the diabetes flow sheet mean increased significantly from pre-implementation ($M = 11.67, SD = 1.06$) to post-implementation ($M = 13.67, SD = 1.34$), $t(42) = 8.26, p < .0000$, respectively (see Appendix J). The mean differences in pre-implementation and post-implementation of diabetes flow sheet was ($M = 2.00, SD = 1.59$) with a 95% CI ranging from [1.51, 2.48], respectively. The magnitude of effect was large (eta squared = .62).

Intervention Results

A total of 43 out of 50 (86%) medical records were utilized for the post-implementation chart review. A total of seven out of 50 (14%) of the medical records flow sheets were incomplete due to no show visits. The measures of the flow sheet resulted, height (100%), weight (97.7%), BMI (90.6%), blood pressure (97.7%), HbA1C (55.8%), nephropathy (ACE or ARB) (46.5%), eye exam (53.5%), and foot exam (25.6%) (ADA, 2019; NCQA, 2018). The overall total scores of the pre and post implementation ranged from 10 points to a maximum of 16 points for each measure of the flow sheet (see Appendix K). A score of one point was given for “NO” and two points was given for “YES”. The pre flow sheet total was ($N = 50$ for 582). The post flow sheet total was ($n = 43$ for 588). The referral documentation included three out of 43 (7%) had eye referrals and one out of 43 (2.3%) had a podiatry referral.

Discussion

Interpretation

The results of the diabetes flow sheet implementation and use were significant for the adherence of the CPG. The post-implementation results compared to the pre-implementation results for the nephropathy profile (46.5% vs 44%), foot (25.6% vs 20%), and eye exam (53.5% vs 36%) showed significant improvement. Unfortunately, the documentation of weight (97.7% vs 100%), BMI (90.7% vs 98%), and HbA1C (55.8% vs 66%) demonstrated a decrease in documentation. The DNP student noted during the audit the lack of missing reports such as lab results in the chart. This hindered the results of both chart reviews. Similar results of the project were noted with those of Albarrak et al., 2018. The researchers reported the ADA standards assessment of physical examination, the elements such as height, weight, BMI, and blood pressure demonstrated above 95.0% compliance to the ADA standards of diabetic care (Albarrak et al., 2018). Meanwhile, their study showed 40% of eye examinations, compared to 53.5% eye examinations with the current study. The nephropathy profile only included documentation for ACE or ARB medication use. The primary care practice did not provide testing for spot urine test for albumin or protein. The referrals showed a total result of 9.3% for eye and foot examination referrals. According to Albarrak et al, 2018 a referral is important and necessary in diabetic patients due to other comorbidities conditions to see any specialist other than primary care physician. In contrast, only 19.3% of their referrals were documented accordingly to ADA specifications (Albarrak et al., 2018). Based on the overall staff evaluation survey, the diabetes flow sheet was found to be useful and easy to follow. There was a variation in the response to whether the flow sheet saved time. Of those, 25% disagreed, 50% neither agree or disagree, and 25% strongly agreed (see Appendix L). Satisfaction and recommendations showed the flow sheet

focused on the problem, information was all on one sheet, easy to monitor the progress, and easier to check when preventive visits are due. One suggestion was noted as maintaining flow sheet on bright colored paper as a reminder.

Unintended Consequences

An unintended consequence occurred during the project. Due to the nurse practitioner's schedule, a second in-service was scheduled. Since the medical assistant failed to complete the flow sheet, the PCP's felt it was more work on them to complete the form. During that time, the medical assistant was training medical assistant students. This was a hindrance to the project because the DNP student had to transpose the remaining data for the duration of the project. This consequence resulted in the PCP's perception of more work for the provider. In a similar study, using flow sheets results in significant improvement in physician adherence, however, may have difficulty in following numerous and detailed standards of care (Moharram & Farahat, 2008).

Limitations

There were several limitations to this project. First, the timeframe of the project was limited to six weeks due to PCP schedule, office closings, and provider and staff vacations. There were two in-services due to the schedules of the physician and nurse practitioner. Second, the DNP student was limited to weekly visits for the project due to other clinical assignment arrangements. If the DNP student was able to be present more often, the adherence to the documentation may have been greater with additional reminders. Third, the flow of the process and documentation could have been minimal for the PCP's if there were additional staff to assist with the documentation of the flow sheet. Fourth, since the office uses paper charting, some of the medical records did not have the necessary documentation like the lab results. Additional staff could assist with filing the necessary documents in the medical records for availability.

Implications and Recommendations

This project has been found to be very useful and easy to follow. There are several benefits of a diabetes flow sheet. The flow sheet will save the PCP time of having to sort through the medical record for the essential criteria for diabetes care. It can improve documentation and provision of diabetes care (Moharram & Farahat, 2008). Primary care physicians can have a tool that is practical and easy to use (Patasi & Conway, 2008). With continued use, the diabetes flow sheet is sustainable to assist the PCP's with a constant reminder of diabetes measures to improve health outcomes. The quality improvement project identified gaps in care that implicated improvement in diabetes care management. Using the diabetes flow sheet for six months to one year, would show optimal improvement in guideline adherence. This primary care clinic and similar facilities could benefit from regular charts audits and continuous education of the staff for greater adherence to guidelines. Future research is needed to provide more education to physicians and support staff to improve adherence to CPG. Minimal structured training in basic diabetes principles, can significantly affect the quality of care and health of patients with diabetes (Maryniuk, Mensing, Imershein, Gregory & Jackson, 2013).

Conclusion

In conclusion, the quality improvement project has shown significant results of a diabetes flow sheet for documentation adherence to CPG. The DNP student was able to provide significant evidence with the use of a diabetes flow sheet for the primary care office that does not utilize EMR. Clinical practice guidelines such as HbA1c, nephropathy, eye and foot exam showed minimal increase in documentation. Evidence has also shown that for primary care practices with no EMR can utilize diabetes flow sheets for efficient processes, adherence to guidelines, and better health outcomes for the patient. The DNP student was able to implement a

diabetes flow sheet that can assist providers with easy access to results, provide pertinent information in one place, and engage the patient on the progression of care. A diabetes flow sheet can be a potential benefit and influence all practices that manage diabetes care without an EMR. This will allow the provider to set attainable goals for better management of diabetes.

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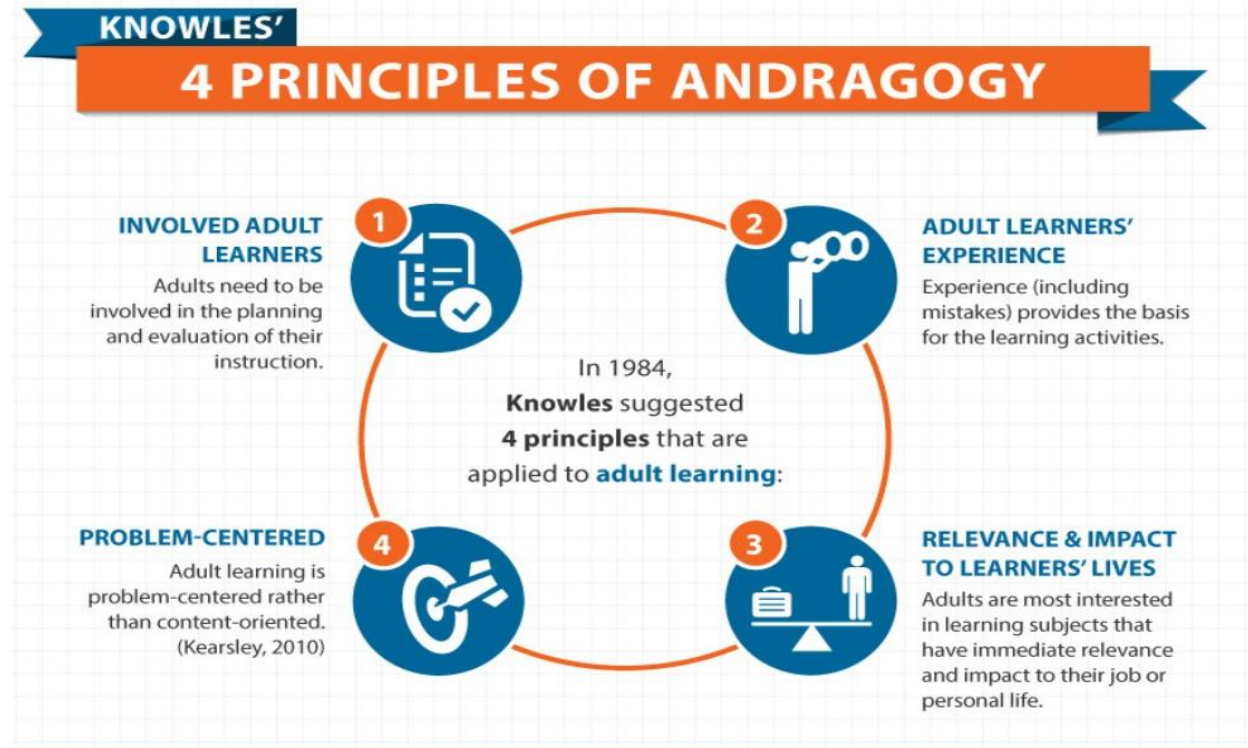
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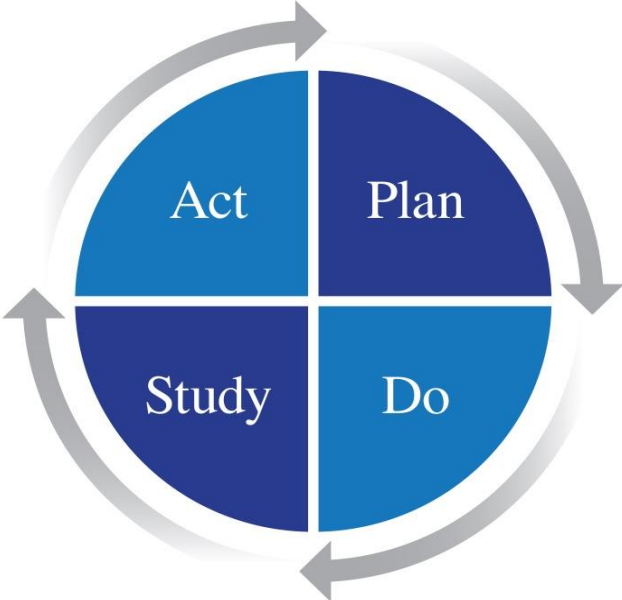
Appendix A

Knowles Four Principles of Adult Learning (eLearning [Online image], 2018; Knowles, 1973)



Appendix B

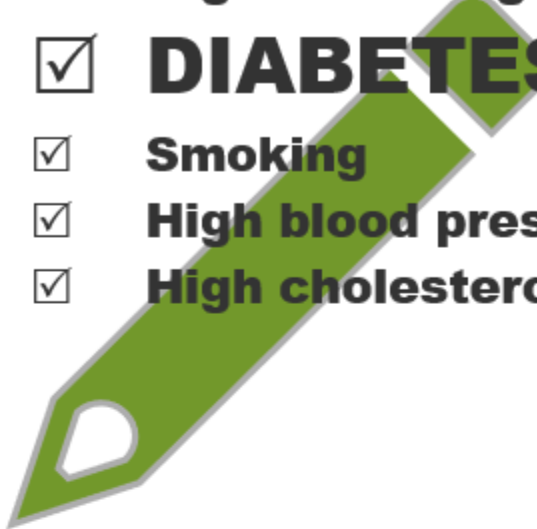
Plan Do Study Act (PDSA) Design (The W. Edward Deming Institute, 2018)



Appendix C

Documentation Reminder Flyer

- High blood sugar**
- DIABETES**
- Smoking**
- High blood pressure**
- High cholesterol**



**DON'T
FORGET
TO
DOCUMENT!**

**You can make a difference in diabetes care
management**



Every Visit
**Height, weight,
BMI**

Every Visit
Blood pressure

Quarterly Visit
**A1C and lab
values**

Annual Visit
Foot & Eye exam

Annual Visit
**Smoking
status/cessation**

Diabetes Flow Sheet

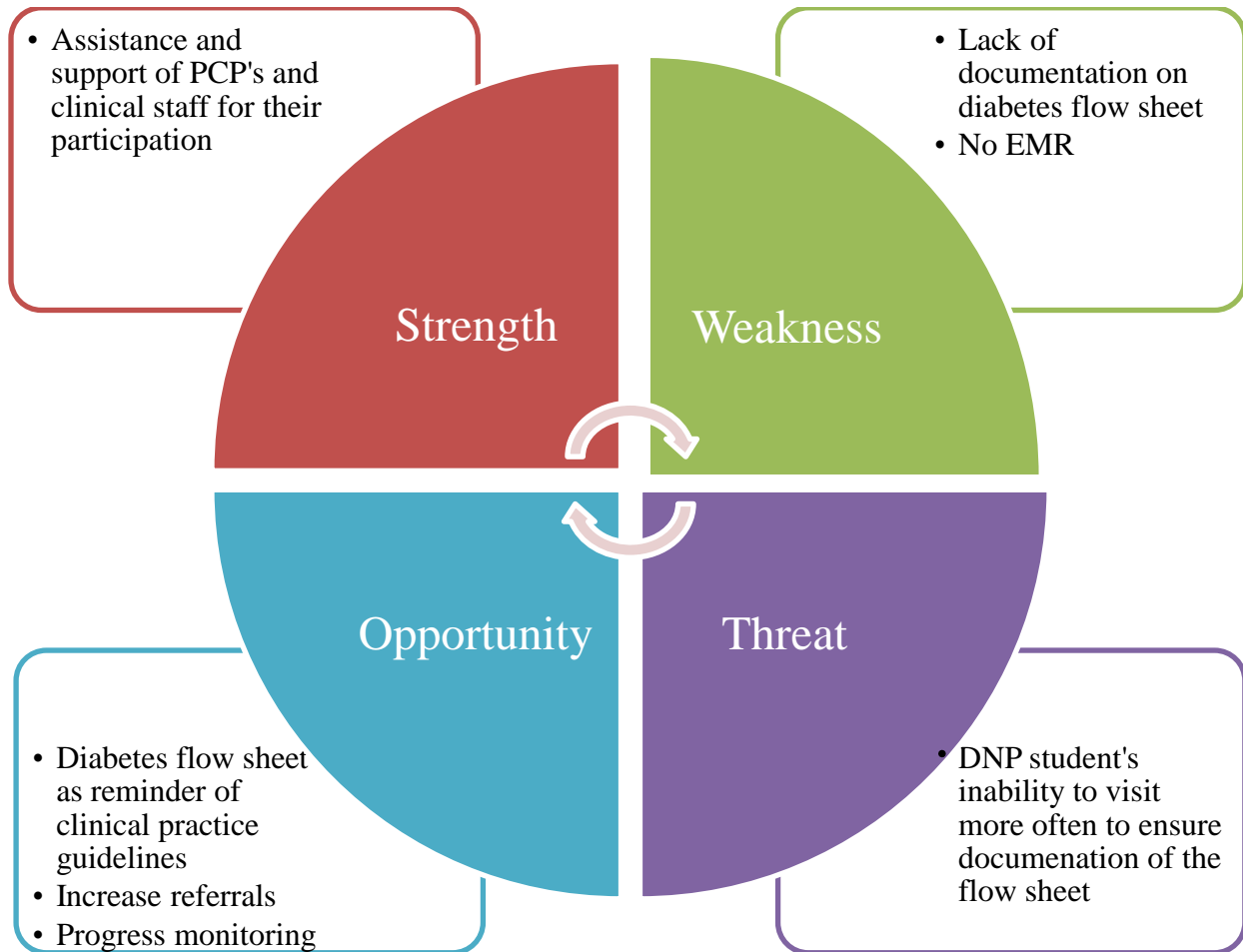
Appendix D

Responsibility and Communication Matrix

Responsibility Communication Matrix	DNP Student	Participants	Time
Audit charts for demographics & gaps in care	R	S	1 Month
Inservice participants on diabetes flow sheet	R	S	15 Minutes
Implementation of project	R	S	1 Month
Documentation reminders postings	R	S	1 Month
Place diabetes flow sheet in charts	R/S	R/S	Weekly for weeks
Documentation of assessments in diabetes flow chart	S	R	6 weeks
Weekly chart audits	R	S	6 weeks
Implementation of evaluation	R	S	6 week Post Implementation
Completion of survey	S	R	6 week Post Implementation
Audit charts post implementation	R	S	6 week Post Implementation
Evaluation of results survey & diabetes flow chart	R/I	S	6 week Post Implementation
R = Responsible			
S = Support			
I = Informs			

Appendix F

Strength, Weakness, Opportunity, Threat (SWOT) Analysis



Appendix G

Diabetes Flow Sheet based on ADA 2019 and NCQA 2018 Guidelines

Name _____ Date of Birth _____ Height¹ _____

Diabetes Measures	Every Visit					
Date of Visit						
Weight ¹						
BMI ¹						
Blood Pressure ^{1,2}						

Diabetes Measure	Quarterly Visit					
Date of Visit						
HbA1c: Poor control >9% ²						
HbA1c: Fair control <8% ²						
HbA1c: Good control <7% ^{1,2}						

Diabetes Measure	Yearly Visit					
Date of Visit						
Nephropathy (spot urine test for albumin or protein or ACE or ARB) ^{1,2}						
Random albumin/protein						
ACE/ARB (Y or N)						
Foot exam (referral) ¹						
Eye Exam (referral) ^{1,2}						

Adapted from ADA Standards of Medical Care in Diabetes 2019¹
 Adapted from NCQA Comprehensive Diabetes Care 2018²

Appendix H

Clinical Practice Guidelines Measures Adapted from ADA 2019 and NCQA 2018

Measures	ADA Recommendation 2019
	NCQA Guidelines 2018
Height	B recommendation
Weight	B recommendation
BMI	B recommendation
Blood pressure	B recommendation ¹ NCQA ²
HbA1C	A recommendation ¹ NCQA ²
Nephropathy Profile	B recommendation ¹ NCQA ²
Eye examination	B recommendation ¹ NCQA ²
Foot examination	B recommendation

¹Adapted from ADA Standards of Medical Care in Diabetes 2019.

²Adapted from NCQA Comprehensive Diabetes Care 2018.

Appendix I
Staff Evaluation Survey

1. Circle your professional role (select only one)

MD NP MA Front Office Receptionist

2. Did you view the diabetes flow sheets in the charts? Yes No

3. Did you complete any components of the diabetes flow sheet? Yes No

4. Did you find the diabetes flow sheet useful?

Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly agree
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5. Did the diabetes flow sheet save time?

Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly agree
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6. Was the diabetes flow sheet easy to follow?

Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly agree
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7. Please list the reasons why you are/not satisfied with the diabetes flow sheet.

8. Please list any suggestions you have for improving the diabetes flow sheet.

Appendix J

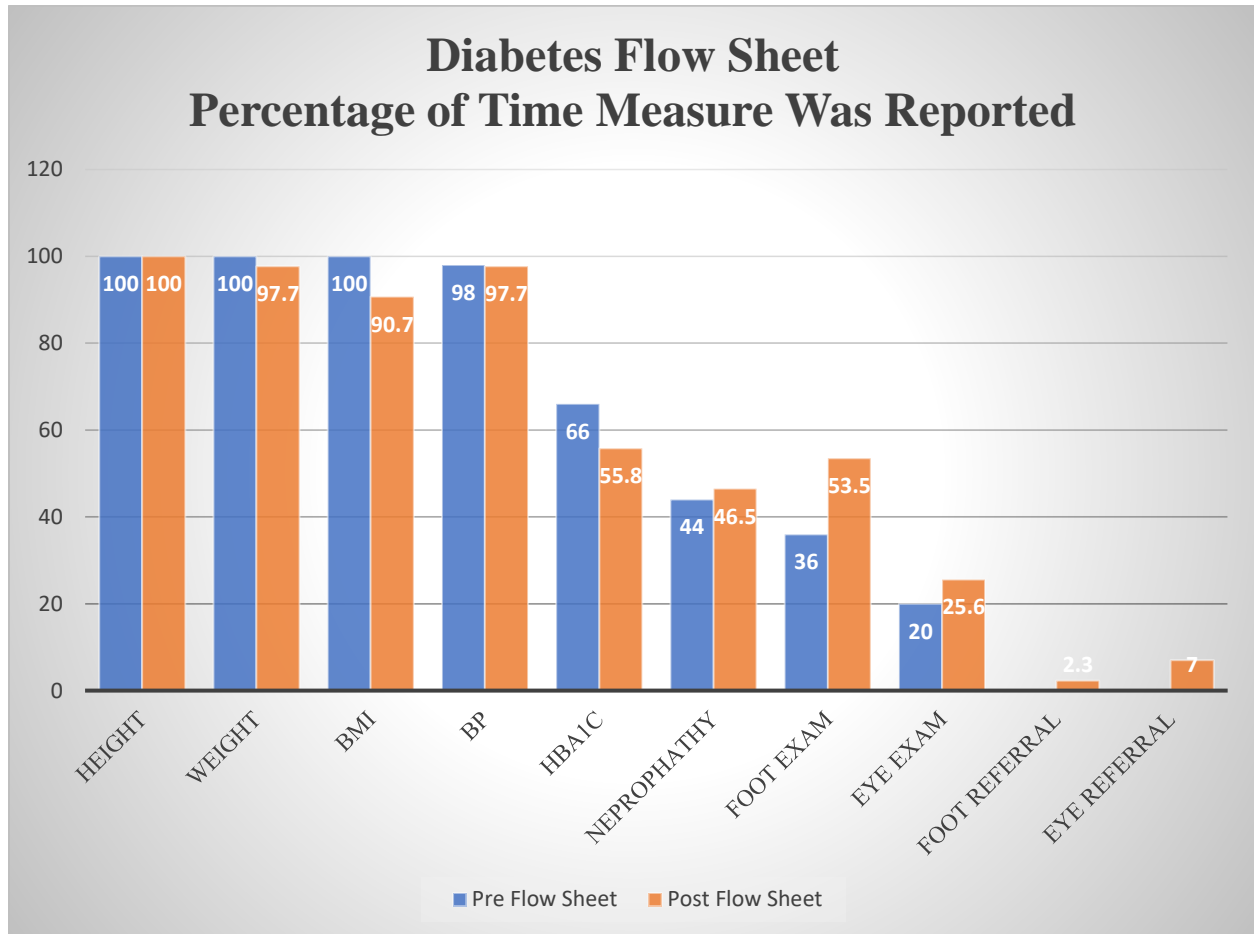
Paired T Test Table

Paired T-test Comparison of Mean Documentation Scores before and after Implementation of Diabetes Flow Sheet

Score	<i>M (SD)</i>	<i>t</i>	<i>df</i>	<i>p</i>
Pre Flow Sheet Score	11.67 (1.06)	8.26	42	<.0000
Post Flow Sheet Score	13.67 (1.34)			

Appendix K

Pre and Post Diabetes Flow Sheet Score



Appendix L

Staff Evaluation Survey Responses

Staff Evaluation Survey

Response Question	Score (%)
Did you view the diabetes flow sheet in the chart?	100%
Did you complete any components of the diabetes flow sheet?	50%
Did you find the diabetes flow sheet useful?	
Strongly disagree	0%
Disagree	0%
Neither agree nor disagree	25%
Agree	0%
Strongly agree	75%
Did the diabetes flow sheet save time?	
Strongly disagree	25%
Disagree	0%
Neither agree nor disagree	50%
Agree	0%
Strongly agree	25%
Was the diabetes flow sheet easy to follow?	
Strongly disagree	0%
Disagree	0%
Neither agree nor disagree	25%
Agree	0%
Strongly agree	75%
Please list the reasons why you are/not satisfied with the diabetes flow sheet.	
Mainly focused on problem	Easy to follow
Helps keep records on one sheet	Easy to monitor progress
Easy to check when preventive is due	More work for the provider
Please list any suggestions you have for improving the diabetes flow sheet.	
Maintain a bright color for the flow sheet as a reminder	

Note. Responses to staff evaluation survey.