A Quality Improvement Project to Improve Nurse Confidence and Ability to Educate Diabetic Patients

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Diabetic Patients

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Abstract

Purpose: Diabetes is a leading cause of death in the United States that is associated with complications when uncontrolled, and the prevalence of diabetes is projected to increase. Since many people managing diabetes become hospitalized, nurses can be key personnel to educate these patients prior to discharge. The current literature suggests that nurses lack knowledge and confidence in providing diabetes education; therefore, this project aims to determine if an educational intervention will increase nurse knowledge, confidence, and compliance with providing diabetes education to hospitalized patients.

Methodology: A quality improvement evidence-based intervention using a one-group, pretest-posttest design utilized surveys to measure socio-demographic characteristics of the 26 participating nurses as well as their knowledge about diabetes and confidence in providing diabetes education. A discharge handout was created for nurses to deliver discharge education and a follow-up survey was performed to assess for compliance. Both descriptive and inferential statistics were used to analyze data.

Results: The findings indicated that nurse knowledge (p < .001) and confidence (p < .001) survey results showed statistically significant increases from pretest to posttest. Regarding post-intervention compliance, 10% of unit nurses reported providing discharge teaching and 25% provided the discharge handout to diabetic patients.

Discussion: The pre-assessment results align with literature regarding nurses having knowledge deficits and lacking confidence in diabetes education. The educational intervention was shown to have increased nurse knowledge and confidence. Upon follow-up, only a small percentage of nurses reported delivering diabetes discharge teaching with the handout.
Conclusion: An emphasis on increasing nurse knowledge and confidence about diabetes and equipping them with tools to deliver diabetes discharge education, regardless of admission diagnoses, should be implemented in hospitals around the country to help combat the diabetes crisis. To increase compliance with programs like this, nurses will need oversight and encouragement from their leaders.
A Quality Improvement Project to Improve Nurse Confidence and Ability to Educate Diabetic Patients

Diabetes is a growing health problem in the United States (US). In 2020, there were 34.2 million people diagnosed with diabetes, and as a leading cause of death, diabetes contributes toward other chronic diseases and complications that require hospital and ER visits and incur billions of dollars in healthcare costs (National Diabetes Statistics Report, 2020). In 2016, there were 16 million emergency department (ED) visits that reported diabetes listed as a diagnosis, and at discharge, 7.8 million patients had a diabetes diagnosis (CDC, 2021). Further it is projected that the total prevalence of diabetes in the US population will increase from 14% in 2010 to 21% in 2050 (Boyle et al., 2010). In addition to increased numbers of people living with the diabetes, there is also the likelihood that the rates for chronic disease and complications associated with diabetes will increase such as cardiovascular disease (CVD), neuropathy, retinopathy, peripheral vascular disease, skin infections, hearing impairments, Alzheimer’s disease, and depression (Mayo Clinic, 2023).

Background and Significance

Cardiovascular disease is the leading cause of death in people living with diabetes, and approximately two-thirds had been diagnosed with type 2 diabetes (ADA, 2021). Since many diabetic patients become hospitalized, the acute care stay, especially at discharge, can provide an opportunity for bedside nurses to provide patients with diabetes education to better manage their disease at home (Donihi, 2017). According to the American Diabetes Association (2014), people with diabetes should receive diabetes self-management education (DMSE). Often, patients are admitted because of chronic diseases associated with diabetes such as coronary heart disease or kidney disease. Because of this, education provided during discharge is typically aimed to
address those conditions, and the diabetes co-morbidity and contributory risk factors are often overlooked. There are efforts in hospitals to have diabetes educators provide diabetes education, but because of limited resources, educators can only reach a limited number of patients in the hospital (Donihi et al., 2017; Smith et al., 2018). With the high number of diabetic patients in the hospital, they are often unable to provide diabetic education to each patient. A study by Preechasuk et al. (2019) found that the obstacles diabetes educators identified included high workloads and unclear roles. Many hospitals do not employ diabetes educators, and of the hospitals that do have them, the number of patients exceeds the number that they can feasibly educate (Donihi et al., 2017). For every certified diabetes educator, there are an estimated 1,600 diabetic patients in need of diabetes education services (Healio, 2020).

Bedside nurses are assigned to each patient in the hospital, and with training, they can potentially educate more diabetic patients (Donihi et al., 2017). Training is needed for registered nurses (RNs) because the literature suggests that nurses have knowledge deficits about diabetes and lack confidence in educating diabetic patients (Gerard et al., 2010; Nikitara et al., 2019; Yacoub et al., 2014). If nurses lack knowledge and confidence in diabetes education, they will be unequipped to help patients as they transition from the hospital setting to their homes. As previous studies have shown, an educational program could increase RNs knowledge and confidence in providing diabetic patients with discharge education (Coonfare & Miller, 2020; Corl et al., 2014; Yacoub et al., 2015). Because many patients with a known diabetes history are hospitalized, there is a need for further research and focus on inpatient diabetes care (Nikitara et al., 2019). The national diabetes crisis, lack of hospitalized diabetic patients receiving education, and lack of knowledge and confidence among RNs demonstrates the significance of the clinical problem for this project.
Problem Statement

Because of the lack of diabetes knowledge among RNs and the number of diabetic patients in hospitals exceeding the number of diabetes educators, additional education is necessary to increase nurse knowledge and confidence in providing diabetes education. Diabetes self-management education is reported to be necessary to help diabetic patients care for themselves; however, many hospitals lack standardized processes that assist nurses with having the understanding and skills to provide this education effectively and appropriately. A diabetes educational program targeting nurses may facilitate an increase in their knowledge about diabetes and confidence in their ability to provide patients with discharge education.

Clinical Question

The clinical question is: Among registered nurses working on a Cardiovascular Surgery Progressive Care Unit, will an educational in-service and diabetes handout increase nurse knowledge, confidence, and compliance with providing diabetes education to patients upon discharge?

Purpose and Aims of the Project

The purpose of this project is to assess nurse knowledge, confidence, and compliance regarding diabetes education by implementing an evidence-based diabetes educational session and providing a handout for registered nurses to teach diabetic patients at discharge.

The aims for this project include:

1) Assess baseline knowledge and confidence that nurses have regarding diabetes education and collect socio-demographic information about the nurse participants.

2) Provide nurses with educational sessions regarding diabetes and present the discharge handout containing information that they will be providing to their diabetic patients.
3) Evaluate whether the knowledge and confidence of nurse participants increased after receiving the educational intervention and handout and whether the nurses were compliant with providing the diabetes education presented to patients during discharge.

**Literature Review**

The American Diabetes Association states that all individuals with diabetes should receive DSME at diagnosis and as needed afterward (Powers et al., 2015). DSME is the process of facilitating knowledge, skills, and ability necessary for diabetes self-care among people living with diabetes (ADA, 2016). The goal for educating diabetic patients in the hospital is to engage them in their care and assist them in becoming better informed about diabetes self-management (Powers et al., 2015). The literature search and review were performed using EBSCOhost for peer-reviewed articles about diabetes educational programs targeting RNs. Common themes that were identified in the literature included a) diabetes educational programs increase nurse knowledge and confidence, b) nurses have knowledge deficits in diabetes, and c) there are barriers to providing diabetes education to patients.

**Diabetes Educational Programs Increase Nurse Confidence and Knowledge**

Research has shown that evidence-based diabetes educational programs can positively influence care outcomes (Spiva & Day, 2011; Yacoub et al., 2015). Multiple studies were found in the literature review that implemented diabetes educational programs to assess nurse knowledge and/or confidence regarding diabetes using surveys and questionnaires. Two studies utilized a pre-test to assess nurse knowledge in diabetes, followed by an educational session, and then a post-test to reassess nurse knowledge/confidence (Spiva and Day, 2011; Yacoub et al., 2015). The study by Spiva and Day (2011) used a computer-based educational session and found no statistical difference in scores, however there was slight improvement in knowledge and
confidence regarding diabetes after the intervention. An important limitation of the study was that the response rate for the post-test was lower than the pre-test which likely impacted the results. The quasi-experimental research study by Yacoub et al. (2015) used 129 RNs from 3 hospitals to implement a diabetes education program. The results of this study showed a significant difference in the test scores before and after the education program, and based on the results, the researchers concluded that the educational program had increased the nurses’ knowledge.

Three studies found that implementing diabetes educational programs increased nurse knowledge and confidence as evidenced by increased test scores and/or increased confidence scores based on the surveys (Coonfare & Miller, 2020; Corl et al., 2014; Yacoub et al., 2015). Coonfare and Miller (2020) implemented a diabetes self-management toolkit, trained nurses on the material, and then evaluated the effect of the education. Before the project was implemented, the researchers sent out a needs assessment survey, and based on the results, nursing staff expressed potential barriers to delivering the education. Barriers that were reported included patient willingness to learn, lack of time to assess patient understanding, lack of time to deliver education, patient non-compliance, and using the same material for each patient (Coonfare & Miller, 2020). The results showed that nurse confidence increased after the intervention (Coonfare & Miller, 2020). It was also suggested that more support was needed from leadership and that research should further address gaps in diabetes knowledge (Coonfare & Miller, 2020). The study by Corl et al. (2014) incorporated a diabetes nurse expert team (DNET) model to determine if nurse confidence and expertise would increase in an inpatient diabetes care unit. At a medical center, 78 nurses participated in a workshop led by the Diabetes Clinical Nurse Specialist, and the researchers found that these workshops increased the nurses’ confidence and
expertise in providing diabetes care to hospitalized patients (Corl et al., 2014). This study solely assessed nurses after the educational component was delivered and recommended that future studies assess nurse knowledge and confidence both prior to and after the educational intervention to compare results.

**Nurses Have Knowledge Deficits in Diabetes**

Transitioning diabetic patients to the outpatient setting is an important goal of inpatient diabetes management (Moghissi et al., 2009). According to the literature, nurses lack sufficient knowledge about diabetes regardless of their educational level (Gerard et al., 2010; Yacoub et al., 2014). Because of this, researchers recommend implementing educational programs in hospitals to educate nurses in diabetes. (Gerard et al., 2010; Yacoub et al., 2014). A descriptive cross-sectional design by Yacoub et al. (2014) assessed nurses perceived knowledge about diabetes and compared it to their actual knowledge. Knowledge deficits were seen regarding diabetes medications, symptoms of hypoglycemia, and how to respond to symptoms of hypo- or hyperglycemia. The researchers recommended continuing education programs for diabetes because years of nursing experience and educational level did not have a significant influence on actual knowledge level (Yacoub et al., 2014). Two studies used modified versions of the diabetes basic knowledge test (DBKT) and the average scores of the nurses’ knowledge were about 65% (Gerard et al., 2010; Yacoub et al., 2014). In both studies nearly half of the participants had no continuing education on diabetes in the past 2 years (Gerard et al., 2010; Yacoub et al., 2014). In a study by Krall et al. (2016), nurses expressed feeling incompetent in providing diabetes information to patients, and a fear of not being able to answer patient questions.

**Barriers to Delivering Diabetes Education**
Despite the number of hospitalized patients who have a history of diabetes, there is a lack of research focused on nursing roles for inpatient diabetes care (Nikkitara et al., 2019). Several studies report that nurses agree that diabetes education is both important and necessary (Krall et al., 2016; Nikkitara et al., 2019; Smith et al., 2018). Smith et al. (2018) examined barriers to implementing electronic diabetes survival skills education (DSSE) on inpatient units. Their survey determined nurses were concerned about having enough time to provide the education due to workload and recommended that there be a standardized process to deliver diabetes education (Smith et al., 2018). Two studies discussed the barrier of a lack of education among nurses (Krall et al., 2016; Nikkitara et al., 2019). More studies also found that barriers to delivering diabetes education was that the educational written content should be at a low health literacy for patients to understand (Krall et al., 2016; Smith et al., 2018). Studies also show that nurses need improved education and a standard process on content to teach patients (Coonfare & Miller, 2020; Krall et al., 2016; Nikkitara et al., 2019; Smith et al., 2018). A study of 19 US hospitals found that less than 25% of them had standardized protocols for diabetes education (Rodriguez et al., 2014). Coonfare & Miller’s educational program (2020) discovered barriers which included patient willingness to learn, patient non-compliance, and the same education for all patients. Two studies had nurses report a lack of time to provide diabetes education (Coonfare & Miller, 2020; Smith et al., 2010). Diabetes self-management education is important to help reduce complications of the disease which impact the health care system, as well as the patient’s quality of life and clinical outcomes (Smith et al., 2018). With adequate education provided to patients, outcomes can potentially be improved for patients living with diabetes (Smith et al., 2018).
This literature review supports the need for this project to increase nurse education and confidence regarding diabetes by implementing an educational program on an inpatient unit that currently lacks a standardized process. Studies demonstrated that diabetes educational sessions improved the knowledge and confidence of nurses. This would expectantly allow nurses to educate diabetic patients effectively and confidently at discharge. When nurses were interviewed, most of them stated that diabetes education is important for patients living with this chronic condition. This DNP project will address educational gaps in nurses’ education, confidence, and compliance regarding diabetes education and their ability to educate hospitalized patients at discharge. Recommendations for future projects included utilizing multiple educational strategies other than just one single educational session, and to assess nurse knowledge before and after the intervention. With this education, the patient can potentially be better equipped to perform diabetes self-management activities once discharged from the hospital. With both diabetes educators and registered nurses teaching patients, hospitals will potentially reach more patients. There are many steps to improving a hospital protocol, however, focusing on improving diabetes education for nurses by building their confidence is a starting point to combating diabetes.

**Theoretical Framework**

**Overview of Theory**

Doreatha Orem’s Self-Care Deficit Nursing Theory is a grand nursing theory that was developed to improve the quality of nursing in general hospitals and is one that can be applied to all aspects of nursing (Nursing Theory, 2020). The main idea is that patients want to care for themselves, and that they can recover faster and more efficiently by performing their own self-care needs (Nursing Theory, 2020). She describes nursing as an art where practitioners give
specialized assistance to patients with disabilities, which then demonstrates their need for self-care (McEwen & Wills, 2011). The major assumptions in this theory are that patients are responsible for their care, nursing is an interaction between two people, a person’s knowledge of potential health problems is needed to promote self-care behaviors, and self-care behaviors are learned within the socio-cultural context (Nursing Theory, 2020). Her theory also explains that people engage in continuous communication among themselves and their environment to remain alive and function (McEwen & Wills, 2011). For patients to act purposefully, they need to be able to identify their needs and make good judgements (McEwen & Wills, 2011). Through assessment, nurses can help patients identify their needs and then provide education that enables them to provide better care for themselves. When patients are encouraged to be independent, such as during transition from the hospital to their home setting, this theory can be applied to help them become more independent (Nursing theory, 2020).

**Theory Application**

Orem described nursing as an art where a practitioner gives specialized assistance to patients with chronic diseases, and for this DNP project, the chronic disease is diabetes. This theory is the foundation for this study because many of these patients have self-care deficits in managing their disease, and during discharge there is an opportunity for bedside nurses to help these patients enhance their knowledge. While the intervention isn’t directly targeted at patients, by improving nurse education and confidence in diabetes, they will be better equipped to educate the diabetic patients they care for. Educating patients based on their self-care deficits can help them to live healthier lives once discharged from the hospital.

For these patients, their diabetes self-care demand exceeds their self-care agency, which is when nursing intervention is needed (Nursing Theory, 2020). Patients experience self-care
agency deficits due to low health literacies, lack of knowledge, lack of accessible resources, and their state of health. Through the nurses’ assessment and educational sessions with the patient, they will know their patients’ deficits and be able to address them. Some diabetic patients and nurses need education on topics such as managing a hyper- or hypoglycemia event, how to count/limit carbs, and when to check glucose levels, etc. The properly educated nurse will watch out for these deficits in many ways such as during admission, shift report, the medical record, patient interactions, and while administering medications. Orem’s 5 ways to help patients include doing for, guiding, supporting, providing a healthy environment, and teaching (Nursing Theory, 2020). During the patient’s hospitalization the nurse is “doing” the patients care. The nurse “guides” the patient by showing them the proper techniques for administering medications or giving an insulin shot. The nurse “provides” a healthy environment by developing a trusting relationship with the patient. Lastly, the nurse “teaches” the patient constantly during patient interactions.

Methodology and Implementation

Project Design

This project is a quality improvement intervention using a one-group, pretest-posttest design. Registered nurses on a cardiovascular surgical progressive care unit (PCU) were assessed prior to the diabetes educational intervention and surveyed on their demographics as well as their knowledge and confidence in diabetes. Their knowledge and confidence were again assessed with the same survey after the intervention. Data were analyzed using descriptive and inferential statistics to assess results of the project.

Participants
The project participants included nurses from a cardiovascular surgical progressive care unit (PCU). There are about 30 nurses that work on the unit, and all were encouraged to participate in the project. A total of 26 nurses consented to participate in the project. The inclusion criteria were RNs over the age of 18, male and female, of any ethnicity, prepared at associate’s, bachelor’s, and master’s degree levels. Participants were recruited via email, postings on the unit’s social media page, and word of mouth. The target sample size was 25 participants, or about 80% of the unit’s RNs. The project was available to nurses via email or paper format.

**Setting and Resources**

The project was conducted on a cardiac surgery PCU is located in Ascension Sacred Heart Hospital in Pensacola, Fl. The PCU holds 25-beds and is open 24 hours a day. The RNs on the unit care for patients having coronary artery bypass grafts and vascular surgeries, heart catheterizations, respiratory failure, critical drips, diabetic ketoacidosis, and overflow medical/surgical ICU stepdown patients.

The stakeholders for this project included the Florida State University’s (FSU) College of Nursing Project Approval Committee, the PI’s major professor (Dr. Laurie Abbott), the unit manager (Jonathan Woodard), Cardiovascular PCU staff, diabetes educator from the hospital (Yvonne Burt), unit nursing educator (Sandra Vickrey), the Institutional Review Board (IRB) for both FSU and Ascension Sacred Heart, and the statistician for the College of Nursing.

**Instrument/Tools**

The assessment tools used for the project included two surveys from the St. Peter Family Medicine Residency. The Diabetes knowledge survey (Appendix A) consists of 51 items to assess understanding of topics related to diabetes self-management (St. Peter Family Medicine
Residency, 2003). The confidence survey (Appendix B) consists of 17 questions to assess level of confidence for the nurses performing self-management activities with patients at discharge (St. Peter Family Medicine Residency, 2003). The surveys were modified by deleting questions that were not pertinent to the present study. For this study, the diabetes knowledge test included 26 out of the 51 questions, and the confidence survey included 10 out of the 17 questions. Permission to use the survey instruments was received via email from the institution (Appendix C). Included in Appendix D contains an additional survey created by the PI that were asked of participants approximately 3 weeks after the educational intervention to assess for compliance delivering diabetes discharge education to patients.

Both questionnaires were completed by participants at baseline (pretest) and after the educational intervention, as the posttest. Participants also completed a demographic questionnaire during the baseline assessment with questions such as age, ethnicity, highest educational level, and years of experience as an RN (Appendix E). Additionally, the PI developed a discharge handout (Appendix F), using information from the hospital diabetes educators, that was kept at the nurses’ station for the health unit coordinator to put into the discharge packet of the patients with diabetes. During the educational intervention, nurses were educated about this handout and encouraged to provide discharge teaching to the diabetic patients. The PI additionally educated and encouraged the charge nurses to include the handout with the patients discharge instructions. The stakeholders for this project reviewed these instruments to ensure they were applicable to the project. Data collected from the project were analyzed using Microsoft Excel and SPSS Software.

**Intervention and Data Collection**
All RNs on the Cardiovascular PCU received an introductory email explaining the project information, informed consent, and risks vs. benefits. The project was announced on the unit’s Facebook page and via work emails about one month prior to the distribution of the first in-service. The assessments were available at the nurses station in the PI’s binder for nurses to complete prior to the educational sessions and they were also sent out along with the introductory email. The surveys were uploaded using FSU Qualtrics. The educational intervention was developed by the PI using evidence-based resources provided by the hospital’s diabetes educator. A PowerPoint was developed and utilized during the sessions. Information taught included basic topics for diabetes such as nutrition, medications, monitoring blood glucose, and management of hypo- and hyperglycemia. The second part of the educational intervention included showing unit employees the discharge handout, where it would be kept, and encouraging them to provide this teaching and handout to patients during discharge. The information in the handout was also incorporated into the educational sessions. The intervention took place over one month and occurred during shift change where both day and night shift nurses were present. Additionally, a voice-over PowerPoint was created and posted on the Facebook page and sent out via email for participants to watch if they were not able to attend one of the in-services. After the intervention, participants were provided with same knowledge and confidence surveys. They were encouraged to complete the survey within 24 hours of watching an educational session. A few weeks after the intervention, another questionnaire was implemented inquiring if nurses participated in providing discharge education with diabetic patients.

Once participants completed the surveys, they submitted them to the PI. On the unit, completed surveys were kept in a specific binder. The survey results were kept secure, and on a
password protected computer. The incentive for project participation included a $50 visa gift card given to a random nurse on the unit after the project was complete. Data collection took place beginning August 2022 through November 2022. Barriers to the project included nurse participation, nurse staff fluctuation, and management change.

**Implementation**

In the spring of 2021, the PI conducted the literature to find evidence-based research to support the clinical question. During this time, the PI also met with the unit manager and diabetes educator to determine ability to carry out the project and to gain support from leadership. The diabetes educator provided insight and resources for the proposed project. The MP assisted the PI in developing the project and the instruments. After meeting with these key stakeholders in 2021, the MP and the PI proposed the project to the FSU DNP project committee in November 2021, and the project was approved with minor revisions. In June of 2022, the Office for Human Subjects for both Ascension Sacred Heart Hospital and Florida State University determined the project to be exempt from IRB review. During the summer of 2022, the PI continued communication with key stakeholders that included the MP, diabetes educator, unit manager, and hospital administration. The educational intervention was also developed in the Summer of 2022, and the project was created and published in Qualtrics. At the end of August 2022, the project was initiated, and the project was completed at the end of November 2022. See project timeline via Gannt chart below in figure 1.

**Figure 1**
Project Sustainability

After the completion of the project, nurses will continue to provide diabetes education to the diabetic patients they discharge and provide them with the discharge handout. The handouts are kept at the nurses’ station in a file organizer at the desk of the Health Unit Coordinator. Both the unit secretary and charge nurses can ensure the diabetes handout be distributed to the diabetic patients on the unit. The results of the project were presented to the unit and copies of the discharge handout were provided to the unit educators in the hospital as well as the diabetes educators. The hospital also had a diabetes educational module incorporated into their annual continuing education in the year 2023.

Human Subject and Informed Consent

The PI submitted this project to the FSU the institutional review board (IRB) as well as the Ascension Sacred Heart’s IRB. The IRB application for FSU and Sacred Heart was determined to not be human research in June 2022. The documents of exemption can be viewed in Appendix G and H.

Data analysis
The results of the study were analyzed using descriptive and inferential statistics in Microsoft Excel and IBM SPSS Statistics 27. Descriptive statistical methods included frequencies, percentages, means, and standard deviation. Descriptive statistics were used for both the socio-demographic and the post-intervention follow-up surveys. A one-sample t-test was used for the pre- and post-knowledge and confidence scores. For this statistical hypothesis, it was assumed that for the pre-knowledge assessment, the population mean was the mean for the post-assessment; likewise, for the population mean for post-assessment, the pre-assessment mean was used. This same methodology was used for the confidence scores. The knowledge test had no established scoring system; therefore, one point was given for each correct answer. A score out of 26 was given for the knowledge assessments. The confidence survey utilized a 10 question Likert scale. The total possible maximum score on the scale was 10 and the maximum was 70. The scale was labeled 1-7, one being the least confident and seven being the most confident.

Results

A total of 26 nurses participated in the project and their personal characteristics are shown in table 1 (Appendix I). Based on the demographic survey distributed to participants, 100% (n=26) were female, 88% (n=23) were Caucasian, and 38% (n=10) were between the age of 20-30 years. Forty-six percent (n=12) had an associate’s degree in nursing and another 46% (n=12) had their bachelor’s degree in nursing. For specialty certifications, 19% (n=5) reported being NIH Stroke Scale (NIHSS) certified and 23% (n=6) had their Advanced Coronary life support (ACLS) certification. Most participants had 1-5 years of nursing experience (54%, n=14).

For the diabetes education knowledge assessment, the highest score possible was 26. The overall mean pre-survey score was a 22.27 (SD=2.16) or 85.8%. The minimum score was as 19
and the maximum score was a 26. The mean post-assessment score was 24.12 (SD=1.28) or 92.7%, and the minimum score was a 21 and the maximum score was a 26. A table of descriptive statistics for this data can be found in table 2 (Appendix J), and charts can be located in appendices K and L. The total number of questions missed on all pre-surveys was 93/676 (14%) and the total number of questions missed on the post-survey was 45/676 (7%). A one-sample t-test showed a statistically significant difference between the pre-survey scores compared to the scores of the post-assessment (M=22.27, s=2.16) and 24.12, t(25) = -4.35, p <.001, α=0.05. The second one-sample t-test also showed a statistically significant difference between the post-survey scores compared to the scores of the pre-assessment (M=24.12, s=1.28) and 22.27, t(25) = 7.38, p <.001, α=0.05. These results can be found in appendix M.

For the confidence surveys, one participant did not fill out the questions on the post assessment (n=25), and all filled out the pre-assessment confidence survey (n=26). The mean pre-intervention confidence level was 51.46 (SD=1.10) with a minimum score of 14 and maximum score of 70. The mean post-intervention confidence score was 60.20 (SD=7.04) with a minimum of 45 with a maximum score of 70. A table of the complete list of descriptive statistic results can be found in table 3 (Appendix N) and appendices O and P depict charts of the results. A one-sample t-test showed a statistically significant difference between the pre-confidence scores compared to the scores of the post-confidence (M=51.46, s=11.00) and 60.2, t(25) = -4.05, p <.001, α=0.05. The second t-test comparing the post-confidence scores to the mean pre-confidence was also significant (M=60.20, s=7.04) and 51.46, t(24) = 6.21, p <.001, α=0.05. These results can be found in appendix Q.

A total of 20 nurses answered the follow-up assessment questions regarding the distribution of the discharge education and teaching. Two (10%) of the nurses reported providing
the discharge teaching, and five (25%) reported providing the diabetes handout. Two participants (13%) reported a lack of time provide the discharge teaching and 17 (85%) participants said they did not provided teaching due to another reason. Reasons given for not providing the discharge handout included “couldn’t find the packet” (n=1, 10%) and another reason (n=19, 95%). These results can be found in appendix R.

Discussion

This quality improvement study used a pretest-posttest design to evaluate an educational intervention to determine whether it improved nurse knowledge and confidence in diabetes education and enhanced compliance in providing discharge education. In addition, the socio-demographic characteristics of the participants were examined, and nurses were followed up with after the intervention to assess if they had begun providing discharge education. This study was created after researching similar studies listed in the literature review, and in conjunction with the increasing prevalence of diabetes. Previous studies discussed nurses lacking knowledge and confidence in diabetes and had positive results with implementing diabetes educational programs. Appropriately managing diabetes has received attention recently because of the many associated complications and socioeconomic influences (Yacoub et al. 2014).

Overall, this project appears to have increased the nurses’ knowledge in diabetes education. Before the intervention the mean score was 85.92 (SD=8.17) on the knowledge assessment and after the intervention the mean score was 92.85 (5.15). This increase in score is a positive outcome suggesting that there was an increase in diabetes knowledge after the intervention. The study by Yacoub et al. (2015) had a larger sample size (N=129) and found that their nurse knowledge increased from 52.7% to 78.3% respectively. This finding is important because the literature has shown that nurses lack knowledge about diabetes (Yacoub et al., 2014;
Yacoub et al., 2015). Knowledge deficits were found in the causes of diabetes, symptoms of hypoglycemia, acceptable glucose ranges, hemoglobin A1C, hypoglycemia treatment, medication mechanisms of action. The study by Yacoub et al. (2014) and Gerard et al. (2010) found knowledge deficits in pharmacological treatment of diabetes. Supporting the results of this study, Yacoub et al. (2014) also found that nurses were knowledge deficient in the actions of oral medications, symptoms of hypoglycemia, and response for hypoglycemia. These findings are significant as nurses treat hypoglycemia daily in the hospital setting.

As found in the literature review, nurses in this study also lacked confidence in diabetes education (Spiva & Day, 2011; Krall et al., 2016). The mean pre-intervention confidence level was 51.46 (SD=1.10) and the mean post-intervention confidence score was 60.20 (SD=7.04). This increase in knowledge on the post-assessment by about 8 points is a positive outcome. Nurses felt the least confident discussing meal planning, reading foods labels, and discussing self-management goals according to the presurvey. After the survey nurses felt the least confident in the same areas. This lack of confidence in these areas could be due to the intervention not having a big focus in these areas. Nurses felt most confident before the survey in the areas of discussing blood sugar readings and talking to providers about diabetes patients. After the survey, nurses felt most confident asking question about diabetes, discussing physical activity, and blood sugar readings. This finding is a positive outcome because a barrier to diabetes teaching noted nurses in the study by Krall (2016) reported that nurses lacked confidence in providing accurate information and answering patients’ questions. The educational intervention was more heavily focused on blood sugar readings and physical activity which would make one suspect these increases in knowledge.
The follow-up assessment inquiring if the nurses were delivering the diabetes discharge handout did not have a positive outcome as none of the nurses reported giving out the discharge handout (n=15). Important to note, this was the only study found to have incorporated this component into the study on diabetes education with registered nurses. Most participants reported “other” as reasoning for not providing the discharge teaching. This outcome reaffirms the challenges that bedside nurses face and highlights more strategies are needed to facilitate delivery of discharge education (Krall et al., 2016). When talking with nurses, some participants reported to the PI that they never saw the discharge handout in their patients discharge materials. Possible reasons for this could be due to not discharging a diabetic patient, nurses who work on night shift and do not discharge patients, forgetting that a handout was created, and the unit coordinator/charge nurse not incorporating the handout with the discharge material.

Because of the positive outcomes in nurse confidence and knowledge after this intervention and other studies, more units in this hospital and other hospitals should consider implementing programs like this one (Spiva & Day, 2011). In future programs, participants individual scores from pre- to post-intervention should be assessed to analyze the statistics more in-depth. It is also important for leadership to be involved in these types of programs to make sure nurses are being educated and in turn educating their patients (Spiva & Day, 2011). Future studies on diabetes education should further assess how nurses providing discharge education impacts patient outcomes. Other research has shown that having nurses who are confident in diabetes can implement teaching with their patients which could reduce hospital admissions (Spiva & Day, 2011).

**Summary**
Diabetes is one of the leading causes of death in the United States and the prevalence is expected to keep increasing (ADA, 2022). This problem will likely also affect many other chronic illnesses because without proper care and treatment most diabetics go on to develop diseases such as CVD, renal disease, eye disease, and others. Because many diabetic patients are hospitalized, whether due to diabetes or some other comorbidity, this project sought to provide education to nurses and patients with the existing disease. This education is necessary to provide because often diabetic patients are hospitalized for reasons other than diabetes and the discharge teaching aims toward those co-morbidities as opposed to the underlying diabetes. Nurses were used as key stakeholders in this project because literature demonstrates there are not enough diabetes educators to see all the diabetic patients who are hospitalized (Donihi et al., 2017; Healio, 2020; Smith et al., 2018). Nurses already provide discharge education to every patient; thus, an educational handout was created for nurses to incorporate into the discharge process. The literature review demonstrated that RNs have knowledge and confidence gaps in diabetes and an educational intervention can aid this need (Gerard et al., 2010; Nikitara et al., 2019; Yacoub et al., 2014).

This DNP project sought to determine whether a diabetes educational intervention would increase nurse knowledge and confidence and compliance providing diabetes education. A convenient sample of 26 nurses from a cardiovascular PCU consented to participate in the study. Nurse knowledge and confidence was evaluated using two surveys developed by the St. Peter Family Medicine Residency that were given before and after the educational intervention. Among the nurses that participated, their knowledge and confidence scores both increased from the pre- to post-assessment and the results were statistically significant using a p value < 0.05.
Upon follow-up several weeks after the intervention, 75% of nurses reported not using the diabetes discharge handout provided and 90% did not provide discharge teaching.

Overall, these findings agree with previous studies showing that nurses lack knowledge and confidence in diabetes, and that by administering education to nurses can improve this barrier in diabetes education. To combat the diabetes crisis, nurses should have adequate education and be confident to provide teaching with patients. Additional ways to increase compliance with providing diabetes discharge teaching should be investigated.

**Implications of Results**

A big part of a nurse’s role is providing education, and to do this, nurses should be knowledgeable and confident in the teaching they provide. In addition, diabetic patients need teaching while in the hospital because they may not receive it elsewhere. Because of the positive outcomes with this study and similar ones in the literature, more educational programs and discharge teaching should be incorporated in hospital units across the country. With confident and knowledgeable nurses, they will possess the skills to educate the diabetic patients they care for regardless of the reason they are admitted. Looking at the bigger picture, this may not decrease the prevalence of diabetes, but can aid diabetics ability to better manage their disease. In turn, this can potentially decrease hospital admissions for co-morbidities that diabetes causes and decrease the development of other co-morbidities as previously mentioned. Because of the negative outcomes of the compliance component, suggestions for compliance in future studies would be to increase buy-in and support from management and other leaders, with continual reminders that there are tools available to teach diabetic patients.

**Limitations**
There were several limitations to this quality improvement project. The sample size was small at 26 nurses from one unit of a single hospital. There was no control group and no key identifiers linking pre- and post-assessments together. Additionally, the nursing profession has a high turnover rate and nurses are constantly entering and leaving units, thus affecting sample size. When performing the statistical analyses, because there were no key identifiers, the pre-and post-assessments could not be directly compared; therefore, a one-sample t-test was utilized. Because the educational interventions were performed at times during shift changes, although both shifts were present, nurses may not have had their entire attention focused on the presentation. Other limitations include leadership change during the project, and a lack of buy in for the continuation of the project.

**Future Clinical Research**

In subsequent studies, researchers should aim to sample a larger population such as all units in an entire hospital, or several hospitals in a region. This would help get a consensus of project effectiveness and hold a higher statistical significance. Incorporating a variety of educational sessions would also help increase participation and audience attention for the educational sessions. As learned from this study, it is also important seek buy-in from leadership to support the nurses providing the education and delivering handouts to patients at discharge. Incorporating change is never an easy or quick task, but it requires ongoing education, support, and encouragement from leadership. In future projects, researchers should focus on the latter aspect of the project and seek to determine how increasing compliance providing discharge education will increase diabetes self-management and decrease readmissions. Also, having buy-in from hospital diabetes educators and nurse managers/educators is key to a successful diabetes program. Trialing incorporating annual diabetes education to adult inpatient units is another step
to continuation of these project goals. Increasing nurse knowledge and confidence in diabetes will ultimately benefit both the nursing field and the diabetic population. This DNP project demonstrated encouraging results to improving the knowledge and confidence of nurses, which is ultimately working toward the goal of improving diabetic patient outcomes.
References


Nutrition and Dietetics. Diabetes Care. https://care.diabetesjournals.org/content/38/7/1372#ref-10.


Appendix A

Modified Diabetes Knowledge Survey

Instructions: Please circle one answer for each question.

**Basic Knowledge**

1. Risk factors for developing Type 2 diabetes include:
   a. Family members with diabetes
   b. Gestational diabetes
   c. Stress of an illness or injury
   d. all of the above
2. Which is NOT a cause of diabetes?
   a. Use of steroids
   b. Eating sugar
   c. Insulin resistance
   d. Pancreatic gland failure
3. Which is NOT a sign of hyperglycemia?
   a. Thirst
   b. Fatigue
   c. Shakiness
   d. Frequent urination
4. Type 1 diabetes, there is not enough:
   a. Insulin
   b. Glucose
   c. Protein
   d. Fat
5. Patients with Type 1 diabetes:
   a. Never need insulin injections
   b. Need 24-hour insulin delivery
   c. May occasionally need insulin
   d. Can take oral medication that makes the pancreas secrete insulin
6. Insulin is made in the:
   a. Liver
   b. Stomach
   c. Kidneys
   d. Pancreas
7. Hyperglycemia means:
   a. Blood glucose is high
   b. Blood glucose is low
   c. Blood pressure is high
   d. Blood pressure is low
8. Symptoms of Hypoglycemia include:
   a. Weakness
   b. Sweating
   c. Shakiness
   d. All of the above

**Monitoring**

9. ADA recommendations for blood glucose levels before meals is:
   a. 50-70 mg/dL
   b. 80-120 mg/dL
   c. 125-160 mg/dL
   d. 180-240 mg/dL
10. Blood glucose level in diabetes over 180 is:
    a. Normal
    b. Acceptable
    c. Unacceptable
    d. Requires an ER visit
11. The A1c Glycohemoglobin test is:
    a. Best under 7
    b. Tells how blood has been controlled for 6 months
    c. Can be tested with urine
    d. Should be kept from the patient
12. Low blood sugar is considered to need treatment when glucose levels are under 70mg/dL
    and should be treated with:
    a. Hersey candy bar
    b. Cheese
    c. Avocado
    d. 6-7 small hard candies
13. Monitoring should be done more often:
    a. On sick days
    b. When traveling
    c. When meals and exercise change
    d. All of the above

**Medications**

14. Diabetes pills
    a. lower blood glucose
    b. increase the release on insulin
    c. correct insulin resistance
    d. all of the above
15. Insulin should be injected in the same site:
    a. True
    b. False
Meal Planning

16. Which nutrient significantly increases blood sugar?
   a. Fat
   b. Water
   c. Sodium
   d. Carbohydrates
   e. Vitamin A

Exercise

17. Regular exercise may
   a. Lower blood glucose
   b. Reduce the amount of insulin needed
   c. Reduce the amount of oral diabetes medication needed
   d. All of the above
18. If blood glucose is less than 80mg/dL during exercise, the patient should:
   a. Lie down
   b. Eat a snack
   c. Call the doctor
   d. Ignore it and keep exercising
19. If blood glucose is over 250 mg/dL, exercise should be delayed.
   a. True
   b. False

General Care Considerations

20. Any sore on the foot should be reported in:
   a. One day
   b. One week
   c. At the next scheduled appointment
21. Feet should be inspected:
   a. Every day by patient or caregiver
   b. Only when there is pain or pressure
   c. After going barefoot
22. Diabetes patients are more at risk for infections or illness because:
   a. The immune system may be impaired
   b. Bacteria thrive on higher glucose levels
   c. Blood vessels may be damaged
   d. Neuropathy may prevent detection of a problem
   e. All of the above
23. Patients with diabetes have greater risks for all the complications except:
   a. Heart Attacks
   b. Strokes
   c. Fractures
   d. Blindness
24. Routine eye exams are done because:
   a. Styles in eyewear change all the time
   b. Early treatment may prevent progression of eye disease
   c. Only needed when there is trouble
25. Ketoacidosis may be caused by:
   a. Too little insulin
   b. Too much food
   c. Too much insulin
   d. Too little food
26. If blood glucose levels are greater than 250mg/dL and there are large ketones in the blood, the patient should:
   a. Take a nap
   b. Take extra insulin and water
   c. Eat a large meal
   d. Exercise
Appendix B

Modified Confidence Survey

When talking with patients who have diabetes: (1=NO comfort – 7=EXTREMELY comfortable)

1) How comfortable are you asking questions about diabetes?
   1  2  3  4  5  6  7

2) How comfortable are you answering those questions?
   1  2  3  4  5  6  7

3) How comfortable are you talking about how physically active a patient is (exercise)?
   1  2  3  4  5  6  7

4) How comfortable are you talking about a patient’s food choices (diet)?
   1  2  3  4  5  6  7

5) How comfortable are you talking about meal planning and reading food labels?
   1  2  3  4  5  6  7

6) How comfortable are you discussing blood sugar readings?
   1  2  3  4  5  6  7

7) How comfortable are you discussing diabetes medications?
   1  2  3  4  5  6  7

8) How comfortable are you helping a patient set a self-management goal?
   1  2  3  4  5  6  7

9) How comfortable are you listening and understanding what makes a patient with diabetes stressed?
   1  2  3  4  5  6  7

10) How comfortable are you talking to a provider about their diabetic patients?
    1  2  3  4  5  6  7
Email Date: 11/24/2021

Hi Miranda,
Absolutely. All materials on the Diabetes Initiative site are free to use. We kindly ask that you attribute the source for anything you use.
Best wishes for a successful project.
--Carol

Carol A. Brownson
Evidence Based Public Health Training Coordinator
Prevention Research Center in St. Louis
Washington University in St. Louis
314-378-5765
Appendix D

Follow-Up Assessment

1. Did you provide diabetes teaching while discharging a diabetic patient?
   a. Yes
   b. No

2. If yes, approximately how many times?
   a. 1-3
   b. 4-6
   c. 7-10

3. If no, was there a barrier?
   a. Lack of Time
   b. Lack of confidence/knowledge
   c. Lack of patient interest
   d. other

4. During the diabetes discharge teaching session, did you provide the patient with the diabetes handout to take home?
   a. Yes
   b. No

5. If yes, approximately how many times?
   a. 1-3
   b. 4-6
   c. 7-10

6. If no, was there a barrier?
   a. Lack of patient interest
   b. No packets/copies
   c. Couldn’t find the handout
   d. other
Appendix E

Demographics Questionnaire

1. What is your gender? [ ] M [ ] F [ ] Prefer not to say

2. What is your ethnicity?
   [ ] Caucasian [ ] African American [ ] Latino/Hispanic [ ] Asian
   [ ] Native American [ ] Other, please specify ______________

3. What is your age?
   [ ] 20-30 [ ] 31-40 [ ] 41-50 [ ] 51-60 [ ] >61

4. What is the highest level of education that you have completed?
   [ ] AA/AS [ ] BSN [ ] MSN

5. Do you hold a specialty certification? If so specify __________________________

6. How many years of experience do you have as an RN?
   [ ] <1 [ ] 1-5 [ ] 6-10 [ ] 11-15 [ ] 16-20 [ ] >21
Appendix F

Diabetes Discharge Education

What is diabetes?
Type 1-your body does not make insulin.
Type 2-your body does not make or use insulin well. This is the most common form.

Monitoring blood sugars
If taking insulin: check sugars before each meal and bedtime. Write them down.
If not on insulin: check blood sugars 2-4 times a day. Write them down.
   Goal blood sugars:
   Before meals 80-140
   2 hours after a meal less than 180

Meal plan
    Eat three meals a day.
    Eat the same amount of carbohydrate at each meal.
    Avoid sugary drinks or desserts.
    Decrease portion sizes.

Low blood sugar (hypoglycemia)
    Signs: sweaty, shaky, dizzy, lightheaded, or unsteady on feet

   What to do? Test blood sugar when you feel these signs or feel different than usual.
   If less than 70 eat 15 grams of carbohydrates
   If less than 50 double the example below

   Example of 15 grams of carbohydrates
   ½ cup of juice
   ½ can of regular soda
   15 skittles

   Recheck sugar in 15 minutes. Keep treating until blood sugar is above 70.
   Eat a snack if your meal is more than one hour away.
   If you have 2 or more low blood sugars in a week, call your health care provider.

Sick days
    Take your diabetes medication(s) when you are sick.
    Except do not take Invokana, Farxiga, or Jardiance. If you cannot take your diabetes medications call your health care provider.

    Try to eat your regular meals. If you cannot, try soft foods such as gelatin, pudding, sprots drinks, toast, soup, or crackers.

    Drink fluids as directed by your care team.
Call your healthcare provider if you have: a blood sugar of 300 or more for 24 hours; redness or swelling around a cut or surgery site; nausea or cannot keep down fluids for more than one day; a temperature of 101 or more; shortness of breath that will not go away; if you do not know what to do.

**Be active**

Regular daily activities such as walking, using stairs, and moving throughout the day.
Aerobic exercise such as biking, brisk walking, and swimming.
Aim for 30 minutes or more 5 days or more each week.

Exercise helps to lower the sugar level and it could lower it too much. Carry a fast-acting carbohydrate, such as glucose tablets or gel when exercising if you are taking insulin or on glyburide, glimepiride, or glipizide for your diabetes.

**Foot care**

High blood sugar can damage the blood vessels in your feet and cause poor blood flow. It can also cause neuropathy by damaging the nerves in your feet.

Wash your feet daily.
Do not apply lotion between toes.
Check your feet daily for blisters, cuts, or redness. If present, consult your doctor.
Trim your nails. Cut straight across.
Change socks daily.
Never walk barefoot.

**Regular doctor visits**

AIC test 2-4 times per year.
See an ophthalmologist yearly for a dilated exam.
Blood pressure: discuss a goal with your healthcare provider.
Cholesterol testing:
- HDL greater than 40 for men and greater than 50 for women.
- LDL less than 100 (less than 70 if you have heart disease).
- Triglycerides less than 150.
Urine test yearly for microalbumin.
Microfilament test for your feet yearly.
Dentist appointment.
Flu and pneumonia vaccinations.

**Follow up with your doctor**

Take your hospital discharge instructions with you and your medications.
Take your blood sugar record and meter.
Dear Miranda Taylor:
On 6/22/2022, the IRB staff reviewed the following submission:

<table>
<thead>
<tr>
<th>Title of Study:</th>
<th>A quality improvement project to improve nurse confidence and ability to educate diabetic patients.</th>
</tr>
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<td>Investigator:</td>
<td>Miranda Taylor</td>
</tr>
<tr>
<td>Submission ID:</td>
<td>STUDY00003312</td>
</tr>
<tr>
<td>Study ID:</td>
<td>STUDY00003312</td>
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<tr>
<td>Funding:</td>
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<td>IND, IDE, or HDE:</td>
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<td>Documents Reviewed:</td>
<td>• Diabetes survey request for use.pdf, Category: Survey/Questionnaire; • hospital approval, Category: External IRB Approval; • Hospital approval.pdf, Category: Other; • IRB_brittany.pdf, Category: External IRB Approval; • Miranda_introductory/consent, Category: Consent Form; • Miranda_IRBdetermination, Category: IRB Protocol; • project discussion, Category: External IRB Approval; • questionnaires, Category: Survey/Questionnaire;</td>
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The IRB staff determined that the proposed activity is not research involving human subjects as defined by DHHS and/or FDA regulations. IRB review and approval by this organization is not required.
Appendix H

NOT HUMAN RESEARCH

June 22, 2022

Miranda Jackson, miranda.taylor@ascension.org

Dear Miranda Jackson,

On June 22, 2022, Ascension Sacred Heart IRB reviewed the following project:

Type of Review: Initial

Title of Study: A Quality Improvement Project to Improve Nurse Confidence and Ability to Educate Diabetic Patients

Investigator: Miranda Jackson

IRB ID: N/A

Funding: None

Grant ID: None

ND, IDE, or HDE: None

Documents Reviewed: Sacred Heart IRB form (1).docx

Ascension Sacred Heart IRB determined that the proposed activity is not research involving human subjects. IRB review and approval by this organization is not required.

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are being considered and there are questions about whether these activities are research involving human subjects, please submit a new request to the IRB for a determination.

Sincerely,

IRB Administrator
Appendix I

Results of Demographic Survey

Table 1

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<th>Demographic Data of Respondents</th>
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Appendix J

Descriptive Statistics Knowledge Assessment

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Appendix K

Figure 2

Knowledge Survey Results

- Pre-assessment
- Post-assessment
Appendix L

Figure 3

Pre-Assessment Knowledge Histogram

Frequency

Pre_assessment

Figure 4

Post-Assessment Knowledge Histogram

Frequency

Post_assessment
Appendix M

Figure 5

One-Sample Statistics

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One-Sample Test

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<th></th>
<th>t</th>
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One-Sample Effect Sizes

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a. The denominator used in estimating the effect sizes.
Cohen’s d uses the sample standard deviation.
Hedges’ correction uses the sample standard deviation, plus a correction factor.

Figure 6

One-Sample Statistics

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One-Sample Test

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One-Sample Effect Sizes

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</tbody>
</table>

a. The denominator used in estimating the effect sizes.
Cohen’s d uses the sample standard deviation.
Hedges’ correction uses the sample standard deviation, plus a correction factor.
Appendix N

Confidence Survey Descriptive Statistics

Table 3

<table>
<thead>
<tr>
<th></th>
<th>Pre-Confidence</th>
<th>Post-Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>51.46</td>
<td>60.2</td>
</tr>
<tr>
<td>Standard Error</td>
<td>2.16</td>
<td>1.41</td>
</tr>
<tr>
<td>Median</td>
<td>52</td>
<td>60</td>
</tr>
<tr>
<td>Mode</td>
<td>52</td>
<td>64</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>11.01</td>
<td>7.04</td>
</tr>
<tr>
<td>Range</td>
<td>56</td>
<td>25</td>
</tr>
<tr>
<td>Minimum</td>
<td>14</td>
<td>45</td>
</tr>
<tr>
<td>Maximum</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Sum</td>
<td>1338</td>
<td>1505</td>
</tr>
<tr>
<td>Sample</td>
<td>26</td>
<td>25</td>
</tr>
</tbody>
</table>
Appendix O

Figure 7

Confidence Survey Results

- Pre-assessment
- Post-assessment
Appendix P

Figure 8

Pre_Confidence Survey Histogram

Mean = 51.46
Std Dev. = 11.006
N = 26

Figure 9

Post_Confidence Survey Histogram

Mean = 60.20
Std Dev. = 7.036
N = 25
Appendix Q

Figure 10

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre_confidence</td>
<td>26</td>
<td>51.46</td>
<td>11.006</td>
<td>2.159</td>
</tr>
</tbody>
</table>

One-Sample Test

Test Value = 60.2

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre_confidence</td>
<td>-4.048</td>
<td>25</td>
<td>&lt; .001</td>
<td>-8.738</td>
<td>-13.18 to -4.29</td>
</tr>
</tbody>
</table>

One-Sample Effect Sizes

<table>
<thead>
<tr>
<th></th>
<th>Standardizer</th>
<th>Point Estimate</th>
<th>95% Confidence Interval Lower</th>
<th>95% Confidence Interval Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre_confidence</td>
<td>Cohen’s d</td>
<td>-0.794</td>
<td>-1.230 to -0.346</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hedges’ correction</td>
<td>-0.770</td>
<td>-1.193 to -0.335</td>
<td></td>
</tr>
</tbody>
</table>

a. The denominator used in estimating the effect sizes.

Cohen’s d uses the standard deviation.

Hedges’ correction uses the sample standard deviation, plus a correction factor.

Figure 11

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post_confidence</td>
<td>25</td>
<td>60.2000</td>
<td>7.03562</td>
<td>1.40712</td>
</tr>
</tbody>
</table>

One-Sample Test

Test Value = 51.46

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post_confidence</td>
<td>6.211</td>
<td>24</td>
<td>&lt; .001</td>
<td>8.74000</td>
<td>5.8358 to 11.6442</td>
</tr>
</tbody>
</table>

One-Sample Effect Sizes

<table>
<thead>
<tr>
<th></th>
<th>Standardizer</th>
<th>Point Estimate</th>
<th>95% Confidence Interval Lower</th>
<th>95% Confidence Interval Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post_confidence</td>
<td>Cohen’s d</td>
<td>1.242</td>
<td>1.760 to 0.710</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hedges’ correction</td>
<td>1.203</td>
<td>1.704 to 0.687</td>
<td></td>
</tr>
</tbody>
</table>

a. The denominator used in estimating the effect sizes.

Cohen’s d uses the standard deviation.

Hedges’ correction uses the sample standard deviation, plus a correction factor.
Appendix R

Follow up Survey Results

Table 4

<table>
<thead>
<tr>
<th>Discharge teaching provided</th>
<th>n=20</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2</td>
<td>10.00%</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>90.00%</td>
</tr>
</tbody>
</table>

**Barriers**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of time</td>
<td>2</td>
<td>10.00%</td>
</tr>
<tr>
<td>Lack of confidence/knowledge</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Lack of patient interest</td>
<td>1</td>
<td>5.00%</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>85.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discharge Handout Provided</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>5</td>
<td>25.00%</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>75.00%</td>
</tr>
</tbody>
</table>

**Barriers**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of patient interest</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>No packets/copies</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Couldn’t find the handout</td>
<td>1</td>
<td>10.00%</td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
<td>95.00%</td>
</tr>
</tbody>
</table>