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Implementation and Evaluation of an In-service Training on Gestational Diabetes for Non-CDCES Staff Nurses

Sogol Sedghi

Implementation and Evaluation of an In-service Training on Gestational Diabetes for Non-CDCES Staff Nurses

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A DNP project submitted in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice

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Abstract

Background: Gestational Diabetes Mellitus (GDM) is a prevalent pregnancy complication with significant maternal and fetal risks. Despite the critical role of nurses in managing GDM, many lack specialized training in this area. This quality improvement project aimed to enhance the knowledge, confidence, and skills of non-CDCES staff nurses in managing GDM through an in-service training program.

Method: Pre-intervention and post-intervention surveys measured the effectiveness of an educational intervention comprising of an overview of GDM, subcutaneous insulin administration, glucometer use, and postpartum management in improving nurses' self-reported confidence and knowledge. Nine non-CDCES staff nurses participated in the mandatory training, and data were analyzed using the T-test to assess statistical significance.

Results: The intervention resulted in significant improvements in nursing staff's confidence and knowledge regarding GDM management. The mean scores for all survey questions demonstrated a statistically significant increase post-training ($p < 0.05$). The training effectively addressed knowledge gaps and significantly improved the nurses' readiness to care for GDM patients.

Conclusion: The in-service training program successfully enhanced the GDM-related knowledge and confidence of nursing staff, indicating its potential to improve patient outcomes. Ongoing access to recorded training materials ensures sustained benefits. This project underscores the importance of continuous education in specialties such as maternal fetal medicine to maximize healthcare delivery and patient outcomes.

Keywords: Gestational Diabetes Mellitus, in-service training, continuing nursing education, Maternal Fetal Medicine, education

Implementation and Evaluation of an In-service Training on Gestational Diabetes for Non-CDCES Staff Nurses

Gestational Diabetes Mellitus (GDM) is one of the most common complications during pregnancy (McIntyre et al., 2019). GDM is defined as the onset of diabetes and insulin resistance during pregnancy. This condition is diagnosed when one has abnormal results on the Oral Glucose Tolerance Test performed between 24-28 weeks of pregnancy. It is important to note that some individuals can have pre-existing type 1 or type 2 diabetes mellitus before conception which can further complicate pregnancy and contribute to abnormal serum glucose levels throughout pregnancy.

Type 1 diabetes, previously referred to as juvenile diabetes or insulin-dependent diabetes, is a chronic condition where the pancreas does not produce any insulin. In type 2 diabetes, the body struggles to regulate and use glucose effectively as fuel (Genuth et al., 2018). This condition leads to high blood glucose levels, potentially causing issues in the circulatory, nervous, and immune systems (Genuth et al., 2018). In type 2 diabetes, the pancreas either does not produce enough insulin or the cells do not respond properly to it, resulting in reduced glucose absorption (Genuth et al., 2018).

It has been estimated that 8% of all pregnancies in the United States are impacted by GDM (ACOG Committee on Obstetric Practice, 2018). Additionally, about half of those with GDM diagnosis go on to develop type 2 diabetes after pregnancy (Casagrande, Linder, & Cowie, 2018).

Unmanaged GDM may lead to the development of adverse pregnancy outcomes such as gestational hypertension, amniotic fluid disorders, pre-eclampsia, preterm birth, stillbirth, cesarean section, and postpartum hemorrhage (ACOG Committee on Obstetric Practice, 2018). Gestational diabetes also leads to complications for the infant after birth such as respiratory distress syndrome, shoulder dystocia, jaundice, hypoglycemia, obesity, and diabetes later in life (ACOG Committee on Obstetric Practice, 2018).

In addressing these challenges, nurses become instrumental in empowering patients to become active participants in managing their health conditions. Patients who are motivated and highly involved in their own care often experience better health outcomes (Barello et al., 2017; Bombard et al., 2018). One way to ensure patients are more active and engaged in their care is to provide training to nurses, with the aim of increasing their skills, confidence, and knowledge. This is particularly relevant as nurses often provide the initial interaction and communication with patients.

Complications of unmanaged gestational diabetes can place a significant strain on our healthcare system and the training implemented and discussed in this paper was a step towards improving maternal outcomes and reducing this burden.

The goal of the implemented project was to enhance the nursing staff's knowledge and increase their confidence at an outpatient perinatology clinic when providing care to patients with gestational diabetes. This goal was achieved by holding an in-service training session for all staff nurses who did not hold a Certified Diabetes Care and Education Specialist (CDCES) credential.

Background

Pregnant patients with GDM are often referred to Maternal Fetal Medicine (MFM) specialists for appropriate screening, diagnosis, and management (Society for Maternal-Fetal Medicine, n.d.). CDCESs working at MFM clinics are highly involved in providing care for patients with this diagnosis. They engage in educating patients about the condition, its implications, risks for the pregnancy and well-being of the fetus. Additionally, they are involved in coordinating care, offering Medical Nutrition Therapy (MNT), and ordering laboratory tests such as serum glucose, hemoglobin A1C, and glucose tolerance. If a patient is referred to MFM care for gestational diabetes, nurses are often the first clinical staff to review and triage the referral. More importantly, nurses are the ones triaging phone calls and are the patients' first line of contact. However, nurses often lack the necessary training in managing patients with this

complex condition. Educating staff nurses who work at MFM clinics can play a crucial role in improving patient outcomes once they are equipped with extra training.

The implemented in-service training included an overview of gestational diabetes, a refresher on subcutaneous injection of prescribed insulin and use of glucometers. The training also included information about postpartum management of GDM and assisted staff nurses to triage and how to answer diabetes-related phone calls received on the direct nurse line. Other content included in the training were pathophysiology, screening/diagnostic tests, and treatment options of GDM. All these elements can help to bridge the knowledge gap for the nursing staff working with this patient population.

The PICO question guiding this project was “does implementation of an in-service training improve nursing staff’s knowledge, confidence, and skills when it comes to providing care for patients with gestational diabetes?”. The effectiveness of the in-service training was measured by conducting pre- and post-intervention tests to assess the staff's knowledge of GDM and their level of comfort in working with this patient population. The educational session was concluded by providing nurses with a phone tree that will enable them to better identify, recognize, and triage GDM-related questions when answering phone calls.

History and Evolution of Continuing Nursing Education

The concept of life-long learning has been a fundamental value in nursing since the profession's inception. Although the formal term "continuing nursing education" did not exist until the mid-20th century, evidence of ongoing learning after initial nursing education can be traced back to Florence Nightingale (Stein, 1998). Nightingale famously stated, "Let us never consider ourselves finished nurses. We must be learning all of our lives" (Cooper, 1973). The requirement of continuing medical education began in the 1970s, but there has been a significant increase in nursing professional development efforts, research, and activities since the 1990s (Brunt & Morris, 2022). Currently, most states in the U.S. require nurses to fulfill some form of continuing education every 2-3 years to maintain their licenses (Brunt & Morris, 2022).

The importance and need for nursing professional development becomes particularly relevant when nurses work in subspecialties such as MFM, which require specialized clinical training and knowledge.

Literature Review

A review of literature was conducted using key search terms of “effect of educational interventions”, “nursing staff”, and “patient outcomes”. PubMed, CINAHL, and EBSCO were the databases used to find peer-reviewed articles published from 2015 to 2023. Ten out of 474 yielded articles across all three databases were selected and included in the literature search review. Three main themes that emerged from the literature included the impact of interventional training on patient outcomes, the most effective education modalities, and the effect of nurses on patient engagement.

The literature search revealed that the impact of educational interventions for nursing staff has been explored across a variety of medical settings (Gomarverdi et al., 2019; Otolorin et al., 2015; Santhoshkumari & Shamil, 2022; Marques et al., 2022). The consensus among literature is that organizing regular training courses for nursing staff across all specialties is one of the most effective ways of ensuring timely interventions and reducing complications for patients (Gomarverdi et al., 2019; Otolorin et al., 2015; Santhoshkumari & Shamil, 2022; Marques et al., 2022; Sapri et al., 2022; Wu et al., 2018)

Multiple authors analyzed data from randomized controlled trials (RCTs) and clinical controlled trials (CCTs) to explore the effects of various education interventions on nursing staff’s knowledge, skills, confidence, and attitude (Sapri et al., 2022; Wu et al., 2018; Bala et al., 2021). All of these authors found that education interventions and implementation of professional development lectures improve nursing care and subsequently have a positive impact on patient outcomes (Sapri et al., 2022; Wu et al., 2018; Bala et al., 2021). Wu et al. (2018) are the only authors which further highlight these findings' limitations. They mention that most studies find a positive correlation between staff education and improved outcomes,

however the direct impact of these interventions on clinical outcomes is often difficult to measure because of the wide range of other interventions that could be contributing to patients' health (Wu et al., 2018).

Many education modalities are discussed within the literature such as simulation, scenario-based, lectures, group discussions, hands-on practice, online learning and more. Most authors included various education modalities in their inclusion criteria but did not identify which ones are the most effective. However, Otolorin et al. (2015) and Santhoshkumari & Shamil (2022) did identify the most effective methods. These two studies found simulation and scenario-based training to be the most effective training interventions in comparison to other intervention modalities, yielding the highest increase in staff competency and positive patient outcomes (Otolorin et al., 2015; Santhoshkumari & Shamil, 2022).

The literature search identified scenario-based training as one of the most effective education modalities for training staff nurses (Otolorin et al., 2015; Santhoshkumari & Shamil, 2022). To enhance the efficacy of the intervention implemented, the in-service training included case studies and scenario-based questions at the end of the session.

Theoretical Framework

Benner's Novice to Expert model (NEM) was the theoretical framework chosen to guide this project. Dr. Patricia Benner developed this framework in 1982 to highlight how nurses acquire nursing skills and knowledge over time. The NEM explains how nurses progress through five stages of clinical competence throughout their professional journey: novice, advanced beginner, competent, proficient, and expert. A novice nurse becomes an expert over time by acquiring clinical experience, specialized knowledge, and specific skills. It is important to note that nurses can also move from being an expert to a novice when switching specialties, and the NEM model is not always linear.

This framework is useful in evaluating and assessing nurses' educational needs at various stages of their career. The NEM supports the need for ongoing training and educational

interventions for nurses. Benner's model has been guiding nurse educators and leaders in developing resources and educational programs to support nurses' learning, knowledge, and career advancements. The framework has also been helpful in increasing nurse retention and job satisfaction.

In this project, the NEM was implemented to improve the nursing staff's knowledge of GDM. Based on my observations and interactions, the nursing staff at the project site are at different stages of the NEM model when it comes to their knowledge of GDM and its proper management. This project aims to equip the nursing staff with the latest evidence-based information on GDM to increase their knowledge and awareness of the disease. The framework will be implemented to allow the nursing staff to become experts on the topic or move up to a different stage within the NEM model.

Methodology

Setting

This quality improvement project took place at a high-risk obstetric clinic in an urban area of Bellevue, WA. The clinic has 7 perinatologists, 3 CDCESs, 1 genetic counselor and provides care to approximately 200 patients per week, many of whom have been diagnosed with and are receiving treatment for GDM.

Design

The method of evaluation was pre-intervention and post-intervention surveys given to the nursing staff at the clinic. The Likert-style pre-intervention survey was sent to the nursing staff one week before the training. The staff members who did not complete the pre-intervention survey were reminded to take it immediately before the training started. The pre-intervention and post-intervention surveys had identical questions to assess self-reported confidence and knowledge about gestational diabetes. The post-intervention surveys were collected immediately after the training. This method was a summative evaluation. The surveys were designed and distributed via Qualtrics.

Participants

The participants were the nursing staff at an outpatient perinatology clinic and specifically those who do not have a CDCES license. There are 9 non-CDCES staff nurses who received the pre- and post-intervention surveys.

Recruitment was done via email by inviting staff nurses to the training. The email asked staff nurses to participate in the training and to complete pre-intervention and post-intervention surveys. The email discussed the purpose of the training and explained the accompanying surveys. The email also explained the benefits of participating in the training.

Inclusion criteria comprised of all staff nurses who are Registered Nurses (RNs) and Licensed Practical Nurses (LPNs). The exclusion criteria comprised of the perinatologists, CDCESs, the billing team, the practice manager, Medical Assistants (MAs) and the scheduling staff. Educational training was deemed mandatory by the nursing manager for all staff nurses at the clinic. The training had 100% attendance and response rate due to the mandatory nature of the training.

Discussion

Results

This was a quality improvement project with one main intervention: an education course for nursing staff at an outpatient perinatology clinic. The efficacy of the training was measured by pre and posttest surveys.

Answer options ranged from 1 indicating not feeling confident or comfortable at all to 5 indicating feeling extremely confident or comfortable. The survey measured self-reported confidence in 5 different categories before and after the training and revealed whether there is an increase in confidence and level of comfort among staff nurses after the training.

All five questions survey questions are displayed in Appendix A. One question included was “how would you rate your confidence on your knowledge of Gestational Diabetes Mellitus?”.

The survey did not collect any direct identifiers. The only indirect identifiers were years of overall nursing experience and years of nursing experience in obstetrics settings. All participants answered the question about overall nursing experience. Out of 9 participants, two answered 20+ years, one answered 10-20 years, five answered 3-10 years and one answered 1-3 years. The percentage of participants based on years of nursing experience is displayed in Appendix B. All participants also answered the question about total nursing experience in obstetrics (OB) settings. Out of 9 participants, one answered 20+ years, zero answered 10-20 years, five answered 3-10 years and three answered 1-3 years. The percentage of participants based on years of OB nursing experience is displayed in Appendix C.

This project focused on measuring and collecting data on the short-term outcomes of the training. One intended short-term outcome was an increase in the nursing team's overall knowledge on GDM and appropriate management as measured by the surveys. The second short-term outcome was an increase in the nursing team's confidence and readiness when providing care to patients with GDM, which was also measured by the surveys.

Outcomes not directly measured in this project include improvements in patient knowledge of GDM. This is expected to occur due to the nursing staff's enhanced knowledge and an increase in patient empowerment by being more well-informed about conditions and appropriate management. Long-term outcomes were also not directly measured, but they included improvements in patient outcomes and increased patient satisfaction.

Data Analysis

The pre-intervention and post-intervention surveys were completed via online Qualtrics tool by staff nurses working at the project setting. Quantitative data from pre-intervention and post-intervention survey scores were collected and used to calculate means values for all five questions. The mean scores for all five questions are displayed in Appendix D.

Statistical analysis of the data was performed via the T-test to determine if data is statistically significant and if there was a change in the mean scores between pre-intervention

and post-intervention survey questions. All T tests had an alpha value of 0.05. T test for all questions revealed a two tailed P value of less than 0.05 indicating statistical significance. The p values for all five questions are displayed in Appendix E.

Dissemination of the Results

The mean value from the scores recorded by pre-intervention and post-intervention survey answers were calculated and reported to the nurse manager to display the efficacy of the training. A comparison table was also presented to the nurse manager from the collected data.

A summary of the results will also be provided to any of the stakeholders involved at no additional cost upon request. The nurse manager and other stakeholders were notified that the summary of results would be available in June after the final analysis.

Future Implications

The proposed training occurred once in person. A narrated PowerPoint presentation of the training was recorded and made available to the clinic nurses after a comprehensive review by the CDCES team and nurse manager. The current and future staff nurses can access the recorded training material at any time. This way, the benefits of the training will be maximized and sustained.

Conclusion

In conclusion, Gestational Diabetes Mellitus (GDM) presents a significant challenge during pregnancy, impacting both maternal and fetal health. Unmanaged GDM can lead to various adverse outcomes, underscoring the importance of effective management strategies. Nurses, as frontline healthcare providers, play a crucial role in educating patients and providing necessary care. However, insufficient training and knowledge gaps among nursing staff can hinder optimal patient outcomes.

This quality improvement project aimed to address these challenges by implementing an in-service training session for nursing staff at an outpatient perinatology clinic. The training focused on enhancing knowledge, confidence, and skills in managing patients with GDM. The

intervention was guided by Benner's Novice to Expert model, recognizing the importance of ongoing education in nursing practice.

Furthermore, the literature review highlighted the effectiveness of educational interventions in improving patient outcomes across various medical settings. Scenario-based training emerged as a particularly effective modality, which was incorporated into the intervention to enhance its efficacy.

The effectiveness of the training was evaluated through pre- and post-intervention surveys, revealing significant improvements in nursing staff's confidence and knowledge levels regarding GDM. Statistical analysis confirmed the significance of these improvements, indicating the positive impact of the intervention.

Looking ahead, the sustainability plan includes providing access to recorded training materials for current and future nursing staff, ensuring ongoing support and knowledge reinforcement. By empowering nursing staff with the necessary skills and knowledge, this project contributes to improving maternal and fetal health outcomes and reducing the burden of unmanaged GDM on the healthcare system.

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Conflicts of Interest

There are no conflicts of interest.

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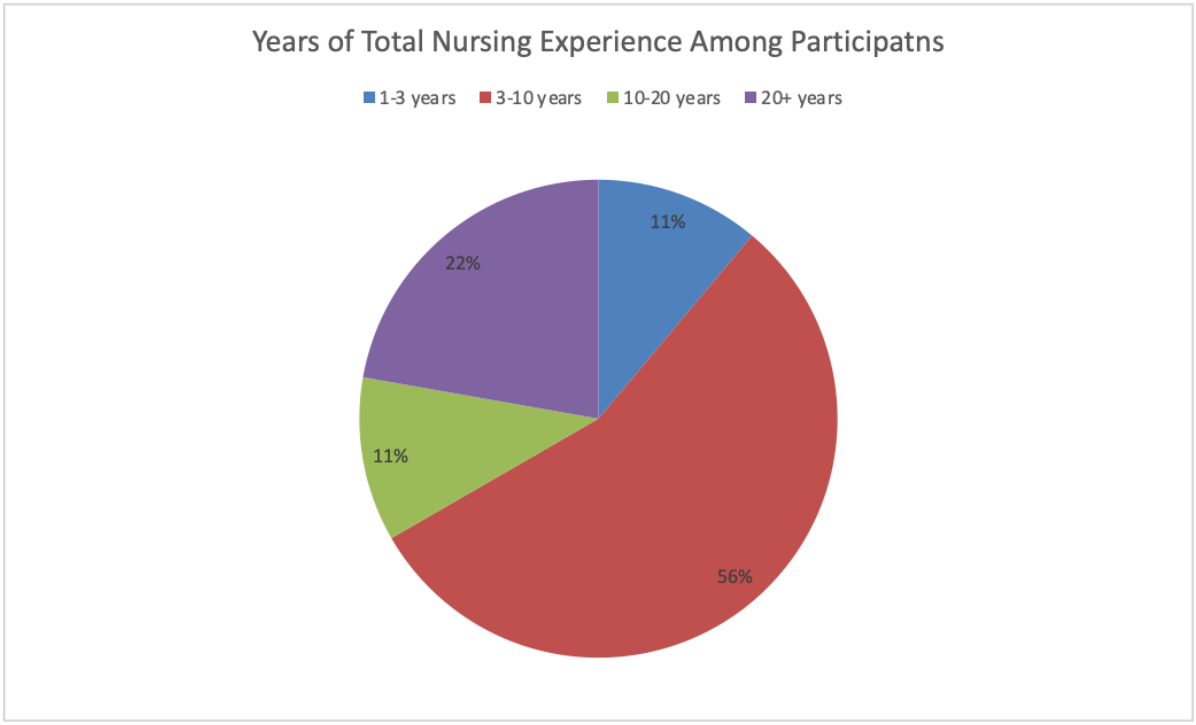
Appendices

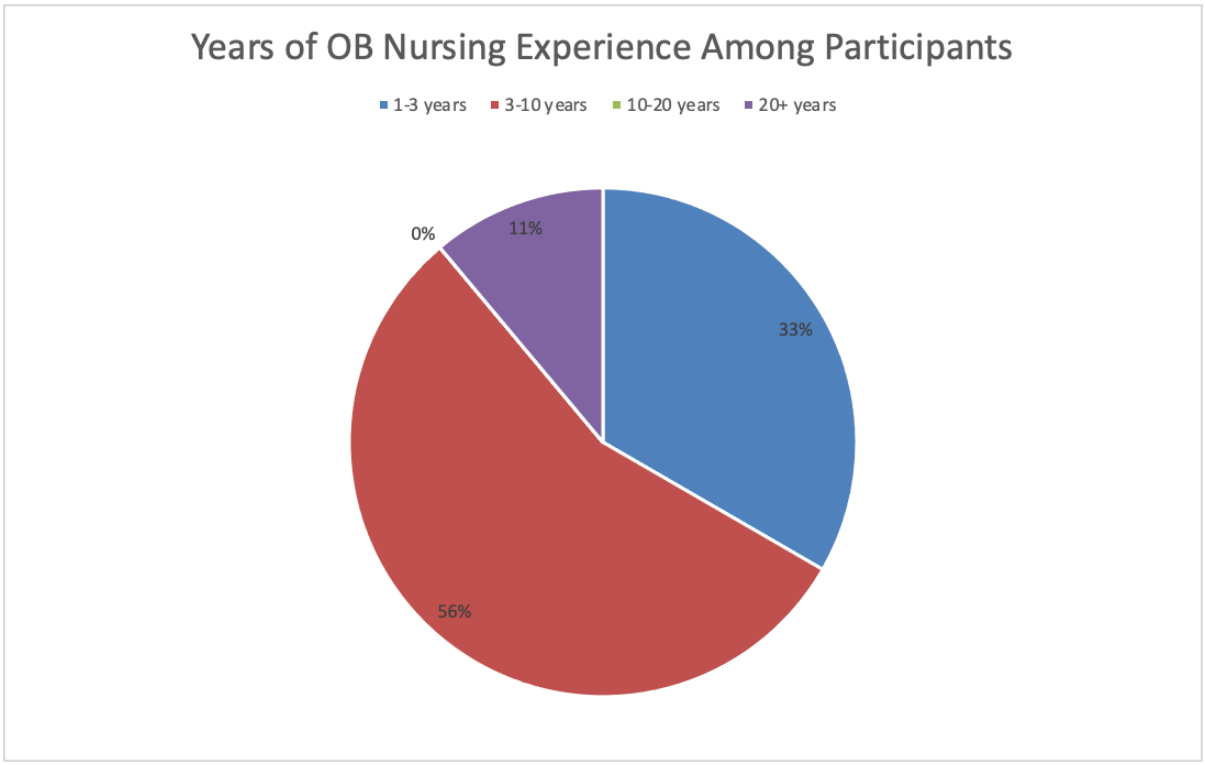
Appendix A

Questions	Answer Choices
1. How would you rate your confidence on your knowledge about Gestational Diabetes Mellitus?	1-Not confident at all 2-Slightly confident 3-Somewhat confident 4-Fairly confidant 5-Extremely confidant
2. How would you rate your confidence on insulin injection training for patients?	1-Not confident at all 2-Slightly confident 3-Somewhat confident 4-Fairly confidant 5-Extremely confidant
3. How would you rate your confidence on glucometer training for patients?	1-Not confident at all 2-Slightly confident 3-Somewhat confident 4-Fairly confidant 5-Extremely confidant
4. How would you rate your confidence on understanding diabetes-related labs?	1-Not confident at all 2-Slightly confident 3-Somewhat confident 4-Fairly confidant 5-Extremely confidant
5. How would you rate your comfort when answering diabetes-related phone calls?	1-Not comfortable at all 2-Slightly comfortable 3-Somewhat comfortable 4-Fairly comfortable 5-Extremely comfortable

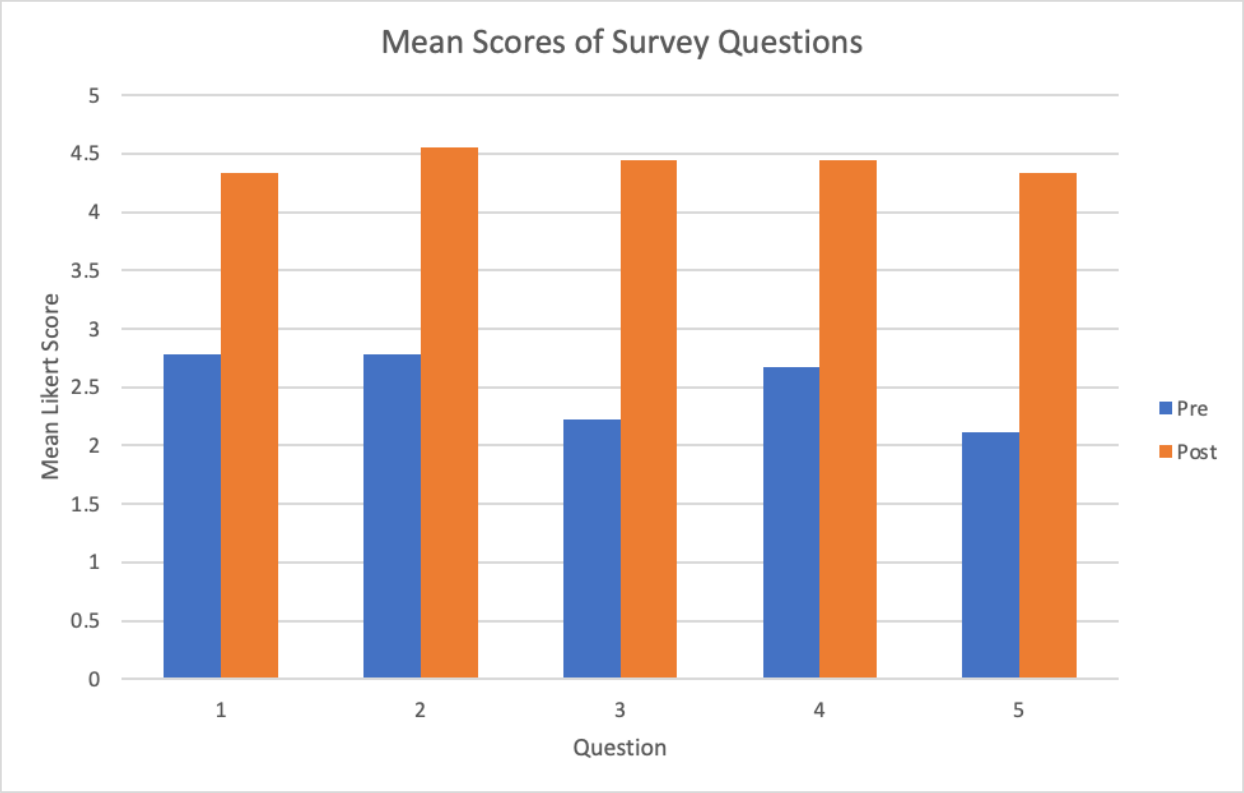
Appendix B



Appendix C



Appendix D



Appendix E

Question	P value
1	0.000195544
2	0.001870412
3	0.000354978
4	0.002086194
5	0.000135306