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Point-of-Care Reminders to Prompt Provider Adherence with Diabetes Care Guidelines for Adults

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**POINT-OF-CARE REMINDERS TO PROMPT PROVIDER ADHERENCE WITH
DIABETES CARE GUIDELINES FOR ADULTS**

by

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EVIDENCE-BASED PRACTICE PROJECT REPORT

Submitted to the College of Nursing and Health Professions

of Valparaiso University,

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in partial fulfillment of the requirements

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DEDICATION

I would like to dedicate this project to my wife and two children. To my wife, Kaelan, I know there have not been so many #perksofbeingmrsspohn these last three years, but your love, grace and support have helped to secure a lifetime of indebtedness to you. To Bella and Tripp, thank you for all your sacrifices as Daddy has had to isolate himself away from you to write a paper, take a test, or to just study. I love you all.

To my SoEpic friends who have encouraged me and prayed for me, and mostly for Kaelan, I can't thank you enough. To Marta, David, Suzy, and Kenzie, thank you for allowing me to practice on and alongside you, complain to and with you, and for pushing me to learn and be better every step of the way. I appreciate each and every one of you!

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ABSTRACT

Diabetes is a complex, chronic illness, and a leading cause of morbidity and mortality (ODPHP, 2019). Gaps in diabetes care exist between clinical guidelines and interventions provided in the clinical setting (ADA, 2015; Chauhan et al., 2017; Renders et al., 2001; Worswick et al., 2013). Improved diabetes management strategies and interventions among healthcare providers are essential to close the quality gap. The purpose of this evidenced-based practice (EBP) project was to prompt providers to adhere to diabetes care guidelines using a paper point-of-care reminder over a 12-week period. Provider performance rates covering four specific guidelines were measured: HbA1c, microalbuminuria, diabetic foot exam and referral for retinal screen. The Johns Hopkins Nursing Evidence Based Practice (JHNEBP) model (Dang & Dearholt, 2017) was used to guide the project. After careful synthesis of the evidence, a paper point-of-care reminder was determined to be the best method for improving provider adherence to clinical guidelines. The practice change was developed and implemented in two clinics within a Northern Indiana healthcare system. Weekly chart audits were conducted to collect and analyze data to determine the effectiveness of the implementation. Outcomes of the four diabetic measures will be tested for statistical significance utilizing a paired sample Wilcoxon signed-rank test. Recommendations based on the results of the EBP project will be made to the healthcare system. The healthcare system may, then, implement protocols and procedures for a paper point-of-care reminder system to improve provider performance rates and close the quality gap.

CHAPTER 1

INTRODUCTION

Background

Diabetes is a complex and chronic illness, and a leading cause of morbidity and mortality worldwide. Currently, it is the seventh leading cause of death in the United States (US) (Office of Disease Prevention and Health Promotion [ODPHP], 2019). According to the Healthy People 2020 initiative, diabetes is defined as “when the body cannot produce enough insulin or cannot respond appropriately to insulin” (ODPHP, 2019). Left unregulated, diabetes leads to several metabolic abnormalities, and micro- and macrovascular complications. Several of these conditions include heart disease, blindness through diabetic retinopathy, kidney disease, and lower extremity amputations (Centers for Disease Control and Prevention [CDC] (2019d; Lawrenson et al., 2018; Renders et al., 2001). As of 2014, there were 14.2 million emergency department visits and 7.2 million hospitalizations of patients where diabetes was listed as at least one diagnosis (CDC, 2019d).

With diabetes numbers on the rise worldwide, there is a growing need for improved diabetes management on the part of primary healthcare providers (ODPHP, 2019, Renders, 2001). The American Diabetes Association (ADA) has created an authoritative “*Standards of Care*” to offer providers “the components of diabetes care, general treatment goals, and tools to evaluate the quality of care” (ADA, 2017, p. S1). However, challenges remain as healthcare systems seek to educate patients in efforts to change their behavior, as well as adapt policy to meet the changing evidence-based practice (Chauhan et al., 2017; Renders et al., 2001; Worswick et al., 2013). Gaps in diabetes care exist between clinical guidelines for best care and the interventions conducted in the clinical setting (American Diabetes Association [ADA], 2015,

Chauhan et al., 2017; Renders et al., 2001; Worswick et al., 2013). Throughout the literature, several quality improvement strategies and interventions are offered as recommendations for both diabetes care and improving provider adherence to clinical practice guidelines. Providers often unconsciously neglect to perform care guidelines, as they may be encumbered by the health system's policies and practices, or by patient load. Regardless, certain benchmarks have been established as best care and providers do not always meet them.

Data from the Literature Supporting Need for the Project

There is a tremendous need for review and new ways to implement best practice as 30.3 million people in the US have diabetes (9.4% of US population, with an estimated 7.2 million are undiagnosed (23.8%) (CDC, 2019c). As of 2017, \$245 billion was spent on medical costs and wages for people with diabetes (CDC, 2019b). In Indiana alone, diabetes rates have escalated from 5.4% in 1996 to 10.4% as of 2016 (CDC, 2019a). Quality measure benchmarks are established by the Centers for Medicaid and Medicare Services (CMS) prior to reporting years for Accountable Care Organizations (ACOs) (CMS, 2019). Benchmarks for diabetes care have been established for the following screenings at 90%, yet as of 2015, 49.8% of patients with diabetes have had an eye exam; 70.6% have had a foot exam by a provider; 73.1% had two or more A1c tests in the previous year. Therefore, it has been determined that major gaps exist in diabetic care between evidence-based research guidelines and clinical practice (Chauhan, et al., 2017; Lawrenson, et al., 2018; Worswick, et al., 2013).

Data from the Clinical Agency Supporting Need for the Project

Based on payer reports that measure completion of diabetic quality measures, the health system has an opportunity to better manage the closure of diabetic care gaps. According to the 2018 Group Practice Reporting Option (GPRO) (quality measures reported for the Medicare

Shared Savings Program ACO), the health system's performance rates were: Hemoglobin A1c Poor Control – 13.90% (inverse measure - measures % of beneficiaries whose A1c is not in control); and Diabetic Foot Exam – 51.19%. The most recent data (through August 2019) of the focused health system's performance rates were: Diabetic Hemoglobin A1c screening- 61.9% (this measures the number of diabetic patients who have had their A1c performed in the last year); Diabetic Eye Exam – 51.5%; and Diabetic Foot Exam – 38.6%. As evidenced by the numbers listed above, this system is not meeting the quality benchmarks that have been set. According to the Director of Physicians, a quality improvement team has sought out interventions that would close their care gaps. Four screenings were identified as current unmet policy guidelines: 1) diabetic hemoglobin A1c screening; 2) microalbuminuria; 3) diabetic foot exam; 4) referral to ophthalmologist for diabetic retinal screen.

Purpose of the Evidence-Based Practice Project

The purpose of this evidenced-based project (EBP) was to prompt providers by implementing a point-of-care reminder to adhere to care guidelines that they might measure improved provider performance. The results from this EBP project may be used by the healthcare system to implement protocols and procedures for a point-of-care reminder system to meet quality benchmarks.

PICOT Question

Specifically, this project addressed the following PICOT question: In providers for patients with diabetes, how does a point-of-care reminder compared to no reminder affect provider adherence to diabetes care guidelines thus resulting in improved provider performance rates over a 12-week period.

Significance of the EBP Project

The aim of this EBP project was to improve provider adherence of diabetic care guidelines by implementing a consistent process across the healthcare system for diabetic quality gap closure. This can be accomplished by developing a protocol for the use of a point-of-care reminder for providers throughout the healthcare system. The organization is permitted to use the results of this project to create a protocol and procedure for the use of a point-of-care reminder as an ongoing intervention. Diabetes is a significant financial burden to patients, healthcare systems and the community at large. Costs between 2012 to 2017, according to the ADA (2017), rose by 26%. Healthcare systems are in need of interventions to ensure they are meeting care guidelines and Medicare Shared Savings ACO benchmarks.

CHAPTER 2

EBP MODEL AND REVIEW OF LITERATURE

This chapter provides a synopsis of the EBP model chosen for this project, application, and strengths and weaknesses. This section also gives an overview of the literature search consisting of the appraisal and synthesis of evidence examined, the hierarchy of the levels used, and the best practice recommendation of focus.

Evidence-based Practice Model

Overview of EBP Model

Evidence-based practice (EBP), according to the Institute of Medicine (IOM), is considered a core competency for all healthcare providers (Dang & Dearholt, 2017; IOM, 2003). Melnyk & Fineout-Overholt (2015) define EBP as a “problem-solving approach to clinical decision-making.” The IOM’s (2009) recommendation is that 90% of clinical decisions are based on best evidence by 2020 (Dang & Dearholt, 2017). Ideally, evidence is to be based on inquiry, appraisal of current research, and translated into practice. In order for this to be accomplished, an EBP model fosters the adoption of evidence and streamlines the processes until standard practices reflect the evidence (Dang & Dearholt, 2011).

The Johns Hopkins Nursing Evidence Based Practice Model (JHNEBPM) was founded by the organizational leadership at the Johns Hopkins Hospital upon the recognition of gaps in the standard for nursing practice and the implementation of the research findings. Based on nurse evaluation of different EBP models, the JHNEBP model was formed consisting of a conceptual model, process, and tools to guide nurses through the critical steps of the EBP process. Research, education, and clinical practice are considered the core of the conceptual model triad for professional nursing practice. Internal factors such as culture, environment, equipment/supplies,

staffing, and standards influence EBP. Likewise, external factors like accreditation, legislation, quality measures, regulation, and standards all influence EBP (Table 2.1).

Implementation of the JHNEBP model is conducted through using three phases: practice questions, evidence, and translation (PET process). Under the practice questions phase, the clinical question is refined in answerable terms, a leader is designated, and an interprofessional team is formed to gather evidence to determine if a practice change is recommended. Through the evidence phase a search is conducted for up to date evidence. This evidence is screened for inclusion criteria, abstracted, appraised using a rating scale, and summarized for easy translation. The evidence is then synthesized, and recommendations are made by the team based on the level, quality, and quantity of evidence. Lastly, the translation phase is designed for the implementation of the team's recommendations. The practice change is then evaluated and disseminated throughout the organization. Translation is incorporated into the organization quality improvement (QI) structure in order to effectively communicate the changes, and to engage the organization in adopting the recommended changes (Melnik & Fineout-Overholt, 2015). The entire process for the EBP is conducted in 19 strategic steps through the three aforementioned phases (Dang & Dearholt, 2017).

Application of EBP Model to DNP Project

The JHNEBP model and its 19-step process was utilized for the purpose of guiding the DNP project. All steps were conducted in their strategic order throughout the three phases and applied to the project. The EBP question was developed and refined in the form of the following PICOT question: "In providers for patients with diabetes, how does a point-of-care reminder compared to no reminder affect provider adherence to diabetes care guidelines thus resulting in improved provider performance rates over a 12-week period?" A team leader was identified to

facilitate the process of moving the project forward. Bi-weekly team meetings were held to determine practice change recommendations. Phase two of gathering the evidence was accomplished with a search of both internal and external evidence and was appraised using the Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool in order to determine the type, level and quality of the evidence. Recommendations were then made based on the synthesis of evidence for a point-of-care reminder to be used. Phase three, translation, consisted of the team implementing and evaluating the practice changes, and translating and disseminating the results throughout the organization.

Strengths and Limitations of EBP Model for DNP Project

There are several strengths to the JHNEBP model, which were evident throughout the process of this EBP project. The fact that nurses created this model is especially helpful in any healthcare setting as nurses comprise the majority of healthcare professionals by any one role (Dang & Dearholt, 2017). Therefore, they have tremendous potential to bring about change through the research and implementation of EBP (Dang & Dearholt, 2017). This model requires a team approach as the identification of the clinical problem, gathering of evidence, and implementation and dissemination of findings are verified by a collaboration of team members. The linear approach through the 19 steps and three phase PET process is simple to follow and is easy to teach and duplicate. The model takes into consideration both internal and external factors as well as research, education, and clinical practice which provides an all-encompassing model that reduces barriers to its utilization.

While the 19 steps can be viewed as linear in nature and become cumbersome and tedious. Though it can be useful throughout a health care system, it does not focus on

organization culture and their openness for change, making it better geared toward the individual clinic (Schaffer, Sandau, & Diedrick, 2013).

Literature Search

Sources Examined for Relevant Evidence

An exhaustive search of the literature was conducted to attain the strongest evidence for the EBP project. The search was conducted within the electronic databases: Cumulative Index of Nursing and Allied Health Literature (CINAHL), Cochrane Library, Joanna Briggs Institute, Medline with full text via EBSCO, and PubMed. Data mining and hand searching were completed with one overview of systematic reviews selected.

In each database, search terms were identified from the PICOT question and later from mesh terms found in preliminary articles. Key words, mesh terms, Boolean operators, the use of AND to combine words or phrases, OR to search for relevant synonyms, truncation, and date limiters were all used to find the best evidence. Primary limiters were date range between 2009-2019, English language, and scholarly journals, where applicable. Each of the following search terms were identified as generating the best evidence throughout the various databases: MM "Guideline Adherence" AND provider* OR doctor* OR physician* OR practitioner* AND intervent* OR reminder* OR "audit and feedback" AND "healthcare outcome" OR "quality improvement" OR impact OR effect* (see Table 2.1).

The search resulted in 1,093 pieces of evidence pertaining to guideline adherence, providers, interventions, or outcomes. The project leader identified 33 articles meeting the research criteria and a more extensive review was completed. Exclusion criteria consisted of (a) patient-focused only studies; (b) single-study evidence; (c) or reviews with too many inconsistencies to clearly identify a conclusion(s). Upon the application of exclusion criteria,

nine sources of high-quality evidence were retained by the project leader including seven systematic reviews and two overviews of systematic reviews.

Cochrane yielded the greatest number of selected pieces of evidence from the best search with a total of four articles being selected. Initial search terms were intervention* AND diabetes AND adherence OR compliance, which yielded five articles. This did provide one article that was used for a citation chase resulting in another article being selected for final review and analysis. Eventually, both would be selected. Ultimately, the best search results were intervent* AND physician* AND reminder* yielding 16 systematic reviews and 524 trials (four selected). JBI generated 62 results with the same search terms as Cochrane, yet none were relevant to the EBP project, so the project leader eliminated this database for the search.

Next, the project leader moved to CINAHL using search terms including MM "Guideline Adherence" AND provider* OR doctor* OR physician* OR practitioner* AND intervent* OR reminder* OR "audit and feedback" AND "healthcare outcome" OR "quality improvement" OR impact OR effect*. This generated 168 results, 10 of which were selected for review and analysis, and zero were utilized for final review. These same terms were used for Medline, which had 417 results with eight being duplicates from the CINAHL search. PubMed was also searched with the same terms as CINAHL and Medline and yielded 197-thousand plus articles. The search terms were altered for Cochrane and JBI and generated 440 results, with only two being relevant. However, they were both duplicates from other database searches. Hand searching was utilized and produced two results, which were duplicates found in Cochrane, CINAHL and Medline. A seminal piece was found often in the literature and was citation chased via grey literature found on the website for the *American Diabetes Association (ADA)*.

Table 2.1

Literature Search Results

Database/Resource Searched	Keywords/Phrases Used	Limiters Used	Number of Results from Search	Relevant Pieces of Evidence
Cochrane	Intervent* AND physician* AND reminder*	none	16 SRs 524 Trials	4 Systematic Reviews 4 selected
JBI	Intervent* AND physician* AND reminder*	none	62	0
CINAHL	MM "Guideline Adherence" AND provider* OR doctor* OR physician* OR practitioner* AND intervent* OR reminder* OR "audit and feedback" AND "healthcare outcome" OR "quality improvement" OR impact OR effect*	2013-2019 Scholarly Journals English	168	10 0 selected
Medline	MM "Guideline Adherence" AND provider* OR doctor* OR physician* OR practitioner* AND intervent* OR reminder* OR "audit and feedback" AND "healthcare outcome"	2013-2019 Scholarly Journals English	417	10 2 selected

	OR "quality improvement" OR impact OR effect*			
PubMed	Intervent* AND physician* AND reminder*	Last 10 years Full text	440	2 Systematic Reviews/duplicates 0 selected
Hand chased articles				1 Systematic Review 1 Overview of Systematic Reviews

Levels of Evidence

The nine articles selected were leveled using Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool. This tool analyses evidence based on a hierarchy ranging from level one, which is the strongest, to level three, the weakest. Level one consists of experimental studies, level two are quasi-experimental, and level three are quantitative non-experimental or qualitative in design.

Seven of the nine pieces of evidence are rated as level 1 or high quality based on the aforementioned criteria according to the JHNEBP Appraisal Tool (see Table 2.2). Two exceptions were Arditi et al., 2017, due to 5 non-randomized trials, and Shojania et al., 2009, due to 6 of 28 studies were quasi-experimental.

Appraisal of Relevant Evidence

All nine articles were also appraised using the Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool. This tool examines a study's design, results, and conclusions to determine its quality rating. The tool assigns a rating of A, B, or C to each piece of evidence. A grade of "A" or "high" is given for reviews that are "consistent, generalizable, sufficient sample size, adequate control, and well-defined conclusions and recommendations" (Dang & Dearholt, 2017, p. 131). A "B" or "good" is given for "reasonably consistent results, sufficient sample size, some control, and fairly definitive conclusions" (Dang & Dearholt, 2017, p. 131). Lastly, a grade of "C" or "low or major flaw" is given for "little evidence with inconsistent results, insufficient sample size, and conclusions [that] cannot be drawn (Dang & Dearholt, 2017, p. 131).

Table 2.2
Appraisal of Literature

Citation	Purpose	Design	Sample	Results/Findings	Level/ Quality
Arditi, C., Rège-Walther, M., Durieux, P., Burnand, B. (2017). Computer-generated reminders delivered on paper to healthcare professionals: effects on professional practice and healthcare outcomes. <i>Cochrane Database of Systematic Reviews</i> , 7(1175). doi: 10.1002/14651858.CD001175.pub4	The purpose of this systematic review was to evaluate how paper reminders, generated through a computer system, would affect guideline adherence by providers and subsequently the effects on patient outcomes.	Systematic review	The review included 35 analyzed studies (30 RCTs and 5 non-randomized trials). 32 were specific to outpatient care. 15 studies assigned patients to a study group while the others all used cluster-allocation methods. 10 were specifically aimed at the providers, while others were pointed toward the clinic or staff, and one was aimed toward the family.	Reminders have a moderate-certain level of improvement, 6.8% overall. Reminder-only methods show improvement at 11%. When combined with other interventions, a slight increase was noted at 4% when compared to the other intervention(s). Uncertainty remains as to whether reminders ultimately improve patient outcomes, regardless of if they improve provider quality of care.	Level 2, High Quality Database: Cochrane
Chauhan, B. F., Jeyaraman, M., Mann, A. S., Lys, J., Skidmore, B., Sibley, K. M., Abou-Setta, A., & Zarychanski, R. (2017). Behavior change interventions and policies influencing primary healthcare providers' practice – an	The purpose of this overview was to review previous systematic reviews to determine the best interventions to improve	Overview of Systematic Reviews	138 reviews were used consisting of 3,502 individual studies. 91% were systematic reviews covering behavior and changes in practice by family physicians.	Several interventions were identified as beneficial to provider behavior change. Education, training, audit and feedback, and reminders were among the primary findings. These were shown to improve screening rates, prescription rates as well as	Level 1, High Quality Database: Citation Chasing

overview of reviews. <i>Implementation Science</i> , 12(38). doi:10.1186/s13012-016- 0538-8	behavior change by providers.			improving patient outcomes and limiting adverse effects.	
Ivers, N., Jamtvedt, G., Flottorp, S., Young, J. M., Odgaard-Jensen, J., French, S. D., O'Brien, M. A., Johansen, M., Grimshaw, J., Oxman, A. D. (2012). Audit and feedback: effects on professional practice and healthcare outcomes. <i>Cochrane Database of Systematic Reviews</i> , 6(259). doi: 10.1002/14651858.CD000 259.pub3	The purpose of this systematic review was to determine the effects of audit and feedback (alone or as a co- intervention) on providers to change their practices and ultimately patient outcomes.	Systematic Review	140 studies were included in this review. 82 comparisons after exclusion criteria applied. Any intervention was included as long as audit and feedback was a core component.	The results revealed that a multimodal intervention that includes audit and feedback significantly increases provider adherence with a weighted median adjusted RD of 4.3%.	Level 1, High Quality Database: Cochrane
Jeffery, R. A., To, M. J., Hayduk-Costa, G., Cameron, A., Taylor, C., Van Zoost, C., & Hayden, J. A. (2015). Interventions to improve adherence to cardiovascular disease guidelines: a systematic review. <i>BMC Family Practice</i> , 16, 147. https://doi-	The purpose of this systematic review was to assess the effects of several interventions that improve providers' adherence to	Systematic Review/Met a-analysis	38 RCTs were analyzed for review that included interventions for adherence and patient outcomes. Meta- analysis was conducted for comparable interventions.	Several intervention types were compared. Guideline dissemination, education, audit and feedback, reminders, academic detailing, team building exercises, case management, among others. Statistical significance was found only in the education component,	Level 1, High quality Database: Medline

org.ezproxy.valpo.edu/10.1186/s12875-015-0341-7	CVD guidelines.			0.58 [95% confidence interval 0.35 to 0.8].	
Lawrenson, J., Graham-Rowe, E., Lorencatto, F., Burr, J., Bunce, C., Francis, J. J., Aluko, P., Rice, S., Vale, L., Peto, T., Presseau, J., Ivers, N., & Grimshaw, J. M. (2018). Interventions to increase attendance for diabetic retinopathy screening. <i>Cochrane Database of Systematic Reviews</i> , 1(CD012054). doi: 10.1002/14651858.CD012054.pub2	The purpose of this systematic review was to test the effectiveness of interventions which would increase diabetic retinopathy screening (DRS) for people with type 1 or 2 diabetes.	Systematic Review	66 RCTs were included in this review, with 62% conducted in the USA.	Meaningful improvements were made via QI interventions, which targeted patients, healthcare professionals, and healthcare systems. 329,164 participant through 56 studies reviewed the intervention versus the usual care. There was an overall improvement of DRS screenings of 12%.	Level 1, High quality Database: Cochrane
Renders, C. M., Valk, G. D., Griffin, S. J., Wagner, E., van Eijk, J. T., Assendelft, W. J. J. (2000). Interventions to improve the management of diabetes mellitus in primary care, outpatient and community settings. <i>Diabetes Care</i> , 24(10). doi: 10.2337/diacare.24.10.1821	The purpose of this review was to assess the effectiveness of various interventions and their effect on health care professionals and their practice and/or their healthcare system.	Systematic Review	41 studies were included in review. Included were comparable interventions, study participants, common settings, and similar outcomes.	Improvements were seen with interventions targeting providers, with limited studies on patient outcomes. Interventions aimed at the organization showed a positive effect. Interventions pertaining to patient teaching and role enhancement were shown to be favorable.	Level 1, High quality Database: Cochrane

<p>Shanbhag, D., Graham, I. D., Harlos, K., Haynes, R. B., Gabizon, I., Connolly, S. J., & Van Spall, H. G. C. (2018). Effectiveness of implementation interventions in improving physician adherence to guideline recommendations in heart failure: a systematic review. <i>BMJ Open</i>, 8(3), e017765. https://doi-org.ezproxy.valpo.edu/10.1136/bmjopen-2017-017765</p>	<p>Implementation interventions were reviewed, which improved provider adherence pertaining to heart failure (HF).</p>	<p>Systematic Review</p>	<p>38 Studies were included with 13 focused on provider-specific interventions; 18 focused on the organization level; 3 focused on the system level; and 4 focused on multi-level interventions.</p>	<p>Multimodal interventions showed the greatest significance. 84% of the studies revealed significant improvements using at least one of the interventions. Reminders were shown to be effective when combined with education and audit and feedback.</p>	<p>Level 1, High quality Database: Medline</p>
<p>Shojania, K. G., Jennings, A., Mayhew, A., Ramsay, C. R., Eccles, M. P., Grimshaw, J. (2009). The effects of on-screen, point of care computer reminders on processes and outcomes of care. <i>Cochrane Database of Systematic Reviews</i>, 3(1096). doi: 10.1002/14651858.CD001096.pub2</p>	<p>The purpose of the systematic review was to specifically look at on-screen computer reminders and its effects on provider processes and outcomes.</p>	<p>Systematic Review</p>	<p>28 studies were included in the review. All studies needed to be randomized or quasi-randomized for inclusion criteria to be met.</p>	<p>Computer generated reminders revealed small to moderate improvements in provider behavior. Specifically, there was a 4.2% increase in provider adherence.</p>	<p>Level 2, High quality Database: Cochrane</p>

<p>Worswick, J., Wayne, S. C., Bennett, R., Fiander, M., Mayhew, A., Weir, M. C., Sullivan, K. J., & Grimshaw, J. M. (2013). Improving quality of care for persons with diabetes: An overview of systematic reviews—what does the evidence tell us? <i>Systematic Reviews Journal</i> 2(26). doi: 10.1186/2046-4053-2-26</p>	<p>The purpose for this overview is to evaluate the effectiveness of various interventions to improve the quality of diabetes care.</p>	<p>Overview of systematic reviews</p>	<p>125 Reviews were used and then summarized results from 50 high level reviews. Reviews were categorized based on intervention type. Interventions included patient education and support, telemedicine, provider role changes, organizational changes.</p>	<p>Quality improvement measures were shown to be less effective than interventions such as patient education and support, provider role changes, and telemedicine.</p>	<p>Level 1, High Quality Database: Citation Chasing</p>
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Level I evidence.

An overview of reviews conducted by Chauhan et al., (2017) was to focus on previous reviews to determine which interventions would best improve behavior change in family care providers. One Hundred thirty-eight reviews were selected, which contained 3,502 individual studies; 91% of which were systematic reviews. Numerous interventions were determined to be effective. Education, training, audit and feedback, and reminders were among the primary findings to show improvements in screening rates, prescription rates, patient outcomes and limiting adverse effects. According to the JHNEBP appraisal tool, this overview is a level one, high quality study.

Ivers et al., (2012) was a systematic review to determine the effects of audit and feedback (as single or co-intervention) on providers to change their practices and ultimately improve patient outcomes. Following exclusion criteria, there were 82 studies compared as long as audit and feedback was a core intervention in the study. Findings indicated that a multi-modal approach, which included audit and feedback, brought about the greatest increases of provider adherence. The weighted median adjusted RD was 4.3%. Critically appraising this article, this systematic review is a level 1, high quality study.

A systematic review/Meta-analysis by Jeffery et al., (2015) assessed the effects of numerous interventions that improve providers' adherence to cardiovascular disease (CVD) guidelines. Thirty-eight randomized controlled trials (RCTs) were reviewed and analyzed that included interventions geared toward both provider adherence and patient outcomes. Intervention types were compared and shown to be effective, including guideline dissemination, education, audit and feedback, reminders, academic detailing, team building exercises, and case management. Statistical significance was only found in the education arm of the study 0.58 [95%

confidence interval 0.35 to 0.8]. Leveling and appraising this article with the JHNEBP tool provides a level 1, high quality review.

Lawrenson et al., (2018) tested the effectiveness of interventions, which would increase diabetic retinopathy screening (DRS) for people with type 1 or 2 diabetes. In this systematic review, they analyzed 66 RCTs. Through quality improvement (QI) projects, interventions were targeted toward patients, healthcare professionals (providers and nursing staff), and healthcare systems. In total 329,164 participants, through 56 studies, reviewed the intervention versus the usual care. There was an overall improvement of DRS screenings of 12%. This study is a level 1 and appraised as high quality.

Renders et al., (2001) was reviewed as a seminal piece of work as it appeared in several other studies' references. It appears to be among the earlier systematic reviews covering interventions to improve the level of care by providers as it pertains to diabetes. Their purpose was to review and assess interventions and their effectiveness toward providers, their organization, or their healthcare system. Forty-one studies were included with comparable interventions, participants and settings, including primary care, outpatient and community settings. Interventions targeting providers saw improvements, as well as interventions aimed at organizations. While interventions aimed at patients did see improvements in overall care, specific results for patient outcomes were limited. Appraising and leveling this systematic review has it as level 1 and of high quality.

Shanbhag et al., (2018) reviewed implementation interventions in their systematic review to assess provider adherence pertaining to heart failure (HF). Thirty-eight studies were reviewed in total, with 13 provider-focused intervention studies, 18 organization-specific studies, three system-level, and four multi-level-specific studies. Studies with a multimodal approach revealed

the greatest improvement. Eighty-four percent of the studies showed significant improvements with at least one intervention. Reminders, when combined with education and audit and feedback were shown to be effective. This systematic review is a level 1, high quality study.

Another overview of systematic reviews by Worswick et al., evaluated various interventions and their effectiveness on improving the quality of diabetes care. Systematic reviews were analyzed and summarized consisting of 125 reviews, in total. Fifty high level reviews were identified and categorized by intervention type. Categories included patient education and support, telemedicine, provider role changes, and organizational changes. This review did consist of patient-specific articles, but also had provider-focused components as well, thus it was retained for the EBP project. Upon critical appraisal of this systematic review, it is considered level 1, high quality study.

Level II evidence.

A systematic review conducted by Arditi et al., (2017) evaluated paper reminders, generated through a computer system, their effect on guideline adherence by providers and subsequently the effects on patient outcomes. Included were 35 studies (30 RCTs and 5 non-randomized trials). Thirty-two were specific to outpatient care. Fifteen studies assigned patients to a study group while 20 used cluster-allocation methods. Ten were specifically aimed at the providers, while 19 were pointed toward the clinic or staff, and one was aimed toward the family. The authors concluded that reminders have a moderate-certain level of improvement, 6.8% overall. Reminder-only methods show improvement at 11%. When combined with other interventions, a slight increase was noted at 4% when compared to the other intervention(s). Uncertainty remains as to whether reminders ultimately improve patient outcomes, regardless of

if it improves provider quality of care. Because not all studies were randomized, this article is a level two, high quality.

Shojania et al., (2009) is a level 2, high quality article due to the fact that some studies reviewed were quasi-experimental. Twenty-eight studies in all were included specifically reviewing on-screen computer reminders and how it affected provider processes and eventual outcomes. Findings showed a 4.2% increase in provider adherence with the use of computer-generated reminders.

Construction of Evidence-based Practice

Synthesis of Critically Appraised Literature

Education

All research articles recommended an educational component for providers and/or nursing staff (Arditi et al., 2017; Chauhan et al., 2017; Ivers et al., 2012; Jeffery et al., 2015; Lawrenson et al., 2018; Renders et al, 2001; Shanbhag et al., 2018; Shojania et al., 2009; Worswick et al., 2013) with two specifically recommending educational outreach visits conducted by an educational team geared toward providers (Chauhan et al., 2017; Renders, et al., 2001). There were variations to how the educational sessions could be conducted, with some identifying routine educational meetings or seminars as opposed to emails or electronic communication (Ivers et al., 2012; Shanbhag et al., 2018).

Although, Jeffery et al., (2015) only identified the educational component to be effective, most others found that education in conjunction with other co-interventions proved to be most successful (Arditi et al., 2017; Ivers et al., 2012; Jeffery et al., 2015; Shanbhag et al., 2018). Shojania et al., (2009) contends that benefits, which involve improvements in processes are small, with little discovery on patient outcomes, while Chauhan et al., (2017) and Lawrenson et

al., (2018), declare that multi-modal interventions such as education with audit and feedback and provider enablement can effectively improve patient outcomes.

Audit and Feedback

In addition to education, another key intervention was audit and feedback. Most often, audit and feedback were combined with education and/or training. When utilized, it did show improvements in provider adherence and ultimately, patient outcomes when combined with other interventions (Arditi et al., 2017; Chauhan et al., 2017; Ivers et al., 2012; Jeffery et al., 2015; Lawrenson et al., 2018; Renders et al, 2001; Shanbhag et al., 2018; Shojania et al., 2009; Worswick et al., 2013). This is also backed up by 32 studies found by Shojania et al., (2009), which indicate that audit and feedback with at least one other intervention proved effective when compared to audit and feedback alone. Ivers et al., (2012) indicates that reminders and feedback had a greater effect on treatment intensification than feedback alone (adjusted RD = 7.25%; no P value reported). Recently, reviews by Shanbhag et al., (2018) found that education with only audit and feedback did not see significant improvement but the combination of education, audit and feedback, *and* reminders all aimed at providers did see improvement.

Reminders

Likewise, reminders were shown across most studies to be effective, either in addition to other interventions or by themselves. Point-of-care reminders have been shown to be effective in modifying provider practice and patient outcomes (Chauhan et al., 2017; Ivers et al., 2012; Lawrenson et al., 2018; Renders et al., 2001; Worswick et al., 2013). Two forms of reminders are consistently identified as either computer-generated or reminders on paper. Arditi et al., (2017) conducted their search on computer-generated reminders delivered on paper, but most others do not specify how paper reminders are generated. Analyzing the studies, the most that list

computer generated indicate that the reminder is “on” the computer either in the form of a pop-up, tab, or electronic medical record (EMR) at the point of care that lists the care guidelines (Ivers et al., 2012; Shanbhag et al., 2018; Shojania et al., 2009; Lawrenson et al., 2018; Renders et al., 2001; Worswick et al., 2013). Patient outcomes (hospitalizations, quality of life, and disease targets) and mortality were improved with the use of reminders when combined with education and/or audit and feedback (Jeffery et al., 2015; Shanbhag et al., 2018).

Best Practice Model Recommendation

After reviewing the literature, three primary interventions for best practice appeared as evidential: education, audit and feedback, and reminders aimed at providers. Given that education was not sufficient for the EBP project and the fact that it was a natural component of any intervention, it was not the best practice model recommendation. Audit and feedback were already being utilized as a quarterly “report card” issued to providers at the sites of interest. Therefore, it did not meet criteria for the EBP project. However, opportunities did—and still do—exist for improvements in the current structure of the audit and feedback system. This left reminders as the primary option for implementation at identified sites. The project leader and the QI team met over the course of two months deliberating the merits of a computer-generated, on-screen pop-up window versus a paper reminder. After initial discussions with the IT department, it was deemed that a paper reminder would be the intervention of choice. The project leader and the QI team worked together to design a paper reminder that would be provided to a nurse or medical assistant (MA) prior to rooming a patient with diabetes. The reminder would then be given to the provider at the point-of-care to be checked off. Following each patient visit, the nurse or MA were able to enter the data into the electronic medical record (EMR) for later data retrieval.

CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

A paper point-of-care reminder for providers was created and implemented August 26 through November 15, 2019. The purpose and goal of this EBP project was to measure the effectiveness of a point-of-care reminder to prompt providers to adhere to diabetic care guidelines. Improving adherence to care guidelines could lead to better patient outcomes like improving hemoglobin A1C.

Participants and Setting

The implementation of this EBP project occurred at two different clinics, which are both a part of a larger not-for-profit healthcare system located in North-Central Indiana. The clinics each serve a diverse population based on their expansive geographical area and the distance between them. Sociodemographic factors, socioeconomic status and types of insurance coverage all are significant considerations to the broad range of clients.

Pre-Intervention Group Characteristics

In addition to clientele, each clinic has multiple providers ranging in age and experience. All were primary care providers, specializing in family practice. Providers consisted of 11 medical doctors (MDs) and one nurse practitioner (NP) ranging in age from 28 to 62, with experience levels ranging from 2 years to 35 years of clinical practice.

Intervention

Utilizing the JHNEBP model for practice change, a literature search was conducted to determine the best method for improving provider adherence to clinical guidelines. Upon synthesis of the evidence, needs of the clinic, and requirements for the project, paper point-of-care reminders were determined to be the best implementation for practice change. The practice

change was developed and implemented in two of the healthcare system's clinics. The project leader and members of the quality initiative (QI) team visited multiple clinics within the healthcare system to determine both effective and ineffective practices for diabetic clinical guideline adherence. Several clinics were using a paper form for point-of-care reminders and other clinics had no reminder system. The two clinics that were chosen for the project had no reminder system in place and had consistently low performance across the four measures of diabetic hemoglobin A1c screening, microalbuminuria, diabetic foot exam, and referral to ophthalmologist for diabetic retinal screen.

The paper point-of-care reminder was developed by the project leader in conjunction with the QI team and was implemented at the two selected clinics. The reminder was a checklist of the four key diabetic guidelines to be performed by the provider. Nursing staff consisting of nurses and/or medical assistants (MAs) were educated on the reminder, the procedure, and expectations. Prior to every visit by a patient being seen for diabetes management, the nursing staff would give the checklist to the provider as a reminder of the guidelines needing to be performed or verified as completed within the limits of the guidelines (i.e. eye exam within the previous two years).

Nursing staff and/or providers charted in the EMR that the four measures were completed within guideline limits. The project leader performed weekly chart audits to collect and analyze data as well as record providers' and subjects' specific demographic information. The project leader captured and maintained data for each individual clinic and correlated with the other clinics in order to determine the effectiveness of the implementation across multiple sites. Specific provider adherence rates were analyzed by the healthcare system for their private use and were not maintained for this project.

The project leader and key stakeholders sought positive ways in which they could influence the providers and their staff when resistance was encountered. The most effective approach was facilitation and support. The project leader spent time with providers and staff each week going over the reminders, discussing methods to streamline the process, and seeking ways to support them. The health care organization (HCO) created a monitoring system for those providers that remained resistant and each provider was informed of their completion of the reminder forms. At the conclusion of the implementation, the project leader provided approximately thirty-seven dollars' worth of pastry snacks to the two clinics, combined.

Comparison

The practice change is centered on current diabetic quality measures in four specific areas, which guidelines require 90% completion rate. Baseline rates for the first clinic at the beginning of the implementation period were: 1) diabetic hemoglobin A1c screening—48.5%; 2) microalbuminuria—79.4%; 3) diabetic foot exam—36.3%; 4) referral to ophthalmologist for diabetic retinal screen—44.3%. Baseline data for the second clinic was 1) diabetic hemoglobin A1c screening—53.1%; 2) microalbuminuria—80.3%; 3) diabetic foot exam—24.6%; 4) referral to ophthalmologist for diabetic retinal screen—39.3%.

Outcomes

This project focused on one primary outcome: provider adherence to diabetes care guidelines. Provider adherence was measured based on Group Practice Reporting Option (GPRO) quality measures that are reported for the Medicare Shared Savings Program ACO. These were conducted through reports generated with the electronic medical record (EMR). This information was also accessed via the EMR by the project leader and/or the QI team members.

Time

The project implementation began the week of August 26, 2019 to coincide with the organization's quarterly reporting period. The chosen timeframe of 12 weeks was based on current guidelines that patients with diabetes have their HbA1c tested every three to six months.

Protection of Human Subjects

Prior to implementation, the DNP project was proposed to the Valparaiso University Institutional Review Board (IRB) to ensure that subjects were protected, and their rights were maintained. Safeguards were put in place to ensure recorded subject data was gathered and maintained via secure electronic access. All electronic access was secured with password-required logins, and encrypted email communication between all parties. No patient identifiers were maintained outside of secured clinical access centers or electronic reports without secured access by both the project leader and the QI team members.

CHAPTER 4

FINDINGS

This EBP project was developed and implemented to provide an evidence-based approach aimed at improving providers' adherence to completing diabetic care guidelines. The PICOT question posed was "In providers for patients with diabetes, how does a point-of-care reminder compared to no reminder affect provider adherence to diabetes care guidelines thus resulting in improved provider performance rates over a 12-week period?" Provider adherence was measured by comparing the completion of the guidelines, by chart audit, before and after implementing the point-of-care reminder. The following data analysis detailed the participant demographics and outcomes of the point-of-care reminder tool.

Participants

Provider-specific demographics were recorded for comparison. All providers (N=12) in both clinics participated in the EBP project utilizing the point-of-care reminders. Among them, 11 were medical doctors (MDs) and one nurse practitioner (NP). There were seven males and five females who participated. Data for the two clinics were separated, analyzed, and compared. Clinic one had seven providers, four male, three female, and the lone NP participant (female). Clinic two, had five providers, three male and two female. Years of practice experience was also compared with the providers ranging from 0-10 years (n=5), 11-20 years (n=4), 21 years or more (n=2). Results for the various demographics were not significant.

Changes in Outcomes

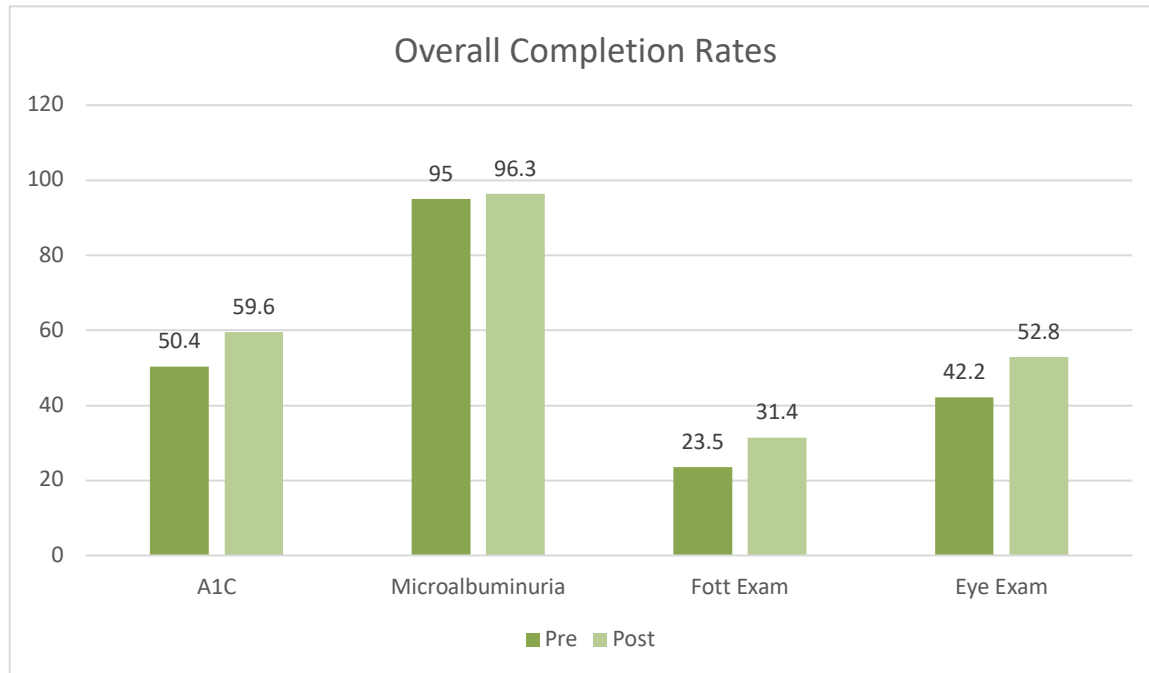
Prior to implementation, baseline data was gathered and reviewed for both clinics and all participating providers. Over the course of the 12 weeks, the paper point-of-care reminder forms were collected, and charts audits were performed to confirm completion accuracy of paper

reminders. Data were then analyzed, and a final evaluation of completion rates was compared to the baseline findings.

Statistical Testing and Significance

Effectiveness of the point-of-care reminder was assessed for statistical significance with the use of SPSS. A paired-samples *t*-test was calculated comparing provider completion rates for all four diabetic measures before implementation with no reminder to the completion rates after the point-of-care reminder was implemented. Provider demographic characteristics were calculated using a Pearson correlation coefficient. Provider adherence, across three of the four guideline measures, (HbA1C, foot assessment, and retinal eye screening) had statistically significant higher completion rates following the implementation of the point-of-care reminders (Table 4.1).

Table 4.1 Overall Provider Completion Rates



Findings

The first paired-samples *t*-test was calculated to compare the mean performance rates for HbA1c to the mean performance rates at the end of 12 weeks. The mean at baseline was 50.41 (*sd* = 19.42), and the mean final rate was 59.63 (*sd* = 14.11). A significant increase from baseline to final was found ($t(11) = -3.318, p = .007$). The second paired-samples *t*-test was compared the mean performance rates for diabetic foot exams to the mean final performance rates. The mean at baseline was 23.51 (*sd* = 17.39), and the mean final rate was 31.41 (*sd* = 16.81). A significant increase from baseline to final was found ($t(11) = -3.726, p = .003$). Next, a paired-samples *t*-test was calculated to compare the mean performance rates for retinal eye screening to the mean performance rates at the end of 12 weeks. The mean at baseline was 42.22 (*sd* = 13.40), and the mean final rate was 49.31 (*sd* = 13.40). A significant increase from baseline to final was found ($t(11) = -3.773, p = .003$). The last paired-samples *t*-test was calculated to compare the mean performance rates for microalbuminuria to the final mean performance rates. The mean at

baseline was 94.99 ($sd = 7.84$), and the mean final rate was 96.30 ($sd = 5.56$). While there was an increase in raw data, no significant difference from baseline to final was found ($t(11) = -.773, p > .05$) (Table 4.2).

Table 4.2 Paired Samples *t*-test

Comparison	<i>t</i>	<i>df</i>	Sig.
Pre-A1c – Post-A1c	-3.318	11	.007
Pre-Foot – Post-Foot	-.733	11	.003
Pre-Eye – Post-Eye	3.726	11	.003
Pre-Micro – Post-Micro	-3.773	11	.456

A Pearson correlation coefficient was calculated examining provider gender and provider years, with all four guideline measures. Weak correlations were found. Neither, provider gender nor years in practice were significant to the final outcomes. As rates indicating improvement or decline in overall adherence were already calculated for each provider, a test for statistical significance was not calculated on an individual provider level.

CHAPTER 5

DISCUSSION

The purpose of this EBP project was to determine if the implementation of a point-of-care reminder in the family practice setting increased providers' adherence to diabetes care guidelines compared to no reminder. There were statistically significant increases in provider adherence in three out of four diabetic care measures. This chapter will provide an evaluation of the project findings using the Johns Hopkins Nursing Evidence Based Practice (JHNEBP) model and the project's strengths and limitations. Implications of the point-of-care reminder for future practice, theory, research and education will also be discussed.

Explanation of Findings

Project findings supported the effectiveness of the point-of-care reminders for prompting providers toward adherence of diabetes care guidelines. Several statistically significant differences were found by utilizing a paired *t*-test when comparing the pre- and post-implementation of this project. There was a significant increase in provider performance rates in three guideline measures: HbA1c, diabetes foot assessment and diabetes retinal screening. However, overall provider performance rates were lower for microalbuminuria. The findings of the EBP project answered the PICOT question by demonstrating the effect of a point-of-care reminder on the adherence of providers over the course of a 12-week period.

These results were consistent with the current literature that demonstrates reminders are an effective tool to prompt providers toward guideline adherence. Systematic reviews by Shojania et al., (2009) and Arditi et al., (2017) indicated reminders had "small to moderate" and "moderate to certain" levels of improvement, respectively. Both pieces of literature indicated that while reminders alone may bring about improvements in adherence rates, improvements are

noted when combined with other modalities. All foundational articles for the project note that a multi-modal approach to improving provider performance rates was what was necessary for positive effect (Arditi et al., 2017; Chauhan et al., 2017; Ivers et al., 2012; Jeffery et al., 2015; Lawrenson et al., 2018; Renders et al., 2001; Shanbhag et al., 2018; Shojania et al., 2009; Worswick et al., 2013). Modalities most often listed were education, audit and feedback, and reminders. The focus of the project was on reminders. However, education and audit and feedback were unmeasured components utilized by the project leader throughout the project.

Aside from reminders, education was instrumental in preparing providers and staff for project implementation. Throughout the project, the project leader continued to meet with providers and staff to educate them on proper methods of completing the reminder forms and for proper documentation in the EMR. Audit and feedback were already a major component for the healthcare system in the form of quarterly scorecards. In addition, the project leader conducted weekly audits and chart checks, and provided ongoing feedback to providers, staff, and key stakeholders. Current literature indicates such a multi-modal approach as a potential cause for the statistically significant outcomes. Given that only three out of four guidelines were shown to be statistically significant was congruent with the literature that uncertainty remains whether reminders alone ultimately improve outcomes (Arditi et al., 2017; Chauhan et al., 2017; Ivers et al., 2012; Shanbhag et al., 2018; Shojania et al., 2009).

Evaluation of the EBP Model

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model was used as the framework for translating the PICOT question into nursing practice. The goal of the JHNEBP is to promote the translation of evidence into every area of nursing practice (Melnyk & Fineout-Overholt, 2015). It can be concluded that the JHNEBP model was the appropriate framework to

guide this EBP project. The JHNEBP model is implemented through the three phases of the PET process: (1) *practice question*, (2) *evidence*, and (3) *translation*. Each phase has distinctive steps aimed at guiding evidence translation. The PET process was conducted through the 19-step process, which was strategically utilized throughout the EBP project.

The first phase of the JHNEBP model establishes the foundation for the EBP project through the development of the practice question. Identifying and implementing strategies to improve provider performance rates was the motivating factor for the EBP project. In this initial phase the clinical question is refined based on best practices found through a thorough search of current literature. The PICOT question for this project evolved from its initial form based on current recommendations from the literature. The original PICOT question aimed to determine the best method for prompting providers toward guideline adherence. Through careful analysis of the literature, three primary modalities were presented. Education, audit and feedback, and reminders were most often shown as beneficial. Education and audit and feedback were already components being utilized by the healthcare organization, while reminders were not. The PICOT question was refined to reflect best evidence found in the literature as it pertained to reminders. Following the final development of the PICOT question, key stakeholders were identified, and the implementation schedule was determined.

The evidence phase consists of analyzing the evidence, appraising the level and quality of the evidence, and making recommendations based on the synthesis of evidence (Melnik & Fineout-Overholt, 2015). Nine articles were selected, appraised for level and quality and synthesized. Synthesis of the literature served as the basis for the EBP protocol practice change. Based on the synthesis of evidence, and following the recommendations of the JHNEBP model to utilize the evidence, the team moved the project toward the translation phase.

In this final translation phase, the project leader and key stakeholders developed an action plan for implementing and evaluating the practice change. Key stakeholders notified the two clinic practice managers of the project and its timeline. The project leader and members of the quality improvement (QI) team developed and refined the point-of-care reminder to be utilized. The project leader and QI team performed weekly chart audits to determine outcomes. As determined by the model, outcomes were evaluated, and results were disseminated to the key stakeholders and throughout the two participating clinics. Results were evaluated and recommendations for next steps were made.

The JHNEBP model provided the EBP project with the necessary steps of identifying the clinical problem, gathering and analysis of evidence, and the implementation and dissemination of findings. The model required a team approach which was critical to this EBP project with input from the project leader, key stakeholders, members of the QI team, and the staff and providers of the two clinics. While the model is linear in nature, it does allow for revision of previous steps and refinement of implementation methods based on both internal and external factors such as research, education, and clinical practice. The model was easy to follow as it was geared toward the two individual clinics.

Strengths and Limitations of the DNP Project

Strengths

Strengths of the project included the ease of the implementation process. Minimal education was necessary for providers and staff on the point-of-care reminder form, as it simply required patients name, date of birth, today's date, and checking the boxes if the guidelines were met (See Appendix A). HbA1c was the only test where the level was required and the date it was completed. Weekly audits were performed to ensure that what was checked on the form was also

documented in the EMR. Providers and staff were offered consistent feedback which was a strength of the project in accordance with the EBP model. Another factor was the low cost involved for the project. The only cost to the clinics was the printing of the forms, which two reminders were printed on each page and could be cut in half (See appendix A).

The most important factor were the significant results of provider adherence in three out of four diabetes care guideline measures. Though patient outcomes were not measured, the literature indicates that improved provider adherence has a positive effect on patient outcomes (Arditi et al., 2017; Chauhan et al., 2017; Lawrenson et al., 2018; Renders et al, 2001; Shanbhag et al., 2018; Shojania et al., 2009). Renders et al., (2001) indicates that interventions geared toward both providers and organizations have a positive effect on provider performance rates thus impacting patient outcomes.

Limitations

As previously mentioned, patient measurements were not evaluated as they did not address the PICOT question. The implementation was 12 weeks, therefore, patients who had their HbA1c checked at baseline and returned three months later for another test would not be affected by whether or not the provider ordered another test. However, providers performing all guidelines as required, would allow them and their patients to remain up to date on their results. Small sample size (N=12) of providers limits the ability to translate the results system-wide. A significant barrier was that the project was originally designed for three clinics, but the practice manager at the third clinic refused the project. A strength of the JHNEBP model is that it was developed by nurses for the translation of evidence into nursing practice. This project had only one nurse practitioner (NP) therefore making it impossible to associate her performance rates to those of other NPs or providers.

Implications for the Future

Practice

Point-of-care reminders were shown to be effective in three of four guideline measures and would be recommended to the health care organization as a future protocol. The reminders were used in conjunction with education and audit and feedback as a multi-modal approach. This aligns with the literature that indicates the effectiveness and benefits of this strategy. The health care organization as a whole did not have a standard reminder in place. Some nursing staff in other clinics had created their own reminder sheets for patients with diabetes and for other co-morbidities. Expanding the protocol for the entire health care organization may lead to improved provider performance rates, which may lead to improved patient outcomes. Both factors that could potentially increase reimbursement from the Centers for Medicaid and Medicare Services (CMS).

By increasing their opportunities to capitalize on CMS reimbursements, the health care system could see more monetary gains. The fact that providers were previously not meeting guideline goals for CMS, the health care organization would need to develop a method of holding providers accountable for their deficiencies. Without a team to consistently audit and provide feedback as well as discipline, simply having a reminder form may not be enough. There must be accountability to ensure that not only is the form being utilized, but that results are being properly documented. If it is not documented, it did not happen.

Theory

As mentioned, the JHNEBP model served its purpose for the two individual clinics and offered a guide to the project overall. A 19-step process may be disadvantageous to a larger organization with a larger number of stakeholders involved in the decision-making processes.

That said, the three phase PET process offers a strategic guide to addressing a clinical problem and translating that into clinical practice. Though the model can be recommended for smaller clinics or offices, it would be best for a larger health care organization to collectively determine which model is best for their organization.

Research

Further research is necessary to determine the impact nurse practitioners (NP) would make with the use of point-of-care reminders and a multi-modal approach. With only one NP participating in the project, effectiveness of outcomes cannot indicate if NPs have better performance rates than their physician colleagues. This project did not establish if reminders only would have a significant effect on provider adherence or performance rates. Education and audit and feedback were primary modes along with the reminders. Advance practice nurses (APNs) are in a favorable position to initiate future research or EBP projects regarding the use of reminders, or a multi-modal approach to improve provider adherence to clinical guidelines, thus closing the quality gap.

Education

The outcomes of this EBP project and the knowledge gained have implications for APNs and nurse educators. APNs and nurse educators can take the results of this EBP project to establish protocols and procedures for a point-of-care reminder, which may improve provider performance rates, and ultimately patient outcomes. Educating staff on the four measures will increase their knowledge of the expected guidelines. Many staff in the two clinics for this project, were unaware that retinal screenings were part of their health care maintenance for patients with diabetes. Several staff members needed to be educated that getting a glomerular filtration rate (GFR) would not meet the criteria for microalbuminuria. As diabetes numbers

continue to rise, APNs and nurse educators can be at the forefront of ensuring providers and nursing staff are educated on the guidelines and best practices to meet them.

Conclusion

The purpose of this evidenced-based project (EBP) was to prompt providers by implementing a point-of-care reminder to adhere to care guidelines. The practice change was guided by the JHNEBP model and the PET process was followed throughout the project asking the clinical question, conducting an extensive search and analysis of the literature, implementing a change in practice, and evaluating the outcomes. This EBP project successfully showed that a point-of-care reminder significantly improved provider adherence and performance rates in three of four guideline measures. These findings indicate that a standard point-of-care reminder, in conjunction with existing education and audit and feedback components is recommended to the health care organization as indicated in the literature.

The results of the EBP project indicate the opportunity for further research and APNs are situated perfectly to lead such projects. Gaps remain between diabetes guidelines and interventions in the clinical setting. Improved diabetes management strategies and interventions are needed to close the quality gap. APNs can take the lead in closing that gap effectively implementing a reminder system in their respective organizations. By utilizing their roles as educator, clinician, researcher, consultant, and leader to implement protocols and procedures, APNs can improve provider performance rates, patient outcomes and close the quality gap.

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BIOGRAPHICAL MATERIAL**Eric E. Spohn**

Mr. Spohn graduated from Indiana University South Bend with a Bachelor of Science in Nursing in 2016. While at IUSB, he co-authored an EBP research paper on pain reduction in pediatric IV insertion that was published in the 2016 IUSB undergraduate research journal. Upon graduation, he worked as a registered nurse on a medical-surgical, orthopedics, and neurology unit. With an interest in research, he represented his clinical setting on the Professional Practice and Research Council implementing evidence-based practice throughout the hospital. He continues to serve as a member of the Michiana Alliance for Men in Nursing (M.A.N.), whose mission is to shape the practice, education, research, and leadership for men in nursing. Before he started his career in healthcare, Mr. Spohn spent 15 years serving in various ministry capacities, including as a counselor and teacher at a home for men recovering from drugs and alcoholism, and as a pastor. Fulfilling a lifelong dream, he enlisted in the United States Army, serving from 2007-2011. After being medically retired due to injuries sustained in combat, he pursued a career in nursing as a new way to serve his community. Mr. Spohn knew from the start of his nursing journey that he wanted to pursue his Doctor of Nursing Practice (DNP) at Valparaiso University due to the program's global focus on healthcare systems and leadership. Mr. Spohn is committed to caring for underserved populations and pursuing leadership positions that shape healthcare policy. Recently, he moved to outpatient behavioral health and will be pursuing his Psychiatric-Mental Health nurse practitioner certification from Purdue University.

ACRONYM LIST

ACO: Accountable Care Organizations

ADA: American Diabetes Association

ANA: American Nurses Association

APA: American Psychological Association

APRN: Advance Practice Registered Nurse

CDC: Centers for Disease Control and Prevention

CINAHL: Cumulative Index of Nursing and Allied Health Literature

CMS: Centers for Medicaid and Medicare Services

DRS: Diabetic Retinal Screening

EBP: Evidence-Based Practice

EMR: Electronic Medical Record

GFR: Glomerular Filtration Rate

GPRO: Group Practice Reporting Option

HCO: Health Care Organization

HF: Heart Failure

IOM: Institute of Medicine

IRB: Institutional Review Board

JHNEBP: Johns Hopkins Nursing Evidence Based Practice model

MA: Medical Assistant

MD: Medical Doctor

NP: Nurse Practitioner

ODPHP: Office of Disease Prevention and Health Promotion

PET Process: Practice Questions, Evidence, and Translation

PICOT: Population Intervention Comparison Outcome Time

QI: Quality Improvement

RCT: Randomized Controlled Trial

RD: Risk Difference

US: United States

Delete the examples above and the following instructions from your document. The purpose of this list is to avoid having to repeat acronyms across chapters. For example, if you introduce the CDC in chapter 1, then when it reappears in chapter 2, you can use CDC and not write it out again. Once an acronym is introduced in the document put it on the list. List acronyms in alphabetical order, with acronym first, followed by a colon, and then the entity.

Appendix A
Point-of-Care Reminder

DIABETIC CHECK

Date _____ Patient Name _____ DOB _____

HbA1c Level _____ Date completed _____

Microalbuminuria (completed within last 12 months)

Diabetic Foot Assessment (completed within last 12 months)

Diabetic Retinal Screen (referral sent or completed within last 2 years)

Please scan or fax to BMG Quality Department:

Scan: kxxxxx@beaconhealthsystem.org

Fax: 574-647-xxxx

DIABETIC CHECK

Date _____ Patient Name _____ DOB _____

HbA1c Level _____ Date completed _____

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