

Impact of Standardized Postpartum Discharge Education in Reducing Non-Urgent
Emergency Room Visits

Submitted by
Baljit Kaur Pannu

A Direct Practice Improvement Project Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Nursing Practice

Grand Canyon University

Phoenix, Arizona

November 19, 2020

© by Baljit Kaur Pannu, 2020

All rights reserved.

GRAND CANYON UNIVERSITY

Impact of Standardized Postpartum Discharge Education in Reducing Non-Urgent Emergency

Room Visits

by

Baljit Kaur Pannu

has been approved


November 19, 2020

APPROVED:

Beth Hale, RN, BSN, MN, Ph.D. Manuscript Chair

Kathy L. Schaefer, RN, BSN, MSN, MGMT, NE-BC Committee Member

ACCEPTED AND SIGNED:



Lisa G. Smith, PhD, RN, CNE

Dean and Professor, College of Nursing and Health Care Professions

12/13/2020

Date

Abstract

Lack of postpartum education on postpartum warning signs can impact non-urgent emergency room (ER) visit rates. Despite current evidence on best practices for postpartum education, there was no consistent, standardized postpartum discharge education at the project site. The purpose of this quantitative, quasi-experimental, project was to determine if the Association of Women's Health, Obstetrics, and Neonatal Nurses' (AWHONN) standardized postpartum discharge education would impact non-urgent ER visits among postpartum women in a hospital in rural North Dakota over four weeks. The theoretical framework for the project employed Albert Bandura's cognitive learning theory and Roy's theory of adaptation during childbirth (TADC). The total sample size was 172, $n= 88$ in the comparative group, and $n= 83$ in the implementation group. Data was extracted from the facility's electronic medical record (EMR). An independent t -test analyzed the comparative versus implementation group data. Results revealed $t(169) = -1.70, p = .091$, indicating there was no statistically significant difference in non-urgent ER visits between the groups. Despite the lack of statistical significance, the project demonstrated clinical significance by raising nursing staff awareness on incorporating consistent evidence-based postpartum education and a translation of evidence into practice. Recommendations include repeating the project over a longer period and at alternative clinical sites to correlate the statistical findings to clinical practice after the COVID-19 pandemic.

Keywords: Association of Women's Health, Obstetrics, and Neonatal Nurses' (AWHONN) standardized postpartum discharge, Bandura, cognitive learning theory, Roy, adaptation during childbirth, non-urgent, and emergency room

Dedication

I would like to dedicate this project to my two small children, Rajan and Rani, as an example of perseverance in the face of multiple obstacles. To my husband Birpal for all his sacrifices and patience during this journey. To our parents, who came here with nothing in hopes of creating a better life for their children. Lastly, to my little boy Himmat, and the motivation his memory has given me.

Acknowledgments

I would like to thank my committee members, Dr. Beth Hale and Kathy Schaefer for all of their time, patience, and expertise during this process. I would like to thank the project site for all their assistance throughout this journey. I would like to thank my husband Birpal and my two children, Rajan and Rani, for their patience and constant encouragement. Thank you to our parents and my sister for all their motivation and support during this journey.

Table of Contents

Chapter 1: Introduction to the Project.....	1
Background of the Project	3
Problem Statement	5
Purpose of the Project	6
Clinical Question	8
Advancing Scientific Knowledge	9
Significance of the Project	11
Rationale for Methodology	13
Nature of the Project Design.....	14
Definition of Terms.....	15
Assumptions, Limitations, Delimitations	17
Summary and Organization of the Remainder of the Project	21
Chapter 2: Literature Review	24
Background of the Problem	25
Theoretical Foundations.....	28
Review of the Literature	33
Consequences of inadequate postpartum discharge education	34
Postpartum discharge education	49
Non-urgent ER visits.....	57
Examples of postpartum discharge education interventions.....	79
Summary	88
Chapter 3: Methodology	93

Statement of the Problem.....	94
Clinical Question	95
Project Methodology.....	98
Project Design.....	100
Population and Sample Selection.....	101
Sources of Data.....	104
Validity	106
Reliability.....	108
Data Collection Procedures.....	111
Data Analysis Procedures	116
Potential Bias and Mitigation.....	118
Ethical Considerations	120
Limitations	122
Summary.....	124
Chapter 4: Data Analysis and Results.....	126
Descriptive Data.....	127
Data Analysis Procedures	131
Results.....	134
Homogeneity of Variance.....	134
Shapiro-Wilk test.....	134
Two-tailed independent samples t-test.....	135
Two-tailed Mann-Whitney U test.....	136
Summary.....	137

Chapter 5: Summary, Conclusions, and Recommendations	139
Summary of the Project	140
Summary of Findings and Conclusion.....	141
Implications.....	145
Theoretical implications.....	145
Practical implications.....	147
Future implications.	147
Recommendations.....	150
Recommendations for future projects.	150
Recommendations for practice.	152
References.....	155
Appendix A.....	175
Grand Canyon University Institutional Review Board Letter	175
Appendix B.....	176
AWHONN’s Standardized Postpartum Discharge Education	176
Appendix C.....	180
Permission to use Standardized Postpartum Discharge Education.....	180
Appendix D.....	182
Postpartum Emergency Room Visit Coding Sheet.....	182
Appendix E	187
Data Collection Tool.....	187

List of Tables

Table 1 Summary Statistics Table for Maternal Age.....	129
Table 2 Frequency Table for Delivery Type, Gravidity, and Race	130
Table 3 Independent Samples t-Test for Non-urgent ER visits by Education.....	135
Table 4 Mann-Whitney Test for Non-urgent ER visits by Education	136

List of Figures

- Figure 1. Race Distribution of Mothers in Education Group..... 130
- Figure 2. The Mean of Non-urgent ER Visits by Levels of Education. 135

Chapter 1: Introduction to the Project

Postpartum discharge education is insufficient for outlining the warning signs associated with postpartum complications (Bingham et al., 2018a; Suplee et al., 2016a). In addition to the inconsistencies in postpartum education, there are gaps in postpartum discharge education, and nurses are unaware of what other nurses are teaching (Bingham et al., 2018a; Suplee et al., 2016a). The resources nurses are using for postpartum discharge education also vary, and nurses are not comprehensive in their discharge education (Suplee et al., 2016a). Additionally, postpartum mothers feel clinicians and health care systems are not adequately preparing them with resources and services to survive during the postpartum period (McCarter & MacLeod, 2019; Verbiest et al., 2018). As a result of problems in postpartum discharge education, mothers are unaware of postpartum warning signs on when to seek medical care in the emergency room (ER) for urgent conditions and when to consult their health care provider for non-urgent conditions (Logsdon et al., 2018; Suplee et al., 2016a). These inconsistencies emphasize the need for education on postpartum warning signs, especially when seeking medical attention from health care providers and when to attend the ER for urgent conditions (World Health Organization, 2015).

Discharge education on when to attend the ER for urgent conditions is necessary as the rate of non-urgent ER visits has increased to approximately 110 million ER visits annually (Centers for Disease Control and Prevention [CDC], 2015; Honigman et al., 2013). The Healthcare Cost and Utilization Project (HCUP) illustrates the rates of ER visits have increased by nine percent in individuals aged 18-44 years from 2006 to 2015 (Sun et al., 2015). Specifically, the rate of postpartum ER visits has increased, where up

to 25% of women attend the ER in the postpartum period (Harris et al., 2015). Out of these postpartum ER visits, up to 80% of them were discharged home from the ER because they were considered non-urgent (Brousseau et al., 2018a).

Non-urgent ER visits presents financial and resource expenditures and inconveniences for patients (Pérez et al., 2018; Sheen et al., 2019). A non-urgent visit represents medical care that can be delayed up to 24 hours without negatively impacting the medical condition (CDC, 2015; Honigman et al., 2013). Non-urgent visits can be a problem in the postpartum period as pregnancy problems were among the top 10 reasons for ER visits among females aged 15-64 (CDC, 2015). The rising rate of non-urgent ER visits paired with maternal lack of knowledge regarding when to seek medical care for postpartum warning signs indicate a need for postpartum discharge education interventions.

This project used a quasi-experimental design to measure the rate of non-urgent ER visits before and after implementing a standardized postpartum discharge education intervention over four weeks. A standardized postpartum discharge education has the potential to improve maternal knowledge on when to seek urgent medical care in the ER for postpartum warning signs and when to seek medical care from health care providers (Bingham et al., 2018a; Brousseau et al., 2018a). If mothers are aware of when to seek medical care in the ER for postpartum warning signs, this may contribute to reducing the rate of non-urgent ER visits.

Non-urgent ER visits represent care that can be attended to in an outside facility (Kilfoyle et al., 2017). Non-urgent ER visits contribute to crowding, long wait times, and the use of resources and medical personal away from patients with emergent conditions

(New England Healthcare Institute, 2010). The cost, resource utilization, and inconvenience of non-urgent ER use demonstrate a need for educational interventions outlining when to seek medical care in the ER.

Background of the Project

Given the rising rates of maternal mortality from postpartum complications, the Association of Women's Health, Obstetrics, and Neonatal Nurses (AWHONN) developed a standardized postpartum discharge education in the form of a checklist (Suplee et al., 2016a). Maternal mortality rates have increased from 7.2 deaths per 100,000 live births in 1987 to 16.9 deaths per 100,000 in 2016 (CDC, 2020). Up to 60% of maternal mortality cases were due to preventable causes such as lack of knowledge on postpartum complications (AWHONN, 2019; Peterson et al., 2019). The top causes of maternal mortality were cardiovascular disease (CVD), preeclampsia or eclampsia, hemorrhage, venous thromboembolism (VT), amniotic fluid embolus, and sepsis (Creanga et al., 2015; Main et al., 2015). The standardized postpartum discharge education was an appropriate intervention as it encompassed warning signs associated with these most common postpartum complications (see Appendix B).

Given the gaps in postpartum discharge education have contributed to a lack of maternal lack of knowledge on postpartum warning signs, there is a need for standardized postpartum discharge education. Nurses are inconsistent in educating mothers on postpartum complications, and mothers were unaware of all warning signs associated with pregnancy complications (Logsdon et al., 2018; Suplee et al., 2016a). Nurses were unaware of what their fellow nurses were teaching and demonstrated inconsistency in the resources used for discharge education (Suplee et al., 2016a). A standardized postpartum

discharge education intervention was appropriate for addressing the gaps in postpartum discharge education.

Lack of knowledge on when to seek medical care in the ER contributes to non-urgent ER visits (Bingham et al., 2018a; Brousseau et al., 2018a). The Healthcare Cost and Utilization Project (HCUP) outlined the rates of ER visits have increased by nine percent for individuals aged 18-44 years from 2006 to 2015 (Sun et al., 2015). Only 23.2% of all ER visits in 2015 were considered immediate or emergent and required hospitalization (CDC, 2015). Additionally, the rates of non-urgent ER visits have increased, where only 4% of non-urgent ER visits led to hospitalization (Honigman et al., 2013). Non-urgent ER visits represent medical care that can be sought at an outside facility without negatively impacting the medical condition (CDC, 2015; Honigman et al., 2013). Non-urgent visits to the ER create financial and resource expenditures for patients and health care organizations (CDC, 2015; Sheen et al., 2018). Health care spending on non-urgent or avoidable ER visits cost approximately \$38 billion annually (New England Healthcare Institute, 2010). For example, 87.8% of non-urgent ER visits required some form of resource utilization, including diagnostic testing or treatment, and 29.8% had imaging (Honigman et al., 2013). Non-urgent ER visits also illustrate the utilization of medical personal away from individuals with urgent medical conditions (New England Healthcare Institute, 2010). Additionally, non-urgent ER visits present an inconvenience for patients, including crowding and long wait times (CDC, 2015; Sheen et al., 2019). The average wait time for non-urgent ER visits was between two to four hours, and the conditions associated with these visits could have been cared for in an outside facility (CDC, 2015).

Problems associated with pregnancy were among the top 10 reasons for ER visits among females between 15- 64 (CDC, 2015). Most postpartum ER visits were considered non-urgent, and mothers were not readmitted (Brousseau et al., 2018a; Sheen et al., 2019). In addition to non-urgent ER visits, many women miss postpartum follow-up appointments with their health care provider (Wilcox et al., 2016). Specifically, postpartum visit attendance rates vary from 49.4% to 67% in some studies across the nation (de Bocanegra et al., 2017; Parekh et al., 2018; Wilcox et al., 2016). Postpartum follow-up visits with health care providers can help with early diagnosis, screening, and management of postpartum complications and contribute to reducing non-urgent ER visits (Wilcox et al., 2016; Yee et al., 2017). Prevention strategies for non-urgent ER visits include educating new mothers on when to seek medical care in the ER, and appropriate follow-up with primary care providers (Brousseau et al., 2018a; New England Healthcare Institute, 2010; Sheen et al., 2019). These strategies are consistent with the recommendations by the American College of Obstetricians and Gynecologists (ACOG), the World Health Organization (WHO), and AWHONN, which recommend the need to educate postpartum mothers on postpartum warning signs and when to seek care in the ER. The need for education on postpartum warning signs supports the implementation of a standardized postpartum discharge education.

Problem Statement

The standardized postpartum discharge education was intended to address the gap in the current state of postpartum discharge education. Given the lack of cohesive messages and resources in discharge education and the need for evidenced-based education, postpartum discharge education must become a priority (Malagon et al., 2017;

Suplee et al., 2016b). Postpartum discharge education interventions have the potential to improve maternal knowledge on when to consult their health care providers and, in turn, can lead to reducing non-urgent ER visits (Bingham et al., 2018b; Brousseau et al., 2018a; Sheen et al., 2019). Despite the availability of evidence-based information on postpartum warning signs, it was not known if or to what degree the implementation of a standardized postpartum discharge education would impact non-urgent ER visits when compared to current practice among postpartum women in rural North Dakota.

The Association of Women's Health, Obstetrics, and Neonatal Nurses (AWHONNs) developed a standardized postpartum discharge education as a checklist. This standardized postpartum discharge education provides a guide for postpartum discharge education that includes teaching points on the most common postpartum complications (AWHONN, 2017; Bingham et al., 2018b; Suplee et al., 2016b). It was hoped that incorporating AWHONN's standardized postpartum discharge education into discharge education practices would reduce non-urgent ER visits by postpartum women.

Purpose of the Project

The purpose of this quantitative, quasi-experimental, quality improvement project was to determine if AWHONN's standardized postpartum discharge education would impact non-urgent ER visits among postpartum women in a hospital in rural North Dakota over four weeks. This project used a quasi-experimental design and collected data on a convenience sample of all postpartum women with full-term live births receiving postpartum discharge education over a four-week timeframe. The rate of non-urgent ER visits before the standardized postpartum discharge education intervention was determined from January 2020. Inclusion criteria included all postpartum women with

full-term live births within a four-week timeframe. Exclusion criteria included postpartum women with preterm births, cognitively impaired postpartum women, and those women with postpartum complications.

The primary investigator used the Cerner Powerchart EMR to collect data on demographic information (gravidity, age-range, and race), delivery type, and non-urgent ER visits from ER discharge diagnoses. The primary investigator used a coding sheet to determine urgent versus non-urgent ER visits (see Appendix D). Rates of non-urgent ER visits (dependent variable) were analyzed before and after standardized postpartum discharge education intervention (independent variable) using an independent *t*-test. The data analysis on the rate of postpartum ER visits before the intervention compared to the rate after the intervention helped answer the clinical question.

A postpartum discharge education intervention was necessary given the gaps in postpartum education and maternal lack of knowledge on postpartum warning signs (Suplee et al., 2016a). In addition to a lack of knowledge on postpartum warning signs, mothers are attending the ER for non-urgent conditions (Bingham et al., 2018a; Brousseau et al., 2018a; Sheen et al., 2019). These problems with postpartum discharge education and the rate of non-urgent visits to the ER warrant a postpartum discharge education intervention outlining when to seek medical care in the ER and when to consult health care providers. The standardized postpartum discharge education provided a teaching guide on warning signs warranting urgent medical care in the ER, and those warranting medical care from health care providers.

Clinical Question

The current state of postpartum discharge education is inconsistent in educating mothers on postpartum warning signs (Bingham et al., 2018a; Suplee et al., 2016a). In turn, mothers are unaware of when to seek medical care in the ER and when to consult their health care provider (Bingham et al., 2018a; Brousseau et al., 2018a). Despite the availability of evidence-based information on postpartum warning signs, it was not known if or to what degree the implementation of a standardized postpartum discharge education would impact non-urgent ER visits when compared to current practice among postpartum women in rural North Dakota.

Given the standardized postpartum discharge education included education on postpartum warning signs, the following clinical question was appropriate: To what degree will implementation of AWHONN's standardized postpartum discharge education reduce the rate of non-urgent ER visits when compared to the current practice among postpartum women in rural North Dakota over a four-week period? The clinical question in this project was aimed at determining the rate of non-urgent ER visits in postpartum women before and after implementing a standardized postpartum discharge education. The recommendations by WHO (2015) and ACOG (2018) outlining the need to educate mothers on postpartum warning signs and when to seek medical care in the ER drove this clinical question.

The standardized postpartum discharge education served as the independent variable, and the rate of non-urgent ER visits served as the dependent variable. A coding sheet (see Appendix D) helped determine which ER visits were urgent and non-urgent. Maternal demographics (gravidity, age-range, and race) and delivery type provided

sample characteristics. It was hopeful that implementing the standardized postpartum discharge education would reduce the rate of non-urgent ER visits.

Advancing Scientific Knowledge

Making practice improvements by addressing gaps in nursing practice is within the professional role of doctorly prepared nurses. An evidence-based standardized postpartum discharge education intervention addresses the gaps apparent within postpartum discharge education by educating mothers on postpartum warning signs (Suplee et al., 2016a). Postpartum discharge education's current state presents discrepancies (Suplee et al., 2016b; Suplee et al., 2017). The inconsistencies in postpartum discharge education outline the need for standardized postpartum nurse discharge education based on evidenced-based guidelines (Malagon et al., 2017). The standardized postpartum discharge education by AWHONN contributes to addressing inconsistencies with postpartum discharge education as it provides a teaching guide for postpartum warning signs. It was hoped that through educating mothers on postpartum warning signs, they would know when to seek prompt medical attention from their health care provider and when to go to the ER for urgent conditions. Evidenced-based postpartum discharge education interventions have the potential to increase maternal knowledge on postpartum warning signs and help counter inconsistencies in postpartum discharge education (AWHONN, 2017; Jain and Moroz, 2017; Kleppel et al., 2016; Suplee et al., 2016b). It was hopeful that through this education on postpartum warning signs, the rate of non-urgent ER visits would decrease.

The theory of adaptation during childbirth (TADC) and cognitive learning theory (CLT) provided the theoretical foundation for this intervention. The theory of adaptation

during childbirth is derived from Roy's adaptation model and supports the information presented within the discharge education intervention (Tulman & Fawcett, 2003). The physical, psychological, and social adaptation to an individual's environment is at the core of the theory of adaptation during childbirth (Tulman & Fawcett, 2003). Using a standardized postpartum discharge education advanced TADC as it incorporates the physical, psychological, and social components of postpartum warning signs (Sabitha, & Shiny, 2015; Tulman & Fawcett, 2003). Including the four modes of adaptation in postpartum discharge education was consistent with the recommendations of the ACOG, who recommend that postpartum care should include physical, social, and psychological changes in a woman (ACOG, 2018).

Cognitive learning theory informed how the standardized postpartum discharge education took place (i.e., face to face education) (Bandura, 1971). A face to face educational intervention builds on the tenants of CLT as it outlines the mental processes that occur within the learner when acquiring information (Braungart & Braungart, 2013; Kretchmar, 2019). Albert Bandura's social learning theory (SLT) is a sub-theory derived from CLT, where learning occurs through observing others (Bandura, 1971; Braungart & Braungart, 2013). In SLT, role models influence the learning process and behavior change (Bandura, 1971; Braungart & Braungart, 2013). Role models are individuals (often in a position of authority) who demonstrate behavior that is observed and often mimicked (Bandura, 1971; Braungart & Braungart, 2013). Given their academic and practical experience in education, postpartum nurses were role models that helped gain attention from maternal learners. Together, TADC provided support for the content of education, whereas CLT provided support regarding the process.

Significance of the Project

This project fits within the quality improvement initiatives set forth by the AWHONN (2020) organization. The mission of AWHONN is the well-being of mothers, newborns, and families through research, educational, and advocacy initiatives. Given the project was intended to improve postpartum discharge education for mothers and better prepare them on when to seek medical care for postpartum warning signs, this project aligned with the goals of AWHONN. This project fits with AWHONN's initiative to empower women to obtain needed care, which resulted in creating the standardized postpartum discharge education used in this project (Suplee et al., 2016b). The project is also aligned with past and current quality improvement initiatives by AWHONN. Past quality improvement initiatives by AWHONN outlined the need to educate mothers on postpartum warning signs during postpartum discharge education (Suplee et al., 2016a). Current quality improvement initiatives by AWHONN include a study to assess the impact of standardized discharge education (checklist) on readmission rates (T. Suplee, personal communication, May 29, 2020). This project had a similar intent in that it determined the impact of the standardized postpartum discharge education on the patient outcome of non-urgent ER visits. Findings from this project support AWHONN's educational initiative to improve mothers' well-being during the postpartum period. Finally, this project helped educate mothers on postpartum warning signs, which aligns with the recommendations by AWHONN, ACOG, CDC, and WHO as methods to reduce preventable maternal mortality from postpartum complications.

This project was consistent with the recommendations from the WHO regarding requirements for postpartum discharge education. The WHO states that all postpartum

mothers require education on the common postpartum danger signs and when to consult health care providers regarding any signs of postpartum complications such as hemorrhage, preeclampsia/eclampsia, infection, and thromboembolism (WHO, 2015). This information was present in the content of AWHONN's standardized postpartum discharge education in a checklist that emphasized the warning signs associated with each of these postpartum complications. The project was consistent with WHO's recommendations that checklists are ideal for incorporating education on postpartum warning signs through quality improvement initiatives (WHO, 2015).

Optimizing postpartum care through enhanced education on postpartum complications was also consistent with the recommendations by the American College of Obstetricians and Gynecologists (ACOG). The ACOG outline that the fourth trimester, or postpartum period, is critical in ensuring long term maternal well-being. Specifically, 60% of maternal mortality rates occur in the postpartum period (Creanga et al., 2015). One of the causes of preventable maternal mortality is a lack of education on postpartum complications (AWHONN, 2019; Suplee et al. 2016a). For these reasons, ACOG recommends that mothers receive information on timely follow-up for postpartum complications (ACOG, 2018). The standardized postpartum discharge education addressed this recommendation as it provides teaching points on postpartum warning signs associated with the common causes of postpartum complications (AWHONN, 2017).

Further, ACOG (2018) outlines the importance of anticipatory guidance in postpartum planning, especially since close to 40% of women do not attend postpartum visits. Lack of postpartum visit nonattendance suggests that postpartum discharge

education in the hospital may be the only source of postpartum education these mothers receive. These recommendations by ACOG and the lack of postpartum visit nonattendance indicate a need for a standardized postpartum discharge education to educate mothers on when to seek medical care for postpartum warning signs.

A standardized postpartum discharge education can help counter non-urgent ER visits in the postpartum period. Given the cost of non-urgent ER visits are approximately \$38 billion annually, educational interventions on when to seek care in the ER for urgent conditions is necessary (New England Healthcare Institute, 2010). Educational interventions can help reduce crowding problems, long wait times, and resource utilization during non-urgent visits (New England Healthcare Institute, 2010). With problems associated with pregnancy among the top 10 reasons for ER visits among females, educational strategies targeting this population may help counter non-urgent ER visits (CDC, 2015). Postpartum discharge education interventions have the potential to improve non-urgent ER visits, reduce unnecessary costs for patients and health care organizations, and reduce the overall inconvenience associated with ER use (Batra et al., 2017; Sheen et al., 2019).

Rationale for Methodology

Quantitative methods were most suited for this doctoral project as it determined the impact of a standardized postpartum discharge education on reducing non-urgent ER visits. Quantitative methods promote evidence-based practice when there is a lack of research on a select topic (Melnyk et al., 2015). In quantitative methods, statistics are used to objectively measure data in numerical form (Goertzen, 2017). Employing a quantitative methodology was appropriate as the project determined the rate of non-

urgent ER visits before and after implementing a standardized postpartum discharge education. Conducting an evidence-based intervention like this was necessary to implement the best evidence in clinical practice and improve patient outcomes (Melnyk et al., 2015). Improving patient outcomes and enhancing clinical care is the epitome of the role of a doctorly prepared nurse.

To determine the effectiveness of the standardized postpartum discharge education, the rate of non-urgent ER visits was compared before and after the intervention. The electronic medical record (EMR) was used to collect demographic information (gravity, age-range, race), delivery type, and ER discharge diagnosis to determine non-urgent ER visits. A coding sheet outlining non-urgent versus urgent ER visits helped guide this process (see Appendix D). Rates of non-urgent ER visits were analyzed before and after standardized postpartum discharge education intervention using an independent *t*-test. Data analysis on the rate of non-urgent ER visits before and after the standardized postpartum discharge education intervention helped answer the clinical question.

Nature of the Project Design

According to Köhler et al. (2017), a project design needs to reflect the project question as well as the specific context. This project consisted of a quasi-experimental design to determine the rate of non-urgent ER visits before and after a standardized postpartum discharge education intervention. A quasi-experimental design is useful when determining any change before and after an intervention (Melnyk et al., 2015). A quasi-experimental design allows a comparison of the means in two non-randomly assigned groups using statistical analysis (Alessandri et al., 2017). This statistical analysis

determines any change in the independent variable (i.e., standardized postpartum discharge education) from the dependent variable (i.e., non-urgent ER visits). A quasi-experimental design is like a randomized control trial, in that it determines the impact of an intervention on a group, but it lacks randomization (Handley et al., 2018). The reason for a quasi-experimental design is that a convenience sample was required to determine the impact of a standardized postpartum discharge education. This project's sample consisted of all postpartum mothers with full-term live births who delivered in the hospital in rural North Dakota over a four-week timeframe. This design was appropriate given the convenience sampling with postpartum mothers and the intent to improve clinical outcomes such as non-urgent postpartum ER visits.

The EMR was used to collect data on maternal demographics (gravidity, age-range, and race), delivery type, and non-urgent ER visits from ER discharge diagnosis. The EMR is useful in accumulating data to outline patterns, which may contribute to improving clinical care (Britton, 2015). Specifically, the EMR contains demographic information and information on patient encounters (Ben-Assuli, 2015). Data on maternal demographics and delivery types were acquired from admission records and delivery notes respectfully. The primary investigator used a coding sheet to determine urgent and non-urgent ER visits from the ER discharge diagnosis (see Appendix D).

Definition of Terms

The following terms were used operationally in this project.

Association of Women's Health, Obstetrics, and Neonatal Nurses

(**AWHONN**). A nonprofit organization founded in 1969 that aims to support nurses in

caring for women, newborns, and families with research, education, and advocacy (AWHONN, 2020).

Electronic medical record (EMR). An EMR is an electronic database for the storage of patient medical information, including patient demographics and diagnosis (Ehrenstein et al., 2019). Cerner Powerchart was the type of EMR used at the project site. Cerner EMR is an integrated database allowing storage, documentation, and access to patient health information (National Center for Medical Records, 2020a).

Gravidity. Gravidity is defined as the number of pregnancies a woman has had in her lifetime (Merriam Webster, n.d.).

Maternal Mortality. Maternal mortality is defined as the death of a woman while pregnant or 42 days postpartum (WHO, 2019), whereas pregnancy-related death is defined as the death of a woman while pregnant or up to one year postpartum due to pregnancy complications (Centers for Disease Control and Prevention, 2019b).

Non-urgent ER visit. A non-urgent visit represents medical care that can be delayed up to 24 hours without negatively impacting the medical condition (CDC, 2015; Honigman et al., 2013). Non-urgent ER visits outline the possibility that medical needs can be met at a different site (Honigman et al., 2013).

Postpartum. Postpartum, also known as puerperium, is commonly defined as six to eight weeks after birth but can be up to 12 months after birth (Berens, 2020). The postpartum period is when women experience physiological changes from pregnancy back to a nonpregnant state (Berens, 2020).

Postpartum warning signs. Postpartum warning signs include postpartum hemorrhage, hypertensive disorders, preeclampsia, and eclampsia. Postpartum warning

signs also include venous thromboembolism, pulmonary embolism, infection, sepsis, postpartum depression, and cardiac disease. The definitions for all postpartum warning signs are in Appendix D.

Standardized postpartum discharge education. The Association of Women’s Health, Obstetrics, and Neonatal Nurses (AWHONN) developed a standardized postpartum discharge education as a checklist to enhance postpartum education about warning signs associated with the most common postpartum complications (AWHONN, 2017). The standardized postpartum discharge education provides teaching points on warning signs for pulmonary embolism, cardiac disease, hypertensive disorders of pregnancy (including preeclampsia and eclampsia). The standardized postpartum discharge education also includes education on obstetric hemorrhage, venous thromboembolism, infection, and postpartum depression (AWHONN, 2017) (see Appendix B).

Urgent ER visit. The five-level triage acuity score characterizes ER visits based on urgency (Honigman et al., 2013). Levels one, two, three, four, and five represent immediate, emergent, urgent, semi-urgent, and non-urgent visits, respectively (CDC, 2015; Honigman et al., 2013). Immediate visits require immediate medical care, emergent visits require medical care within 14 minutes, urgent visits require medical care within 60 minutes, and semi-urgent visits require medical care within one to two hours (Honigman et al., 2013).

Assumptions, Limitations, Delimitations

The information in this section outlines the assumptions, limitations, and delimitations of the DPI project. Assumptions outlined what is expected truth in the DPI.

Delimitations outlined the factors under the primary investigator's control. There were several assumptions present in this project. First, it was assumed that all postpartum mothers would visit the same hospital ER in which they gave birth (topic-specific assumption). In other words, it was assumed that mothers who delivered in rural North Dakota would not go to another city for ER services. This assumption was appropriate as the hospital in rural North Dakota was the closest health care facility for residents of several rural communities.

The second assumption was a methodological assumption. It was assumed that the population would have equal variance and normal distribution. The assumptions of equal variance and normal distribution are true when considering the samples in an independent *t*-test (Kim, 2015). Normal distribution ensures that the population's means are similarly distributed, and equal variance suggests the differences of the samples are equal (Kim, 2015). Normal distribution and equal variance ensured that characteristics of the sample population of mothers are similar. Demographic information, including gravidity, age-range, race, and date of delivery, were collected to represent the characteristics of the sample population of mothers. Having similar sample characteristics at baseline helps prevent alternative explanations for health (Kim, 2015).

The third assumption was also a methodological assumption. It was assumed that each nurse educated mothers using standardized discharge education instead of traditional discharge education methods. In other words, a methodological assumption was that nurses would follow through with the standardized discharge education intervention. Lack of follow-through can also serve as a limitation, so close monitoring and

encouraging postpartum discharge documentation ensured the consistency of the intervention.

There were several limitations apparent within this project. First, the sample of mothers attending the ER could have undiagnosed underlying health conditions, making them more likely to visit the ER. Undiagnosed conditions represent a threat to internal validity, reflecting whether the intervention was responsible for the outcome (Cor, 2016). In other words, the undiagnosed underlying health condition may have been the reason for attending the ER and not necessarily the standardized discharge education intervention.

The second limitation was sample size. The sample size depended on the number of deliveries over four weeks in a small hospital in rural North Dakota, and in turn, it may have been too small. The size of the sample influences the project results. For example, a sample size that is too small may impact the internal or external validity of a project (Cor, 2016). In other words, if the project sample were too small, it would have been difficult to determine whether the intended concept was being measured (internal validity) and challenging to provide generalizations to a larger population (external validity) (Cor, 2016).

The third assumption was the Coronavirus-19 pandemic. Overall, the Coronavirus-19 pandemic has led to a national decrease in the number of ER visits (Hartnett et al., 2020). Despite the general decrease, North Dakota has experienced the lowest decrease in ER visits than one year before the pandemic (Hartnett et al., 2020). However, North Dakota was moved from low to moderate risk for exposure and transmission of Coronavirus-19 during project implementation (North Dakota

Department of Health and Department of Commerce, 2020). The project site did not experience any change in live births due to the pandemic (D. Mcavoy [Manager, Family Birth Center], personal communication, June 22, 2020). Despite the lack of change in live births, it was essential to consider that Coronavirus-19 may have impacted the rate of non-urgent ER visits.

There were delimitations in this project. The project was conducted in a small hospital in rural North Dakota over a four-week timeframe. This delimitation outlines that the sample was inclusive of individuals residing in rural North Dakota and neighboring rural communities.

Despite the limitations, the findings from this project can contribute to existing literature. The generalizability of findings depended on sufficient sample size (Cor, 2016; Handley et al., 2018). Achieving a sufficient sample size was one component needed to generalize this project's findings to postpartum women with uncomplicated pregnancies. The convenience sampling of postpartum women with uncomplicated deliveries limits generalizability to mothers with complicated deliveries (Handley et al., 2018). The project site is a small rural hospital in North Dakota, which may not represent postpartum women with access to larger hospitals in urban cities. Postpartum women living in large urban areas may have easier access to hospitals nearby versus mothers living in rural communities. Future projects can focus on building from this quality improvement initiative towards standardized discharge education interventions across larger populations and multiple locations.

Summary and Organization of the Remainder of the Project

The current state of postpartum discharge education is inconsistent in educating mothers on postpartum warning signs (Bingham et al., 2018a; Suplee et al., 2016a). In turn, mothers are unaware of when to seek medical care in the ER and when to consult their health care provider (Bingham et al., 2018a; Brousseau et al., 2018a). Despite the availability of evidence-based information on postpartum warning signs, it was not known if or to what degree the implementation of a standardized postpartum discharge education would impact non-urgent ER visits when compared to current practice among postpartum women in rural North Dakota. Therefore, the purpose of this quantitative, quasi-experimental, quality improvement project was to determine if AWHONN's standardized postpartum discharge education would impact non-urgent ER visits among postpartum women in a hospital in rural North Dakota over four weeks.

The gaps and inconsistencies in postpartum discharge education suggest the need for standardized postpartum nurse discharge education based on evidenced-based guidelines (Malagon et al., 2017; Suplee et al., 2016b). As a result of the irregularities in discharge education, mothers are unaware of postpartum warning signs (Logsdon et al., 2018). Postpartum women are attending the ER with non-urgent conditions, which creates financial consequences for patients and health care organizations (Brousseau et al., 2018a; Sheen et al., 2019). It is hoped that through this standardized discharge education intervention, mothers know postpartum warning signs, know when to consult their health care provider for medical care, and in turn, prevent non-urgent postpartum visits to the ER.

This project consisted of a quasi-experimental design to determine the impact of a standardized discharge education intervention on the rate of postpartum ER visits from data recorded in the EMR. A quantitative methodology was most appropriate for this project as the aim was to use statistics to objectively measure data in numerical form (Goertzen, 2017). The content in the standardized postpartum discharge education intervention was supported by TADC, and CLT guided the process of educating nurses on the standardized postpartum discharge education. This project aligned with the past and current initiatives by AWHONN to improve maternal health through educational initiatives (AWHONN, 2020). Furthermore, this project also reflected the recommendations by ACOG, AWHONN, CDC, and WHO that outline the need for postpartum discharge education to include postpartum warning signs. It was hopeful that having a strong methodological and theoretical foundation and being transparent about limitations would guide this quality improvement initiative.

Chapter 2 provides a review of the literature on the consequences of inadequate postpartum discharge education, postpartum discharge education, non-urgent ER visits, and examples of postpartum discharge education interventions. Chapter 2 also provides an in-depth discussion of TADC and CLT and how it informed this project. Chapter 3 outlines the methodology behind this project, including an expansion of project design and data collection procedures. Chapter 4 outlines the data analysis procedures and provides written and visual summaries of the findings. Finally, chapter 5 provides a discussion of the results and compares them to the current literature. It was hoped that this quality improvement initiative would lead to a standardization of discharge

education, improving maternal knowledge on postpartum warning signs, thereby reducing unnecessary postpartum ER visits over a four-week timeframe.

Chapter 2: Literature Review

The purpose of this quantitative, quasi-experimental, quality improvement project was to determine if AWHONN's standardized postpartum discharge education would impact non-urgent ER visits among postpartum women in a hospital in rural North Dakota over four weeks. Postpartum discharge education on postpartum complications varies among nurses and does not fulfill mothers' needs in the postpartum period (Bingham et al., 2018a; Suplee et al., 2016a). As a result of inconsistencies in education on postpartum complications, mothers are unaware of when to seek medical care in the ER for urgent conditions and when to consult their health care provider for non-urgent conditions (Logsdon et al., 2018; Suplee et al., 2016a). Mothers are attending the ER with non-urgent conditions, which presents financial and resource expenditures and inconvenience for a patient (Pérez et al., 2018; Sheen et al., 2019). These gaps in postpartum education outlined the need for education on postpartum warning signs and when to seek medical attention from health care providers and when to attend the ER for urgent conditions (WHO, 2015). Despite the availability of evidence-based information on postpartum warning signs, it was not known if or to what degree the implementation of a standardized postpartum discharge education would impact non-urgent ER visits when compared to current practice among postpartum women in rural North Dakota.

Chapter 2 provides a review of the literature on the consequences of inadequate postpartum discharge education, postpartum discharge education, non-urgent ER visits, and examples of postpartum discharge education interventions. This chapter also covers the theoretical foundations, including the theory of adaptation during childbirth (TADC) and cognitive learning theory (CLT). Databases for review of the literature included

Grand Canyon University Electronic Library Resource databases CINAHL (Cumulative Index of Nursing and Allied Health Literature), PubMed, Ovid, EBSCOhost, AWHONN, and Google Scholar. Search terms included: *Bandura, cognitive learning theory, Roy, adaptation during childbirth, standardized postpartum discharge education, non-urgent, and emergency room*. The primary investigator collected literature from the last five years. The primary investigator used the findings from this literature review to guide chapter 2 of this proposal, including background on the problem, theoretical frameworks, review of literature, and a summary.

Background of the Problem

Postpartum discharge education is insufficient in outlining warning signs associated with postpartum complications (Bingham et al., 2018a; Suplee et al., 2016a). The most common causes of postpartum complications include pulmonary embolism, cardiovascular disorder, hypertension, hemorrhage, venous thromboembolism, infection, and postpartum depression (AWHONN, 2017; Peterson et al., 2019; WHO, 2015). As a result of inconsistent postpartum discharge education, mothers are unaware of when to attend the ER with urgent postpartum warning signs (Logsdon et al., 2018; Suplee et al., 2016a).

Despite the evidence supporting the need for postpartum discharge education to include postpartum warning signs, postpartum discharge education is inconsistent in meeting these needs (Bingham et al., 2018a; Suplee et al., 2016a; WHO, 2015). Lack of knowledge on postpartum complications suggests missed opportunities for preventable causes of maternal mortality (CDC, 2019b; WHO, 2019). Maternal mortality has increased from 7.2 deaths per 100,000 live births in 1987 to 16.9 deaths per 100,000 in

2016, where many cases are considered preventable (CDC, 2020). Additionally, 60% of maternal mortality occurs in the postpartum period (Creanga et al., 2015). The rising rates of maternal mortality represent the unmet needs of mothers and health care organizations (Kleppel et al., 2016). One solution is through the WHO recommendations that suggested all mothers receive education on postpartum complications and when to seek medical attention in the postpartum period (WHO, 2015).

The postpartum period, or fourth trimester, is critical in ensuring long term maternal well-being (ACOG, 2018). Mothers receive one postpartum visit, usually at six weeks (Kleppel et al., 2016), and up to 40% do not attend this visit (ACOG, 2018). Lack of postpartum visit attendance outlines missed opportunities for screening, diagnosing, and managing postpartum complications (Wilcox et al., 2016). Lack of postpartum visit attendance paired with the lack of knowledge on postpartum complications is linked to an increase in non-urgent ER visits (Sheen et al., 2019; Wilcox et al., 2016).

A non-urgent ER visit represents medical care that can be delayed up to 24 hours without negatively impacting the medical condition (CDC, 2015; Honigman et al., 2013). Non-urgent ER visits outline the possibility that medical needs could be met at a different site (Honigman et al., 2013; Kilfoyle et al., 2017). Non-urgent ER visits are an inconvenience for patients and create unnecessary spending and resource utilization for health care organizations (CDC, 2015; Sheen et al., 2019). Non-urgent ER visits contribute to crowding, long wait times, and the use of resources and medical personal away from patients with emergent conditions (New England Healthcare Institute, 2010). The average wait time for non-urgent ER visits was between two to four hours, and these conditions could have been addressed in an outside facility (CDC, 2015). Problems of

pregnancy were among the top 10 reasons for ER visits among females aged 15-64 (CDC, 2015). Health care spending on non-urgent or avoidable ER visits cost approximately \$38 billion annually (New England Healthcare Institute, 2010). One of the unnecessary spending for non-urgent ER visits is the increase in resource utilization such as diagnostic testing, treatment, and imaging (CDC, 2015; Honigman et al., 2013).

Most postpartum ER visits are considered non-urgent, and mothers are not readmitted (Brousseau et al., 2018a; Sheen et al., 2019). Non-urgent ER visits in the postpartum period outline the need for postpartum discharge education interventions to reduce unnecessary costs and inconvenience with non-urgent ER use (Batra et al., 2017; Sheen et al., 2019). Standardizing postpartum discharge education with postpartum warning signs has the potential to decrease non-urgent ER visits (Bingham et al., 2018b; Brousseau et al., 2018a; Sheen et al., 2019).

The Association of Women's Health, Obstetrics, and Neonatal Nurses (AWHONN) developed a standardized discharge education tool to enhance postpartum education on warning signs associated with the most common postpartum complications (AWHONN, 2017). The standardized postpartum discharge education is a checklist (see Appendix B) developed based on the recommendations by AWHONN, ACOG, CDC, and the Joint Commission for improvements in postpartum discharge education (Suplee et al., 2016a). Given that mothers are unaware of postpartum warning signs, a postpartum discharge education outlining these warning signs is necessary (Suplee et al., 2016a).

The standardized postpartum discharge education provides teaching points on the warning signs for pulmonary embolism, cardiac disease, and hypertensive disorders of pregnancy (including preeclampsia and eclampsia). The standardized postpartum

discharge education also includes education on obstetric hemorrhage, venous thromboembolism, infection, and postpartum depression (AWHONN, 2017). The standardized postpartum discharge education outlines the postpartum warning signs warranting immediate medical attention in the ER, and those warranting prompt medical care from health care providers. The standardized postpartum discharge education also has a section to ensure mothers know when their postpartum follow-up appointment is scheduled, and confirmation of receiving standardized postpartum discharge education. Educating mothers on when to seek medical care in the ER for urgent conditions and when to consult health care providers for non-urgent conditions may help reduce non-urgent visits to the ER.

Theoretical Foundations

The theory of adaptation during childbirth (TADC) is derived from Roy's adaptation model and outlines the four modes for maternal adaptation in the postpartum period (Tulman & Fawcett, 2003). The four modes in TADC include physiological, role function, self-concept, and interdependence and represent maternal needs in the postpartum period (Tulman & Fawcett, 2003). The theory of adaptation during childbirth outlines opportunities to alter external stimuli to promote maternal adaptation in all four modes (Tulman & Fawcett, 2003).

The standardized postpartum discharge education promotes adaptation in all four modes; it emphasizes postpartum warning signs warranting urgent medical attention in the ER, and those seeking care through health care providers. For example, the physiological and role function modes represent the physical and functional changes related to childbearing (respectively, Tulman & Fawcett, 2003). The standardized

postpartum discharge education outlines the physical and functional warning signs associated with postpartum complications. Postpartum complications, such as blood clots, bleeding, pre-eclampsia, and cardiovascular conditions, are life-threatening complications that impact maternal physical well-being and, in turn, impact her role function as a new mother (AWHONN, 2019).

The self-concept mode outlines psychosocial health with childbearing, whereas the interdependence mode outlines social support networks (Tulman & Fawcett, 2003). Life-threatening postpartum depression is one of the warning signs outlined in the standardized postpartum discharge education. Postpartum depression can impact self-concept and interdependence modes of adaptation. Educating mothers on normal versus abnormal emotions and when to seek medical attention in the postpartum period is necessary for successful adaptation (Verbiest et al., 2018). Postpartum follow-up visits have also provided opportunities for screening for postpartum depression (Wilcox et al., 2016). The standardized postpartum discharge education includes an area for written confirmation of scheduled postpartum follow-up visits. In addition to postpartum depression screening, the postpartum follow-up visit allows opportunities to assess social support and, in turn, the interdependence mode of adaptation. The standardized postpartum discharge education also has a section for documentation of social support presence, which is necessary for the interdependence mode of adaptation. Seeking timely care for postpartum depression with health care providers can lead to appropriate management (ACOG, 2018) and, in turn, may reduce non-urgent ER visits (Malik et al., 2017). Ensuring maternal adaptation in all four modes outlines the importance of incorporating a biopsychosocial approach to nurse education regarding postpartum

discharge complications (Tulman & Fawcett, 2003). The standardized postpartum discharge education encompasses all four modes of adaptation in TADC and hence is an ideal postpartum discharge education intervention (Tulman & Fawcett, 2003).

The TADC addresses the content in this standardized postpartum discharge education, where cognitive learning theory addresses the process of education. Cognitive learning theory (CLT) served as an appropriate theoretical foundation in an educational intervention. Cognitive learning theory emphasizes the mental processes that occur within the learner when acquiring information and can provide a foundation for educating mothers on postpartum warning signs (Bandura, 1971; Braungart & Braungart, 2013; Kretchmar, 2019).

Cognitive learners are active participants in knowledge construction, where motivations, beliefs, and social influences can be instrumental in the perception, interpretation, and response to the environment (Braungart & Braungart, 2013; Kretchmar, 2019). Albert Bandura's social learning theory (SLT) is a sub-theory derived from CLT where learning occurs through observing others and the influence of role models on the learning process and behavior change (Bandura, 1971; Braungart & Braungart, 2013). Bandura outlined four phases of learning, including attentional, retention, reproduction, and motivational (Bandura, 1971; Braungart & Braungart, 2013). The attentional phase outlines the importance of role models on learning and behavior (Braungart & Braungart, 2013). Role models are individuals (often in a position of authority) who demonstrate behavior that is observed and often mimicked (Bandura, 1971; Braungart & Braungart, 2013). The influence of a role model on an individual's behavior depends on the learner's internal processes, where the learner has ultimate

control over the perception, interpretation, and storage of information (i.e., self-regulation) (Braungart & Braungart, 2013). Postpartum nurses represent role models that help gain attention from maternal learners through their educational and practical experience. The retention phase ensures that the learner is engaged in learning retains the information they observe (Braungart & Braungart, 2013). For example, the standardized postpartum discharge education occurred at a time convenient for the mother, when the mother was not tired, providing infant care, or distracted with other procedures. The reproduction phase outlines the ability of learners to replicate what was taught (Braungart & Braungart, 2013). Recording mothers' signatures on each section of the standardized postpartum discharge education can confirm learning took place. Lastly, in the motivation phase, learners need to be motivated to change their behavior (Bandura, 1971; Braungart & Braungart, 2013). Motivation emphasizes learner goals, which can be instrumental in creating disequilibrium and hence behavior change (Braungart & Braungart, 2013). For example, nurses educate mothers that untreated postpartum warning signs can lead to preventable maternal mortality (AWHONN, 2019; CDC, 2016).

Metacognition is defined as thinking about thinking and can impact the self-regulation of learning (Braungart & Braungart, 2013; Kretchmar, 2019). Attentive learners can organize and interpret incoming information about their previously existing knowledge and thoughts, which can alter perception and hence behavior (Braungart & Braungart, 2013). The importance of attentiveness in learners outlines the need to assess mothers' understanding of postpartum complications at a time that is convenient for them. In CLT, retention and application of knowledge in new situations depends on its

meaningfulness, where social influences, developmental stage, and context can impact learning (Kretchmar, 2019). Meaningfulness of information is relevant to this project as mothers have outlined the need for education on postpartum warning signs (McCarter & Mcleod, 2019; Verbiest et al., 2018). Common applications of CLT include information acquisition, memory processing, problem-solving, and understanding where learning can occur through guidance and social interactions (Braungart & Braungart, 2013). These apply to a postpartum discharge education intervention as it provides the mental processes within mothers during postpartum education delivery and methods of conducting postpartum education.

Both TADC and CLT can inform a postpartum discharge education intervention on complications in the postpartum period (Braungart & Braungart, 2013; Tulman & Fawcett, 2003). First, TADC was useful in outlining the content that should be included in postpartum discharge education. For example, incorporating the four modes of adaptation to include the physical, psychological, and social changes in the postpartum period was beneficial for doctorly prepared nurses to educate new mothers from a risk-reducing perspective. Second, CLT is useful in situations that involve the acquisition of knowledge, understanding, and memory processing; hence can aid the process of postpartum education (Braungart & Braungart, 2013). CLT outlines the importance of organization, goal setting, and clear expectations within a teaching environment (Braungart & Braungart, 2013). CLT places the learner at the forefront and emphasizes the importance of meaningful experiences, feedback, and role modeling for behavior change (Braungart & Braungart, 2013). In the intervention of postpartum education,

behavior change included an understanding of when to seek medical care from health care providers and when to go to the ER for postpartum warning signs.

Review of the Literature

Inadequate postpartum discharge education has consequences for mothers and health care organizations. Lack of knowledge on postpartum complications is cited as a significant contributor to preventable causes of maternal mortality (AWHONN, 2019). Despite this problem, the current state of postpartum discharge education is inconsistent in addressing postpartum warning signs associated with the most common postpartum complications (Bingham et al., 2018a; Suplee et al., 2016a). As a result of the inconsistencies in postpartum discharge education, mothers are unaware of the postpartum warning signs or when to seek medical care in the emergency room (ER) (Logsdon et al., 2018; Suplee et al., 2016a).

The lack of knowledge of postpartum complications is linked to postpartum ER use for non-urgent conditions (Pérez et al., 2018; Sheen et al., 2019). Non-urgent ER visits represent unnecessary spending for health care organizations and create opportunities for intervention (Pérez et al., 2018). Non-urgent ER visits outline the possibility that medical needs could be met at a different site (Honigman et al., 2013). The lack of knowledge on when to seek medical attention for postpartum warning signs in the ER outlines a need for a postpartum discharge education intervention addressing these warning signs. Postpartum discharge education interventions such as a standardized postpartum discharge education have the potential to reduce non-urgent ER visits in the postpartum period (Bingham et al., 2018b).

This review of the literature outlines the themes and subthemes that represent the variables in this project. The consequences of inadequate postpartum education were explored, including subthemes of maternal mortality, lack of maternal knowledge on postpartum complications, and postpartum visit nonattendance. Postpartum discharge education was explored as a theme and includes subthemes of consistency in postpartum discharge education, lack of nursing knowledge on discharge education, and quality improvement opportunities. The theme of non-urgent ER visits was examined, including subthemes of postpartum non-urgent ER visits and characteristics associated with non-urgent ER use. Additionally, the role of primary care visits in reducing non-urgent ER visits and maternal education to reduce non-urgent ER visits were also reviewed. The last theme examined examples of postpartum discharge education interventions, including subthemes of improving the quality of postpartum discharge education, standardized discharge education interventions, and targeted interventions using postpartum warning signs. This review outlines the problems with inadequate postpartum discharge education, gaps in discharge education, the problem with non-urgent ER visits. It supports the need for a postpartum discharge education intervention using peer-reviewed studies.

Consequences of inadequate postpartum discharge education. Maternal mortality rates have increased from 7.2 deaths per 100,000 live births in 1987 to 16.9 deaths per 100,000 in 2016 (CDC, 2020). Maternal mortality is defined as the death of a woman while pregnant or 42 days postpartum (WHO, 2019). Postpartum complications are a significant contributor to maternal mortality (Suplee et al., 2016a). Postpartum complications require timely follow-up with healthcare providers (ACOG, 2018); however, mothers are not aware of postpartum warning signs associated with postpartum

complications (Suplee et al., 2016b). Lack of knowledge on postpartum complications is a significant contributor to preventable causes of maternal mortality (AWHONN, 2019; CDC, 2019). Specifically, up to 60% of maternal mortality cases were due to preventable causes, such as lack of knowledge of postpartum complications (AWHONN, 2019; Peterson et al., 2019). Further, ACOG outlines the importance of anticipatory guidance in postpartum planning, especially since close to 40% of women do not attend postpartum visits (ACOG, 2018). Postpartum follow-up visits are opportunities for early screening, diagnosis, and management of postpartum conditions (Wilcox et al., 2016). This section uncovers complications resulting from inadequate postpartum discharge education. The subthemes include maternal mortality, lack of maternal knowledge on postpartum complications, and postpartum visit-nonattendance.

Maternal mortality. Alkema et al. (2016) conducted a systematic analysis of levels and trends of maternal mortality between 1990 and 2015 for 183 countries to determine progress and projections for reducing maternal mortality to below to less than 70 deaths per 100,000 births by 2030. Researchers used information from the United Nations Maternal Mortality dataset, which is a public dataset that provides information on national vital statistics, surveys, and census information (Alkema et al., 2016). Researchers gathered data on maternal mortality rates (MMR) from 171 of 183 countries. They found the global rate of MMR decreased from 1990 (385 per 100,000) to 2015 (216 per 100,000), which suggests a relative reduction of 43.9% in MMR worldwide (Alkema et al., 2016). Despite this success in MMR reduction, researchers outline the need to decrease MMR at a rate of 7.5% each year to reach the 2030 goal (Alkema et al., 2016).

Morton and Peterson (2014) analyzed the characteristics of women who died from preeclampsia and eclampsia in California to determine contributing factors, quality improvement opportunities, and outcome measures for a Maternity Care Improvement Preeclampsia Toolkit. Morton and Peterson used 145 cases of preeclampsia/eclampsia related death between the years 2002 and 2004 from a total of 26 hospitals in the United States (Morton & Peterson, 2014). Many of these deaths were, particularly with hemorrhage, preeclampsia (Morton & Peterson, 2014). Findings from Morton and Peterson's (2014) review outlined that preeclampsia contributed to 17% of pregnancy-related deaths between the years 2002-2004 in California, whereas almost all (n=24/25) were considered preventable.

The Center for Disease Control and Prevention (CDC) conducts a pregnancy mortality surveillance system (PMSS) to determine trends in maternal mortality and identify potential strategies to counter these trends. The rationale for the PMSS is the rise in maternal mortality rates, with approximately 700 women dying from pregnancy-associated complications annually (Petersen et al., 2019). The purpose of this PMSS was to determine the causes and timing of pregnancy-related deaths between 2011 and 2015 (Peterson et al., 2019). Researchers collected and coded data from the CDC's PMSS between 2011 and 2015 and 13 maternal mortality review committees between 2013 and 2017 (Peterson et al., 2019). Data collection included sociodemographic information, cause of death, the timing of death in pregnancy or postpartum, and prevention strategies to target the causes of mortality (Peterson et al., 2019). Timings for pregnancy-related death include 31.3% mortality rate during pregnancy, 16.9% on delivery day, 18.6% within 1 to 6 days after delivery, 21.4% within seven and 42 days after delivery, and

11.7% within 43 days and one year after birth (Peterson et al., 2019). The most common causes of death were cardiovascular conditions, hemorrhage, and infection, where 60% of the pregnancy-related deaths were considered preventable (Peterson et al., 2019). The findings outline maternal mortality from hemorrhage, and amniotic fluid embolism occurred on the day of delivery and hypertensive disorders between birth and six days postpartum (Peterson et al., 2019). Additionally, pulmonary embolisms occurred between one and 42 days postpartum, and cardiomyopathy occurred between 43 days and one year postpartum (Peterson et al., 2019).

The California Pregnancy-Associated Mortality Review conducted a case series design study to determine maternal and clinical factors leading to pregnancy-related death in California between 2002-2005 and areas for improvement (Main et al., 2015). The sample studied included 207 cases of pregnancy-related deaths in California to determine the leading causes of death (Main et al., 2015). The top causes of maternal mortality were cardiovascular disease (CVD), preeclampsia or eclampsia, hemorrhage, venous thromboembolism (VT), and amniotic fluid embolus (Main et al., 2015). Many (41%) of these deaths were preventable, particularly with hemorrhage, preeclampsia (Main et al., 2015).

Morton et al. (2019b) conducted a qualitative descriptive study using thematic analysis to outline quality improvement opportunities (QIOs) linked to the five major causes of pregnancy-related death in the state of California. The study took information from the California Pregnancy-Associated Mortality review committee to outline quality improvement initiatives towards maternal health (Morton et al., 2019b). The sample consisted of 203 cases of pregnancy-related deaths in California between the years 2002

and 2007 (Morton et al., 2019b). The causes for pregnancy-related deaths included cardiovascular, preeclampsia or eclampsia, hemorrhage, venous thrombosis, and sepsis (Morton et al., 2019b). The findings from Morton et al. (2019b) suggest the common causes of maternal mortality were cardiovascular disease (CVD), preeclampsia or eclampsia, hemorrhage, venous thromboembolism (VT), and sepsis (Morton et al., 2019b). Deaths involving hemorrhage and preeclampsia were considered preventable (Morton et al., 2019b).

Creanga et al. (2015) conducted a review of the Center for Disease Control's (CDC) Pregnancy Mortality Surveillance System (PMSS) to determine the characteristics and causes of pregnancy-related mortality in the United States during the years 2006-2010 and compared to causes of pregnancy-related death since 1987. The sample in the PMSS included all cases of pregnancy-related mortality between 2006-2010 in non-Hispanic white women, non-Hispanic black women, Hispanic women, and others (total live births 20,959,533) (Creanga et al., 2015). Researchers found a higher incidence in maternal mortality rates among black women and an overall increase in maternal mortality rates with the top causes of cardiovascular disorders, preeclampsia or eclampsia, hemorrhage, VT, and sepsis (Creanga et al., 2015).

Al-Safi et al. (2011) conducted a retrospective cohort designed study to determine the demographics, clinical course, and complications of delayed preeclampsia in patients with or without eclampsia. The sample consisted of 152 postpartum mothers who were discharged and readmitted for delayed postpartum preeclampsia (2 days to 6 weeks after delivery) between 2003 and 2009 (Al-Safi et al., 2011). The findings from Al-Safi et al.'s

(2011) study outline that most deaths occurred one week after postpartum discharge, which is a critical period for the development of postpartum eclampsia.

The rates, preventative nature, and most common causes of maternal mortality are apparent within these studies (Alkema et al., 2016; Morton & Peterson, 2014; Peterson et al., 2019). Among the causes of maternal mortality were lack of knowledge on postpartum complications (Morton & Peterson, 2014) and the timing of most deaths occurring within seven days postpartum (Peterson et al., 2019). The findings also state the high preventability rate of maternal mortality (Peterson et al., 2019; Morton & Peterson, 2014). In addition to preeclampsia, the most common causes of death were cardiovascular conditions, hemorrhage, and infection (Peterson et al., 2019). Although Alkema et al. (2016) outlined a global decrease in MM, Peterson et al. (2019) outline the increase in rates in the United States, which is consistent with the findings of the CDC (2020). All the researchers described a need to reduce preventable MM through targeted interventions (Alkema et al., 2016; Morton & Peterson, 2014; Peterson et al., 2019). These studies support a standardized discharge education, including warning signs on the most common causes of postpartum complications, as it can help improve maternal knowledge on when to seek medical care for the most common causes of maternal mortality (AWHONN, 2017). These findings are consistent with those of AWHONN (2019) and CDC (2016).

The findings from these studies were consistent in outlining the most common causes of maternal mortality and suggested many pregnancy-related deaths were preventable, particularly with hemorrhage, preeclampsia, sepsis, VT, and CVD (Main et al., 2015; Morton et al., 2019b). One week appears to be the most common time for the

development of postpartum complications such as eclampsia (Al-Safi et al., 2011). Generally, black women seem to have a higher incidence of maternal mortality from postpartum complications (Creanga et al., 2015).

There were several limitations to the studies. Morton et al. (2019b) conducted a study with a retrospective design over a ten-year time span, which may not account for changes in health care innovations in the treatment of maternal mortality. The reliability of mortality information may have been threats to the findings in both Creanga et al. (2015) and Al-Safi et al. (2011). For example, the uncounted pregnancy-related deaths, lack of mortality information to CDC, timing of death certificate checkboxes, and limited information on preexisting comorbidities may have represented incomplete data (Creanga et al., 2015). Al-Safi et al. 's (2011) study may have had undiagnosed cases of preeclampsia from mild symptoms. Despite the limitations, these results provide several insights into the causes and preventative natures of maternal mortality. These results outlined that health care provider factors (e.g., delayed response to warning signs) and patient factors (e.g., lack of knowledge and lack of seeking timely care) contributed to preventable cases (Main et al., 2015). Future studies should focus on the impact of comorbidities on maternal mortality and quality improvement initiatives towards preventable causes of maternal mortality (Al-Safi et al., 2011; Creanga et al., 2015). These findings suggested that interventions are needed to address the preventative nature of maternal mortality (Al-Safi et al., 2011; Creanga et al., 2015; Main et al., 2015).

Lack of maternal knowledge of postpartum complications. Logsdon et al. (2018) conducted a cross-sectional study to determine new mothers' knowledge of postpartum complications. Given that nurses are at the forefront of providing postpartum education,

more information is needed to see what new mothers know about risks for pregnancy-associated mortality (Logsdon et al., 2018). The research questions are the number of warning signs new mothers could identify, actions new mothers would take if the onset of warning signs, and whether new mothers were aware of the timing for postpartum complications (Logsdon et al., 2018). Findings from Logsdon et al. (2018) suggest that new mothers knew that heavy bleeding (61.7% of mothers), severe headache (64.2%), swelling (70.8%), and leg pain (57%) were postpartum warning signs. Mothers were less aware of feelings of harming self or baby (48%), shortness of breath (49%), blood clots larger than the baby's hand (45%), a temperature higher than 100.4 (40.8%), and odor with vaginal discharge (44.2%). In responses indicating what mothers would do in response to any of these warning signs, only 60% responded they would call labor and delivery, 71% said they would go to the emergency room, 42.5% would call 911, and 18% would have no action (Logsdon et al., 2018). In the last response, only 38.3% of mothers knew the timing for pregnancy-related complications could be up to one year postpartum (Logsdon et al., 2018).

Adams et al. (2017) conducted a cross-sectional survey design study to determine women's perception of postpartum care from midwives before discharge. Adams et al. (2017) also intended to determine the reasons for attending or not attending postpartum follow-up visits. Adams et al. (2017) used a convenience sample of 70 husband-wife pairs living in rural communities in Malawi to complete a survey on their perceptions of postpartum assessments, discharge education, and midwife kindness. The sample included mothers with live births over four years at one of the four facilities in their district. Researchers collected data using the WHO Safe Motherhood Needs Assessment

Questionnaire (Adams et al., 2017). Adams et al. (2017) found that women felt their postpartum assessments and health education by midwives were inadequate in educating them about the postpartum period.

Almalik (2017) conducted a prospective cohort design study to determine maternal learning needs and concerns postpartum and to determine if these needs were met at 6-8 weeks postpartum. Almalik (2017) used a convenience sample of 150 postpartum women in Jordan to determine mothers' perceived learning needs. Almalik used the perceived learning needs to scale immediately postpartum and at 6-8 weeks postpartum in this study. Researchers used a descriptive survey with the perceived learning needs scale before hospital discharge (Almalik, 2017). Almalik (2017) found that the health care delivery postpartum was insufficient in meeting maternal needs at 6-8 weeks postpartum, which may increase the rates of postpartum complications.

Montgomery and Laury (2019) used the account of a new mother with a Ph.D. in nursing science to discuss her experience with the postpartum period or fourth trimester. The rationale behind this exploration is the emphasis of postpartum discharge education on newborn care and lack of postpartum follow-up until six weeks postpartum (Montgomery & Laury, 2019). The authors outline searching for information on search databases online and self-diagnosing based on symptoms, speaking to the importance of appropriate postpartum education on when to seek care from health care providers or when to attend the ER (Montgomery & Laury, 2019). This account outlines that women may be unprepared for what to expect in the postpartum period and require appropriate discharge education to seek timely care from health care providers when necessary (Montgomery & Laury, 2019). The author outlined a lack of knowledge on the meaning

of swollen legs, abdominal cramps, high blood pressure, and that she was able to seek postpartum care before the six-week mark if needed (Montgomery & Laury, 2019).

Findings from these studies suggest that new mothers were not aware of all postpartum warning signs and did not know the urgency associated with the warning signs (Logsdon et al., 2018; Montgomery & Laury, 2019). These findings outline the postpartum warning signs warranting urgent medical care from the ER based on AWHONN's standardized postpartum discharge education. Specifically, a lack of knowledge on shortness of breath and high blood pressure as urgent warning signs were noted (Logsdon et al., 2018; Montgomery & Laury, 2019). These warning signs are among the signs warranting urgent medical care from the ER based on AWHONN's standardized postpartum discharge education (AWHONN, 2017).

Limitations in these studies include small sample size in Adams et al. (2017), Almalik (2017), and Montgomery and Laury (2015) and self-reported data in Adams et al. (2017). Additionally, the location in Malawi (Adams et al., 2017) and Jordan (Almalik, 2017) may not be representative of all postpartum populations given differences in health care delivery. Future studies can expand on these studies with quantitative methodology and larger sample sizes in the United States. Despite these limitations, the results from this study support the need for better postpartum education on warning signs for new mothers and support the project using this information through AWHONN's standardized postpartum discharge education.

Postpartum visit non-attendance. Wilcox et al. (2016) conducted a retrospective cohort study to determine the incidence and predictors of postpartum nonattendance within 12 weeks after birth. The rationale behind this study is that postpartum visit

nonattendance will mean postpartum women are missing important chances for screening for postpartum depression and treatment for other disorders (Wilcox et al., 2016).

Researchers hypothesized a high rate of postpartum visit nonattendance, particularly in low income and socially vulnerable populations of women (Wilcox et al., 2016). Wilcox et al. (2016) used a sample of 4049 women who received prenatal care in a Montefiore associated site in 2013 to conduct the study. Researchers used data from electronic medical records to determine maternal demographic information, insurance, delivery information, and postpartum visit data (Wilcox et al., 2016). The findings from Wilcox et al. (2016) state that 67% of women did attend a minimum of one postpartum visit within 12 weeks of giving birth. Factors associated with postpartum visit nonattendance included Medicaid coverage or lack of insurance, Hispanic race, age, and vaginal delivery (Wilcox et al., 2016).

Parekh et al. (2018) conducted a cross-sectional study to determine the impact of disparities by race, ethnicity, region, Managed Care Organizations (MCO), and year in prenatal and postpartum care visits among women enrolled in the Medicaid program HealthChoices. One of the rationales for this study is the high rate of maternal mortality in the country, particularly among racial and ethnic groups (Parekh et al., 2018).

Monitoring postpartum care is one way to recognize and improve maternal outcomes of care (Parekh et al., 2018). Parekh et al. (2018) used a representative sample of 12,228 women in the HealthChoices Program who delivered between 2011 and 2015. In this sample, 49% of women were White, 31% were Black/African American, 15% were Hispanic/Latino, and 4% were Asian (Parekh et al., 2018). Researchers used information from the Healthcare Effectiveness Data and Information Set (HEDIS) to determine

postpartum care timeliness (between 21-56 days postpartum) and outlined differences in ethnicity, race, region, year, and MCO (Parekh et al., 2018). The findings suggest the overall rates of postpartum care timeliness was 61%, which was considered higher than the national average in this sample (Parekh et al., 2018). Specifically, white and Asian women had greater postpartum care timeliness when compared to Black/African American women (Parekh et al., 2018).

De Bocanegra et al. (2017) conducted a prospective cohort study to determine differences in race and ethnicity in receiving postpartum care among Medicare-covered women in California. The rationales for this study were the racial and ethnic challenges in maternal health and how postpartum care can contribute to these disparities (de Bocanegra et al., 2017). Researchers hypothesized that racial and ethnic disparities would contribute to postpartum nonattendance (de Bocanegra et al., 2017). Researchers used a sample of 199 860 women who delivered in 2012 and were funded by Medicaid (de Bocanegra et al., 2017). The Medicaid Healthcare Effectiveness Data and Information Set (HEDIS), current procedural terminology codes, ICD-9-CM diagnosis codes, and Healthcare Common Procedure Coding system codes provided data for this study. Researchers used Medi-Cal and Family Planning, Access, Care, and Treatment (PACT) to collect data on race, ethnicity, and age (de Bocanegra et al., 2017). In this study, the Medicare-covered group had only 49.4% of women who attended their postpartum visit (de Bocanegra et al., 2017). The group was made up of 67.4% Latino, 49.9% English speaking, 46% Spanish as a primary language, and 57.9% of women between the ages of 20-29 (de Bocanegra et al., 2017).

Morgan et al. (2018) conducted a cross-sectional survey to determine the number of patients who attended postpartum visits and the characteristics associated with postpartum visit nonattendance. The rationale for this study was the lack of research on the attendance of postpartum visits in Maryland and risk factors related to nonattendance (Morgan et al., 2018). Researchers used stratified random sampling with 2204 women who gave birth in Maryland between 2012 and 2013 using the Maryland Pregnancy Risk Assessment Monitoring System (PRAMS) (Morgan et al., 2018). Postpartum visit nonattendance was the dependent variable, and maternal demographics (including race and maternal age) were part of the independent variables (Morgan et al., 2018). The findings from the PRAMS survey suggest that most women (89.6%) did attend postpartum visits, where the lack of postpartum visit attendance was associated with younger age (less than 24 years), Non-Hispanic Black and Hispanics demographics, and mothers who experienced infant death (Morgan et al., 2018).

Factors associated with postpartum visit nonattendance include younger age (20-29), non-Black and Hispanics demographics (de Bocanegra et al., 2017; Morgan et al., 2018; Parekh et al., 2018; Wilcox et al., 2016), Medicaid coverage (de Bocanegra et al., 2017; Wilcox et al., 2016), and mothers who experienced infant death (Morgan et al., 2018). Postpartum visit attendance varied between the studies and included 49.4% (de Bocanegra et al., 2017), 61% (Parekh et al., 2018), and 67% (Wilcox et al., 2016), where Parekh et al. (2018) found a higher than the national average rate on postpartum visit attendance and could be attributed to participants enrolled in a Medicaid's HealthChoices program. Missing postpartum visits outlines missed opportunities for postpartum depression screening (Parekh et al., 2018; Wilcox et al., 2016) and preeclampsia

diagnosis (Parekh et al., 2018). The rates of nonattendance outline the importance of providing mothers with appropriate postpartum discharge education while in the hospital. The project covers signs and symptoms for depression screening as well as warning signs for preeclampsia and would be a necessary intervention. This project is supported by the studies that outline the need to educate mothers on when to seek medical care in the postpartum period (de Bocanegra et al., 2017; Morgan et al., 2018; Parekh et al., 2018; Wilcox et al., 2016).

There are limitations to the studies. For example, Wilcox et al. (2016) conducted a retrospective chart review, which is dependent on the quality of data in the medical charts and led to excluding women with missing chart data. Further, Morgan et al. (2018) may have limitations in generalizability, given the inclusion of only those mothers that completed the survey. Parekh et al. (2018) included only participants insured under the Medicaid program, which may not be generalizable to all populations. Despite these limitations, these studies outlined valuable gaps in postpartum healthcare and reiterated the increasing importance of standardized postpartum discharge education. They provide opportunities for education, which may help reduce non-urgent ER visits through knowledge on when to seek medical care.

In summary, these studies outline the most common postpartum complications leading to maternal mortality include cardiovascular disease (CVD), preeclampsia or eclampsia, hemorrhage, venous thromboembolism (VT), amniotic fluid embolus, and sepsis (Creanga et al., 2015; Main et al., 2015; Morton et al., 2019a). Despite the evidence on the most common postpartum complications, mothers are unaware of postpartum warning signs associated with postpartum complications (Morton et al.,

2019a; Seacrist et al., 2019). Lack of maternal knowledge on postpartum warning represents the potential for untreated postpartum complications (Almalik, 2017; Logsdon et al., 2018; Morton et al., 2019a; Seacrist et al., 2019). Specifically, mothers were unaware of the postpartum warning signs for hemorrhage, shortness of breath, preeclampsia, and depression (Logsdon et al., 2018; Main et al., 2015; Montgomery & Laury, 2019; Morton et al., 2019), which are among the postpartum warning signs outlined by AWHONN. These studies support that a lack of maternal knowledge on postpartum warning signs is a significant contributor to preventable maternal mortality (AWHONN, 2019; CDC, 2019b; WHO, 2019). The high rate of preventability of maternal mortality from postpartum complications presents a need for enhanced education on postpartum warning signs (Alkema et al., 2016; Morton & Peterson, 2014; Peterson et al., 2019). The findings from these studies are inconsistent with the recommendations from the AWHONN (2017), WHO (2015), and ACOG (2018), which outline the importance of postpartum discharge education on postpartum warning signs and seeking timely medical care.

The findings from this section of the review also outline that a lack of postpartum visit nonattendance is a consequence of inadequate postpartum discharge education (de Bocanegra et al., 2017; Parekh et al., 2018; Wilcox et al., 2016). The lack of postpartum visit nonattendance presents another gap in postpartum healthcare regarding early detection of postpartum complications (de Bocanegra et al., 2017; Parekh et al., 2018; Wilcox et al., 2016). These findings outline the need for the postpartum discharge process to emphasize the importance of postpartum follow-up visits.

The need for discharge education to enhance maternal knowledge on postpartum warning signs to counter the preventable nature of maternal mortality represents a need for quality improvement initiatives (AWHONN, 2019). Mothers require education on when to seek timely postpartum follow-up care to ensure early screening, diagnosis, and management of postpartum complications (Wilcox et al., 2016). These needs for postpartum discharge education are fulfilled in AWHONN's standardized postpartum discharge education. The next section of the review covers postpartum discharge education, including subthemes of lack of consistency in postpartum discharge education and lack of nursing knowledge regarding discharge education. This section also reviews quality improvement opportunities.

Postpartum discharge education. The postpartum period, or fourth trimester, is critical in ensuring long-term maternal well-being (ACOG, 2018). A critical component of ensuring maternal health in the postpartum period is through postpartum discharge education on postpartum warning signs (WHO, 2015). Through educating mothers on postpartum warning signs, women may be better prepared to seek timely medical care for life-threatening postpartum complications (Kleppel et al., 2016). Despite the potential for postpartum discharge education to ensure maternal well-being in the postpartum period, current methods of postpartum discharge education are inconsistent (Suplee et al., 2016b). Postpartum discharge education has several gaps in the content and evidenced-based resources used for education (Suplee et al., 2016b).

Further, nurses are unaware of postpartum warning signs and timing for postpartum complications (Kleppel et al., 2016). These represent opportunities for quality improvement initiatives for postpartum discharge education. This section of the review

will cover the lack of consistency of postpartum education, lack of nursing knowledge regarding discharge education, and quality improvement opportunities.

Lack of consistency in postpartum discharge education. Suplee et al. (2017) conducted a cross-sectional study to determine nursing knowledge on maternal morbidity and mortality and postpartum warning signs and what information nurses shared with mothers about identifying postpartum warning signs. Researchers used a sample of 372 postpartum nurses who were members of AWHONN. Registered nurses completed a 25-item electronic survey to determine nursing knowledge and teaching skills with postpartum warning signs (Suplee et al., 2017). The survey was developed by the research team based on the findings from a previous study on the same topic (Suplee et al., 2017). The findings outline that nurses were unaware of the timing of maternal mortality and were not comprehensive in their discharge education (Suplee et al., 2017).

Verbiest et al. (2018) conducted a qualitative study to determine research questions, strategies, and possible solutions based on conversations between new mothers, health care providers, and stakeholders (community leaders). The goal of this study was to determine unmet maternal and family needs in the fourth trimester or first 12 weeks postpartum (Verbiest et al., 2018). Researchers carried out the patient-centered outcomes project with 22 new mothers, health care providers, and community stakeholders between February 2016 and August 2017 in North Carolina. Participants were recruited through community organization collaboration and referral for new mothers by health care providers (Verbiest et al., 2018). The project included monthly in-person and online meetings with study investigators and maternal health professionals. Researchers collected key health themes outlining maternal health concerns (Verbiest et

al., 2018). The themes from dialogue with mothers described that women felt unprepared for postpartum recovery, were not satisfied with postpartum care and left the hospital worried with questions (Verbiest et al., 2018). One dialogue outlined that mothers were unaware that the series of emotions during the first two weeks postpartum were considered normal (Verbiest et al., 2018). Mothers expressed the need to be more prepared to recognize the signs and symptoms of depression (Verbiest et al., 2018).

McCarter and MacLeod (2019) conducted a qualitative thematic analysis to determine postpartum women's, partners', and nurses' expectations and priorities during hospitalization. Researchers wanted to outline maternal and partner expectations versus nurse expectations and identify gaps (McCarter & MacLeod, 2019). Researchers used a convenience sample of 12 labor, delivery, and postpartum units to conduct focus group interviews in a small hospital in the northeastern part of the United States (McCarter & MacLeod, 2019). Researchers used responses from semi-structured interviews to conduct thematic analysis on responses from postpartum women, their partners, and their nurses on postpartum expectations (McCarter & MacLeod, 2019). Among the findings from McCarter & MacLeod (2019), mothers felt needing more information on physical and emotional care, where nurses felt priorities in care included safety issues and barriers to effective discharge education.

The findings from these studies identified the areas for improvement for discharge education. Although Verbiest et al. (2018) and McCarter and Macleod (2019) had limitations in their sample size and qualitative design, they provide insight into the inconsistencies within postpartum discharge education. Specifically, women felt clinicians and health care systems were not adequately preparing them with resources and

services to survive in the postpartum period (McCarter & MacLeod, 2019; Verbiest et al., 2018). Nurses were also unaware of the timing for maternal mortality and were inconsistent in their discharge education delivery, especially among a group of participants that were members of AWHONN (Suplee et al., 2017). These studies, paired with the findings from Suplee et al. (2017), suggest inconsistencies in the current landscape of postpartum discharge education and support the importance of providing evidenced-based discharge education to improve maternal knowledge on when to seek medical care for postpartum warning signs, such as those in the project.

Lack of nursing knowledge regarding discharge education. Suplee et al. (2016a) conducted an exploratory qualitative study to determine nurse's knowledge and methods of postpartum discharge teaching to mothers. Researchers used six focus groups to carry out discussions using semi-structured interviews (Suplee et al., 2016a). The sample consisted of nurses from six hospitals across two different states (Suplee et al., 2016a). Researchers wanted to know what nurses were teaching women about postpartum warning signs (Suplee et al., 2016a). Responses from nurses were audiotaped, transcribed, and coded (Suplee et al., 2016a). Findings outline nurses were inconsistent with their discharge teaching methods and lacked knowledge on the postpartum warning signs (Suplee et al., 2016a).

Mselle et al. (2017) conducted a qualitative study to assess the current state of postpartum care delivery in hopes of creating opportunities for improving postpartum health. Researchers conducted this study based on the recommendations by WHO, where all mothers should receive three postpartum interactions (Mselle et al., 2017). Researchers used a sample of 10 nurse-midwives and three obstetricians across three

postpartum clinics in Tanzania (Mselle et al., 2017). Researchers conducted face to face semi-structured interviews to evaluate their experiences with postpartum care delivery (Mselle et al., 2017). Nurses expressed education on postpartum danger signs, health promotion, and illness prevention were all necessary components of quality postpartum discharge education (Mselle et al., 2017).

Adams and Ray (2019) conducted a cross-sectional survey to determine midwife's knowledge of postpartum warning signs and postpartum care and identify interventions for improving patient outcomes. The rationale behind this study is the importance of knowledge on postpartum mortality, early identification of postpartum warning signs, and how it can impact the quality of care (Adams & Ray, 2019). Researchers used a convenience sample of 246 midwives across four hospitals in Ghana and collected data on postpartum knowledge with a survey (Adams & Ray, 2019). Findings from Adams and Ray (2019) found only 28.1% of midwives knew all nine postpartum warning signs for complications. Most mothers could identify bleeding, severe headache, and high temperatures as warning signs but limited on identifying chest pain, shortness of breath, and thoughts of hurting oneself as warning signs (Adams & Ray, 2019). Finally, the higher number of years of experience was linked to a better knowledge of postpartum warning signs ($P= 0.03$) (Adams & Ray, 2019).

Despite their qualitative designs, both Suplee et al. (2016a) and Mselle et al. (2017) outline that nurses needed more education on postpartum warning signs and supports a project intervention using AWHONN's standardized postpartum discharge education targeting postpartum warning signs. Although Adams and Ray (2019) used a sample of Midwives, the lack of knowledge on postpartum warning signs among

midwives is valuable, given they are professionals in maternal health. The location for both Mselle et al. (Tanzania) and Adams and Ray (Ghana) may not be generalizable to other settings but provide insight into the current state of nursing knowledge on postpartum warning signs. Given the apparent lack of knowledge demonstrated from all three studies, a standardized discharge education intervention using AWHONN's standardized postpartum discharge education can better prepare nurses to educate mothers on postpartum warning signs.

Quality improvement opportunities. Morton et al. (2019a) used the information from the cases of maternal death by the California Pregnancy-Associated Mortality Review Committee to determine quality improvement opportunities for women with preeclampsia and eclampsia. Morton et al. (2019a) conducted a qualitative descriptive study using thematic analysis and 54 cases of pregnancy-related deaths from preeclampsia or eclampsia between the years 2002 to 2007. Morton et al. (2019a) also outlined preventable maternal mortality in cases of preeclampsia and eclampsia. Researchers found that both health care providers and women were unaware of the warning signs for preeclampsia and eclampsia and outlined 242 quality improvement opportunities from reviewing cases of maternal mortality about preeclampsia and eclampsia (Morton et al., 2019a).

Similarly, Seacrist et al. (2019) conducted a qualitative descriptive review of pregnancy-related deaths due to hemorrhage to determine quality improvement opportunities. Researchers used 33 cases of pregnancy-related deaths due to obstetric hemorrhage in California between 2002 and 2007 and conducted a thematic analysis of the cases (Seacrist et al., 2019). The researchers used quality improvement domains of

readiness, recognition, and response and outlined to identify 159 quality improvement opportunities (Seacrist et al., 2019). Researchers found 10% of pregnancy-related deaths in California were due to obstetric hemorrhage and were considered preventable due to missed warning signs and women's lack of knowledge on when to seek medical attention (Seacrist et al., 2019).

Bingham et al. (2018a) conducted another quality improvement study to describe the structure and process of AWHONN's 18-month quality improvement project on postpartum hemorrhage. The project intended to measure the effectiveness of structural changes (update on hemorrhage policies, education of staff, and conducting postpartum hemorrhage drills) and process changes (quantification of blood loss, risk assessments at various points, and debriefing after hemorrhage) (Bingham et al., 2018a). The 18-month project took place in 58 hospitals in three states, where 2,852 participants completed the online education by AWHONN (Bingham et al., 2018a). Bingham et al. (2018a) found that mothers did not know what to do if they experienced warning signs, indicating a need for an educational intervention. Bingham et al. (2018a) found the changes in structure and process relating to obstetric hemorrhage showed an improvement, particularly nursing knowledge on quantification of blood loss, hemorrhage risk assessment, and debriefing improved.

These findings can add to the existing literature from AWHONN (2017), where lack of knowledge on warning signs on postpartum complications can contribute to maternal mortality (Morton et al., 2019a; Seacrist et al., 2019). The commonality between these three studies is the lack of maternal knowledge on postpartum warning signs, where both Morton et al. (2019a) and Seacrist et al. (2019) suggested a need for

improved education on postpartum warning signs. Limitations in these studies include the qualitative methodology in Morton et al. (2019) and Seacrist et al. (2019), which represent views of the sampled population. Bingham et al. (2018a) found a lack of time to fully implement the project, which could represent missing or incomplete data. Despite these limitations, these studies provide support for the need for improved knowledge of postpartum warning signs.

In summary, there are inconsistencies with the current methods of postpartum discharge education (McCarter & Macleod, 2019; Suplee et al., 2017; Verbiest et al., 2018). Lack of nursing knowledge on postpartum warning signs create a gap in postpartum discharge education and provide opportunities for quality improvement initiatives (Bingham et al., 2018a; Mselle et al., 2017; Morton et al., 2019a; Seacrist et al., 2019; Suplee et al., 2016a; Suplee et al., 2017). Specifically, nurses are unaware of the timing of maternal mortality and are not comprehensive in their discharge education (Suplee et al., 2017). The current delivery of postpartum discharge education has yielded mothers to feel a lack of preparedness with the postpartum period (McCarter & MacLeod, 2019; Verbiest et al., 2018). These studies are consistent with the literature that suggest postpartum discharge education interventions can better prepare mothers for postpartum complications (AWHONN, 2017; Jain and Moroz, 2017; Kleppel et al., 2016; Suplee et al., 2016b).

These findings are consistent with the recommendations from AWHONN, WHO, and ACOG, which outline the importance of postpartum discharge education on postpartum warning signs and seeking timely medical care (ACOG, 2018; AWHONN, 2017; WHO, 2015). One solution to target this problem with a lack of consistency is to

implement a standardized postpartum discharge education that provides a teaching guide for nurses on postpartum warning signs (AWHONN, 2017). Standardized postpartum discharge education can help educate mothers on when to seek prompt medical attention for postpartum warning signs in the ER and when to consult health care providers (AWHONN, 2017). The next section of the review covers non-urgent ER visits, including the subthemes of non-urgent postpartum ER visits and characteristics associated with non-urgent ER use. The following section also covers how postpartum visit nonattendance contributes to non-urgent ER use and the role of maternal education to counter non-urgent ER visits.

Non-urgent ER visits.

A non-urgent visit represents medical care that can be delayed up to 24 hours without negatively impacting the medical condition (CDC, 2015; Honigman et al., 2013). Non-urgent ER visits outline the possibility that medical needs could be met at a different site (Honigman et al., 2013). In comparison, urgent ER visits require immediate medical attention (Honigman et al., 2015).

Many visits to the ER by postpartum women are non-urgent (Brousseau et al., 2018a; Sheen et al., 2019). Non-urgent ER visits present financial and resource expenditure for health care organizations as well as inconvenience for patients (Pérez et al., 2018; Sheen et al., 2019). Postpartum visit non-attendance is a significant threat to non-urgent ER visits as postpartum follow-up visits provide opportunities for early screening, diagnosis, and treatment of postpartum complications (Parekh et al., 2018; Wilcox et al., 2016). Postpartum discharge education should include information on when to seek medical attention from health care providers and when to attend the ER for urgent

conditions (WHO, 2015). This section of the review of literature will include postpartum non-urgent ER visits, including characteristics and risk factors for postpartum ER visits. This section will also cover the role of postpartum visit non-attendance to non-urgent ER use and maternal education to reduce non-urgent ER visits.

Postpartum non-urgent ER visits. Brousseau et al. (2018a) conducted a retrospective cohort study to determine the characteristics of postpartum women who sought care in the ER. Brousseau et al. (2018a) conducted this study to gain a better understanding of the postpartum complications driving ER visits, determine ways to prevent ER visits, and improve the health of postpartum women. Brousseau et al. (2018) hypothesized there would be common characteristics among the postpartum women and the reason behind postpartum ER visits (Brousseau et al., 2018a). The sample included a review of all postpartum patients who sought care in the ER within 42 days of delivery over six months between December 2013 and June 2014 (Brousseau et al., 2018a). Researchers conducted a comprehensive review of all medical records, which included admission records and discharge documentation (Brousseau et al., 2018a). Researchers found that, out of 5708 deliveries, 252 women (5%) visited the ER in the postpartum period, where 80% of them were discharged home from the ER and were considered non-urgent (Brousseau et al., 2018a). The most common reasons for ER visits were normal postpartum examination (27%), hypertension (21%), and wound infection (9%) (Brousseau et al., 2018a).

Sheen et al. (2019) conducted a case-control study to determine characteristics associated with ER use among postpartum women. Sheen et al. (2019) hypothesized intrapartum and postpartum complications such as hypertension and hemorrhage would

be associated with increased postpartum ER use. The sample in Sheen et al. 's (2019) study included 100 matched pairs of postpartum women who delivered in a New York Hospital between 2012-2013 and visited the ER within 42 days postpartum. Researchers collected demographic, pregnancy, labor, and postpartum data using the Electronic Medical Record (EMR) (Sheen et al., 2019). Researchers found that women with complications during labor and postpartum, especially complications of hypertension and preeclampsia, had a higher likelihood of postpartum ER use (Sheen et al., 2019). Despite the appropriateness of ER use in some cases, other circumstances suggest poor healthcare resource allocation and costs for the organization and society (Sheen et al., 2019).

Brousseau et al. (2018b) conducted a retrospective cohort study to determine the characteristics of postpartum women who received a hypertension diagnosis on postpartum ER visits. The sample consisted of women with postpartum ER visits within 42 days of delivery in Rhode Island between December 2013 and May 2014 (Brousseau et al., 2018b). Researchers compared postpartum ER visits resulting in a hypertension diagnosis to all other postpartum diagnoses (Brousseau et al., 2018b). Researchers sought to collect data to determine characteristics associated with postpartum ER visits (Brousseau et al., 2018b). Researchers reviewed women's electronic medical records (EMR), including admission records, delivery, and operating room records, ER documentation, discharge reports, and postpartum hospitalization, to collect demographic information and see if there were any comorbidities and delivery complications (Brousseau et al., 2018b). Researchers found that out of 252 women with postpartum ER visits, 52 (20.6%) had a hypertension diagnosis, and 58% of these women were readmitted (Brousseau et al., 2018b). The mean day for postpartum ER visit was 11.5

days postpartum, and the most common risk factors associated with hypertension in the postpartum period included hypertensive disorders during pregnancy, obesity, older age, and induction of labor (Brousseau et al., 2018b). Other common reasons for postpartum ER visits included wound complication (18%), high fever (17%), abdominal pain (15.9%), headache and dizziness (12%), vaginal bleeding (11%), and breast issues (11%) (Brousseau et al., 2018b). Headache and dizziness complaints at the ER were most associated with a hypertension diagnosis (Brousseau et al., 2018b).

Ronksley et al. (2016) conducted a retrospective observational study to determine patient and encounter associated reasons and costs linked to short-term resource intensity within frequent users of the emergency room (ER). The rationale for this study was little information about the patterns of high-frequency users of the emergency room as well as improving efficiency and costs associated with ER use (Ronksley et al., 2016). Ronksley et al. (2016) hypothesized that individuals with cluster ER visits would continue to have unresolved medical issues (pain and psychiatric conditions) and produce higher ER costs when compared to individuals without cluster ER visits. Ronksley et al. (2016) used information from the patient registration system and the National Ambulatory Care Reporting System to collect data on all adults (16,153) with at least three ER visits over from April 2012 to March 2013 in a tertiary hospital in Ottawa, Canada. Researchers collected information on daily visit rates to determine individuals with cluster ER visits and clinical and administrative data to assess patient characteristics and costs (Ronksley et al., 2016). The findings from Ronksley et al. (2016) outlined that 13.5% of the sample had cluster ER visits around a short time and were more likely to be homeless, need psychiatric resources, and leave without seeing the physician. In the sample of high ER

users, 55.3% were women, only 15% of all encounters by high users ended up in admissions, and the most common complaints were abdominal pain and chest pain (Ronsley et al., 2016). The median cost for one patient in the high user group was \$764, where the costs associated with short term cluster visits were higher than this (Ronsley et al., 2016).

Kilfoyle et al. (2017) conducted a cross-sectional study to determine sociodemographic patterns with urgent and non-urgent use of the emergency room (ER) amongst pregnant women. The reasoning behind this study is that non-urgent ER use represents care that can be fulfilled with an obstetrician visit (Kilfoyle et al., 2017). Researchers used a convenience sample of 233 women who were recruited during their postpartum hospitalization in Providence, Rhode Island, between July and August 2012 (Kilfoyle et al., 2017). Researchers used medical records to collect data on prenatal care, ER visits, and maternal demographics to compare women with non-urgent ER visits without non-urgent ER visits (Kilfoyle et al., 2017). Out of the 233 women, 197 (84%) visited the ER during their pregnancy, where 83 (35.6%) of these women had non-urgent ER visits (Kilfoyle et al., 2017). The most common reasons for ER utilization were women feeling they were experiencing an emergency (45%) or referral by the primary care provider (36%). Women with English as a second language or lack of private health insurance were among the highest non-urgent ER use (Kilfoyle et al., 2017). The women in the non-urgent ER use group were more likely to have missed prenatal visits (32.5%) (Kilfoyle et al., 2017).

Honigman et al. 2013) conducted a retrospective cross-sectional study of the National Hospital Ambulatory Medical Care Survey from 2006 to 2009. The purpose of

this study was to compare resource utilization from ER visits for non-urgent, immediate, emergent, and urgent visits (Honigman et al., 2013). Visit urgency was characterized using the five-level triage acuity score, and resource utilization included diagnostic testing, treatment, and hospitalization (Honigman et al., 2013). Researchers collected data from 1408 hospitals with a total of 140,415 ER visits. Honigman et al. (2013) found that 87.8% of non-urgent ER visits had some form of resource utilization, including diagnostic testing or treatment in the ER, and 29.8% received imaging. Only 4% of non-urgent ER visits led to hospitalization, and the average length of stay for non-urgent ER visits was three hours (Honigman et al., 2013). Characteristics of non-urgent ER use included younger age, non-Hispanic black race, and Medicaid insurance (Honigman et al., 2013).

These studies outlined that many of the ER visits by postpartum women led to normal examination represents non-urgent costs and could have been treated with health care providers (Brousseau et al., 2018a; Brousseau et al., 2018b; Ronksley et al., 2016; Sheen et al., 2019). Although Kilfoyle et al. (2017) used a sample of pregnant women, their findings are consistent with these studies. Additionally, non-urgent ER use represents resource utilization, including diagnostic testing, treatment, and imaging (Honigman et al., 2103). One recommendation to counter non-urgent ER use is through improved discharge education intervention that prompts women on when to seek medical care from their health care providers (Brousseau et al., 2018a; Brousseau et al., 2018b; Kilfoyle et al., 2017; Ronksley et al., 2016; Sheen et al., 2019). Headache and dizziness complaints at the ER were most associated with a hypertension diagnosis (Brousseau et al., 2018b), which is appropriate given these symptoms are warning signs included in

AWHONNs standardized postpartum discharge education. The variables and data collection methods in Brousseau et al. (2018a & 2018b) and Sheen et al. (2019) are consistent with those in the postpartum discharge education intervention. The findings support the need for postpartum discharge education on postpartum warning signs, so mothers are aware of when to go to the ER and when to seek care from health care providers. The next subtheme will focus on the characteristics and risk factors for postpartum ER visits.

Characteristics associated with non-urgent postpartum ER visits. Batra et al. (2017) conducted a cross-sectional retrospective study in where they assessed the patient characteristics related to postpartum Emergency room (ER) use within 90 days postpartum. The rationale behind their original research was the lack of information on the role of the ER in postpartum care (Batra et al., 2017). Researchers hypothesized that lower-income, public insurance, and delivery complications were most associated with women using the ER within 90 days postpartum (Batra et al., 2017). Researchers used a population-based sample of all live births in California from 2009-2011 and acquired maternal discharge and ER data from the California Office of Statewide Health Planning and Development (Batra et al., 2017). Researchers used demographic information (race, ethnicity, payer, age, income) and clinical characteristics of delivery as the independent variables to determine characteristics of postpartum ER use (Batra et al., 2017). From 1,071,232 births, 88,674 women (8.3%) presented to the ER at a minimum of one time within 90 days of discharge, 13.4% of these women had two ER visits, and 5.8% made three or more visits (Batra et al., 2017). Half of the postpartum ER visits were made within the first three weeks postpartum, where most of the ER visits included a

nonemergent diagnosis (Batra et al., 2017). The most common characteristics associated with postpartum ER visits were low-income and birth complications (Batra et al., 2017). Additionally, the most common ER diagnosis for women presenting to the ER after vaginal deliveries were urinary tract infection (3.8%) and wound infection (3.7%) for cesarean deliveries (Batra et al., 2017).

Abdulla et al. (2020) conducted a retrospective cohort study to determine the link between immigrant maternal status and risk for Emergency Room (ER) utilization 90 days after discharge of preterm infant. Researchers hypothesized that preterm infants who had immigrant mothers lead to higher ER visits (Abdulla et al., 2020). Researchers used data collected by a transition to home program in Rhode Island and included 732 mothers with 866 preterm babies who delivered in Women's and Infants hospital (Abdulla et al., 2020). Information on ER visits (dependent variable) and demographic information (independent variables) on this sample was collected; researchers compared immigrant mother information to native mother information (Abdulla et al., 2020). Demographic data included primary language, place of birth, age, length of time in the United States, number of infants delivered, marriage status, number of people residing in the home, and number of total children with ages (Abdulla et al., 2020). The results indicate that, out of the 732 mothers, immigrant mothers that presented to the ER were likely than native women to be older (76% compared to 65% in the native population). Immigrant mothers were more likely to have birthed more than one child (91% compared to 29%), did not have English as their primary language (60% versus 6%), less than high school education and Medicaid insurance (20% versus 13%) (Abdulla et al., 2020). Additionally, the ER

visits among immigrant women were most likely associated with nonmedical stressors (Abdulla et al., 2020).

Bryant et al. (2016) conducted a retrospective cohort study to identify rates and characteristics of women who accessed health care within two years postpartum. The rationale for this study is to elaborate on health care delivery in the postpartum period and, in turn, improve women's health around pregnancy and postpartum (Bryant et al., 2016). Researchers hypothesized chronic health conditions would be associated with health care utilization (Bryant et al., 2016). The outcome was to determine health care utilization across primary care, outpatient care, emergency room (ER), and inpatient admissions (Bryant et al., 2016). Researchers collected data on a cohort of 6216 women who delivered at Massachusetts General Hospital between 2006 and 2010 and used electronic medical records, discharge documentation, and billing data to acquire information for their study (Bryant et al., 2016). The results from Bryant et al. 's (2016) study state 91% of women used health care services between two months and two years postpartum, where 81% attended primary care due to pre-pregnancy chronic medical condition, and 13.9% attended the ER for a minimum of one time. Factors associated with postpartum ER use included medically underserved populations (e.g., public health insurance), obesity, and younger age (Bryant et al., 2016).

Harris et al. (2015) conducted a retrospective cohort study to determine if women with pregnancy complications had increased Emergency Room (ER) use within six months postpartum when compared to women who did not have complications. Researchers hypothesized that women with pregnancy complications would have greater ER use dependent on their age (Harris et al., 2015). Researchers used a population-based

cohort sample of all pregnant women between the ages of 12 and 45 that delivered between 2003-2010 in Maryland and were covered by Medicaid (total of 26,074 pregnancies) (Harris et al., 2015). Information on outpatient ER visits was acquired from the Maryland Medicaid claims data that is to the United States census data. Out of 26,074 pregnancies, 20% were complicated with Gestational diabetes (GDM) (42.1%), gestational hypertension (GH) (35.4%), and preeclampsia (42.5%), in which 5.8% had both GDM and preeclampsia and 5.2% had GDM and GH (Harris et al., 2015). There was a total of 25% postpartum ER visits within six months postpartum, where women with complicated pregnancies demonstrated one ER visit (27.7%) when compared with the comparison group (23.6%) (Harris et al., 2015). Factors associated with postpartum complications included older age, African American, and medical comorbidities when compared with women without complications (Harris et al., 2015). There was a total of 11,138 (25%) postpartum ER visits by women over six months postpartum, were 3,971 (62.8%) had one ER visit, 1,928 (30.2%) had two to three visits, and 464 (7.3%) had four to 10 visits to the ER (Harris et al., 2015). Of these visits, 12% of these visits occurred in the first eight weeks postpartum, and 16% occurred between 9-24 weeks postpartum (Harris et al., 2015).

Weissmann-Brenner et al. (2020) conducted a retrospective descriptive study to outline diagnosis, causes, and risk factors for attending the gynecological Emergency Room (ER) by postpartum women and to find links between their postpartum discharge diagnosis and visits to the ER. Researchers used the women's department database in Chaim Sheba Medical center in Israel to collect data on all women that attended the gynecological ER within six weeks of delivery (Weissmann-Brenner et al., 2020).

Researchers collected medical history, pregnancy and birth complications, method of delivery, ER diagnosis, ER treatments, and rate of readmissions between January and September 2016 (Weissmann-Brenner et al., 2020). Out of 7371 deliveries, 5502 (74.6%) were vaginal, 1869 (25.3%) were cesarean, and 412 were vaginal operational (5.6%) (Weissmann-Brenner et al., 2020). Out of the 7371 deliveries, 413 (5.6%) women had postpartum ER visits, where 18 had two visits, three women had three visits, and three women had four visits within six weeks postpartum (Weissmann-Brenner et al., 2020). One-third of women were considered healthy (34.7%), with ER diagnosis, 56.4% required some form of treatment, and only 1% were readmitted; The most common causes for postpartum ER visits were fever (30.3%), surgical site, or episiotomy issues (26.6%), and abdominal pain (25.7%) (Weissmann-Brenner et al., 2020). Additionally, women with hypertensive disorders of pregnancy and diabetes were more likely to have the same issues upon postpartum ER visits (Weissmann-Brenner et al., 2020).

The findings from these studies outline the characteristics, risk factors, and timing of postpartum ER visits. For example, individuals with low income, public insurance (Abdulla et al., 2020; Batra et al., 2017; Bryant et al., 2016; Harris et al., 2015), immigrants, less than high school education (Abdulla et al., 2020), younger age, obesity (Bryant et al., 2016; Harris et al., 2015), African American, and those with complications during pregnancy (Harris et al., 2015; Weissman-Brenner et al., 2020) were most likely to visit the ER postpartum. These findings are consistent with previous studies that outline young age and Medicaid insurance is a common characteristic of non-urgent ER visits (Honigman et al., 2013). The most common timing for postpartum ER visits was within the first six weeks postpartum (Batra et al., 2017; Harris et al., 2015; Weissmann-

Brenner et al., 2020), and visits were most commonly nonemergent (Abdulla et al., 2020; Batra et al., 2017). The most common reasons for visits to the ER were urinary tract infections, wound infections (Batra et al., 2017), exacerbation of chronic health conditions (Bryant et al., 2016), fever, surgical site issues, and abdominal pain (Weissman-Brenner et al., 2020). These findings support the need for reducing non-urgent ER visits through a quality improvement initiative. Women with hypertensive disorders of pregnancy and diabetes were more likely to have these same issues upon postpartum ER visits (Weissmann-Brenner et al., 2020). These findings relate to the postpartum discharge education intervention as hypertension is considered one of the postpartum warning signs. These studies outline opportunities for enhanced education to describe when postpartum women should seek care from the ER (Batra et al., 2017; Harris et al., 2015; Weissmann-Brenner et al., 2020) and hence supports the project.

Abdulla et al. (2020), Bryant et al. (2016), and Harris et al. (2015) all had a retrospective cohort design but had limitations within their study. For example, Harris et al. (2015) conducted the study over eight years within the timeframe when Medicaid expansion occurred and could relate to a higher number of postpartum ER visits. Abdulla et al. (2020) were limited in their design as there was a lack of comparison with a group that did not participate in the transition to home program and inclusion of only immigrant mothers in the state of Rhode Island, which may not be generalizable. The findings from Weissman-Brenner's study may not be generalizable to other settings as the study took place in a gynecological ER in Israel. Batra et al. (2017) had a large sample size that would favor generalizability. All studies covered similar variables of maternal demographics to determine characteristics of postpartum ER use (e.g., race, insurance).

Despite the limitations, these studies support the need for a postpartum discharge education intervention. The next subtheme will focus on the role of primary care in reducing non-urgent ER visits.

Role of primary care visits in reducing non-urgent ER visits. Tsai et al. (2018) conducted a retrospective observational cohort study to determine the impact of a primary care clinic intervention on Emergency room (ER) rates and emergency severity using a pre- and post-intervention. Researchers used ER data on all visits from August 2009 to August 2011 at a hospital in South Carolina to determine the impact of a primary care clinic on the reduction of ER visits and severity (Tsai et al., 2018). Researchers used billing data, ER data, ER patient registration, and inpatient admission data on all visits of individuals greater than 18 years of age before and after the intervention (Tsai et al., 2018). The intervention consisted of opening a primary care walk-in clinic in 2011 where ER nurses educated qualifying patients on seeking care from primary care providers or attending this new clinic if they did not have one (Tsai et al., 2018). These results outline a reduction in ER visits with 16372 before the primary care clinic intervention and 18496 after the intervention, where high users demonstrated a decrease in ER visits from 5.43 (top) to 3.21 mean ER visits (Tsai et al., 2018). High users showed a 41.7% reduction in ER use in the post-intervention period (Tsai et al., 2018). Lastly, there was an increase in the severity of patients that visited the ER in the post-intervention period (Tsai et al., 2018).

Yee et al. (2017) conducted a prospective observational study to determine if women in a postpartum patient navigation new motherhood (NNM) program were more likely to attend postpartum visits. Yee et al. (2017) included a sample of 218 women who

were enrolled in the NNM program as well as those that received care before NNM initiation. The study took place in a tertiary teaching hospital in Chicago and reviewed postpartum care attendance before and after NNM implementation from May 2015 until May 2016 using medical records (Yee et al., 2017). The results from Yee et al. (2017) outlined an increase in postpartum visit attendance among women enrolled in NNM (88.1%) versus those attending postpartum care before the implementation of NNM (70.3%). Additionally, mothers enrolled in the NNM program were more likely to receive postpartum depression screening (81.2%) when compared with women before NNM implementation (62.8%) (Yee et al., 2017).

Fung et al. (2015) conducted a population-based cross-sectional study to determine if individuals with primary care doctors had any impact on emergency room services. Researchers hypothesized that having a regular family physician would be associated with decreased emergency room utilization (Fung et al., 2015). The rationale for this study comes from the lack of knowledge on whether primary care physicians can lead to a reduction in emergency room utilization (Fung et al., 2015). Researchers used 3,148 participants to complete a structured questionnaire to assess the use of health care services in Hong Kong between 2007 and 2008. Fung et al. (2015) conducted telephone surveys through random digital telephone calls to collect data on health care utilization (including emergency room use) and information on primary care physicians. Researchers found that individuals with regular primary care physicians (67% of the sample) were less likely to visit the emergency room for health care services compared to people who did not have a regular primary care physician (Fung et al., 2015).

Pourat et al. (2015) conducted a pre-intervention post-intervention analysis to determine if the implementation of the Health Care Coverage Initiative (HCCI) led to increased adherence to Primary Care Provider (PCP) use and subsequent changes to ER use. The rationale for the study was the rise in ER use after the implementation of the Affordable Care Act (ACA), which increased health insurance coverage for millions of individuals (Pourat et al., 2015). Researchers hypothesized that the use of the ER would decrease with an increase in PCP adherence and an increase in PCP use after HCCI implementation (Pourat et al., 2015). The HCCI policy was implemented to increase PCP coverage for eligible members to improve preventative care, patient experience, and ER visits (Parout et al., 2015). The total sample consisted of 4,191 members before HCCI implementation (2008) and 5,837 members after HCCI implementation (2009), where the dependent variable of most interest was the frequency of ER visits (Parout et al., 2015). Parout et al. (2015) found that HCCI implementation led to a reduction of ER visits among those that demonstrated PCP adherence, compared to those that did not adhere to PCP, proving the hypothesis correct.

Mahajan et al. (2020) conducted a retrospective review to determine signs and symptoms of Hypertension Disorders of Pregnancy (HDP) and ER diagnosis among postpartum women. Mahajan et al. (2020) used a random sample of 111 women (44 participants in the case group and 75 in the control group) who attended the ER within 42 days postpartum between 2011 and 2012 in Alberta, Canada. Researchers collected information on HDP from Alberta's National Ambulatory Care Reporting System (NACRS) and medical chart reviews for demographics, delivery data, and ER findings (Mahajan et al., 2020). The results outline that only 53.3% of the women with HDP had

bloodwork and urine analysis compared to 30.4% in the non-HDP group, and out of the HDP group, 42.9% was diagnosed in the ER, and 40.3% received antihypertensive treatment (Mahajan et al., 2020). The most common presenting symptoms for HDP were changes in vision, headache, and peripheral edema (Mahajan et al., 2020).

Luo et al. (2018) conducted a retrospective cohort study to determine the number of postpartum women who attend the ER and outpatient clinics with postpartum hypertension disorder complications over six weeks. The second purpose was to assess risk factors associated with postpartum hypertension disorder complications and conduct a cost-benefit analysis to emphasize a postpartum community care program as a method to reduce ER and clinic visits for postpartum hypertension disorder complications (Luo et al., 2018). Researchers used a sample of 319 women who attended an Antenatal Community Care Program for hypertension during pregnancy and delivered in Calgary, Alberta, between 2014 to 2015 (Luo et al., 2018). Luo et al. (2018) used administrative data, medical charts, and outpatient clinic data to collect data on ER visits, associated costs, and outpatient visits for postpartum hypertension disorder over 42 days postpartum, respectively. Findings from Luo et al. (2018) state that 30 out of 319 women attended the ER and outpatient clinics for PPHD. Researchers found that these women had abnormal labs indicating gestational hypertension and were using multiple medications (Luo et al., 2018). Based on the cost savings from ACCP in this study, researchers felt women could save an average of \$152 (CAD) with PCCP (Luo et al., 2018).

These studies support the need to educate mothers on the importance of postpartum health care visits as this can help reduce non-urgent ER visits and diagnose

and treat postpartum complications promptly (Fung et al., 2015; Luo et al., 2018; Parout et al., 2015; Tsai et al., 2018; Yee et al., 2017). Specifically, hypertension disorders of pregnancy are underdiagnosed and undertreated in the ER and require interventions to enhance postpartum HDP recognition and management (Mahajan et al., 2020). A postpartum discharge education intervention includes warning signs for hypertension. It outlines the conditions that require medical attention in the ER, and those that require prompt attention to health care providers. The postpartum discharge education intervention may prompt women to attend postpartum visits in the face of postpartum warning signs and potentially reduce non-urgent ER visits. Mahajan et al. (2020) supported the idea that earlier appointments with the Obstetrician can lead to earlier diagnosis and management of postpartum warning signs such as hypertension and reduce ER visits. Encouraging outpatient visits and reducing ER visits is linked to cost savings for health care organizations and patients (Luo et al., 2018; Parout et al., 2015).

There were several limitations to these studies. For example, Tsai et al. (2018) lacked information on whether patients visited other ERs or whether a reduction in ER was due to disease maturation. Further, Yee et al. (2017) included a Medicaid sample in a tertiary facility with several resources, and Fung et al. (2015) conducted their study in Hong Kong, which is not representative of all populations and settings. Additionally, Luo et al. (2018) had a small sample size, which would limit generalizability. Pourat et al. (2015) demonstrate strength in study design; they provide an example of conducting a pre- and post-intervention study, which is consistent with the design of the project. The findings from these studies provide consistent information on the importance of postpartum health care in reducing ER and can apply to the project as it encourages

women to seek medical attention from health care providers in the face of postpartum warning signs. The next subtheme will focus on maternal education to reduce non-urgent ER visits.

Maternal education to reduce non-urgent ER visits. Pérez-Martínez et al. (2019) conducted a quasi-experimental retrospective study to determine any change in the number of postpartum emergency room (ER) visits in mothers who received care from midwives versus obstetricians (Pérez-Martínez et al., 2019). The midwife's role consisted of providing an educational intervention that included individualized assessments of postpartum needs and educating women on postpartum warning signs (Pérez-Martínez et al., 2019). Researchers compared the frequency of ER visits between the control group (1313 women) cared for by Obstetricians and an intervention group (1308 women) cared for by midwives through non-random assignment at a level two hospital university hospital in Madrid (Spain) (Pérez-Martínez et al., 2019). Researchers collected information on the frequency of ER visits that consisted of obstetric emergencies and those had been hospitalized between 2013 and 2014 (Pérez-Martínez et al., 2019). Researchers found a total of 33 women (2.5%) in the intervention group, and 41 women (3.1%) in the control group visited the ER within 40 days postpartum (Pérez-Martínez et al., 2019). However, the results were not statistically significant, mostly due to non-random sampling and small sample size (Pérez-Martínez et al., 2019).

Malik et al. (2017) conducted a retrospective cross-sectional study to determine factors associated with perinatal ER use. The rationale for this study is the lack of studies on the characteristics of pregnant women attending the ER (Malik et al., 2017). Researchers hypothesized that women with psychosocial risk factors would be more

likely to use the ER during pregnancy (Malik et al., 2017). Researchers recruited a sample of 678 postpartum women who gave birth in a Michigan Hospital between October 2002 and May 2003 and from February to May 2009 (Malik et al., 2017). Data were collected through telephone surveys with postpartum women and reviewed medical charts to acquire information about pregnant ER visits (Malik et al., 2017). Postpartum mothers were contacted at two weeks and two months postpartum via telephone and asked survey questions such as those on postpartum depression (Malik et al., 2017). The results outline that 218 pregnant women (33%) had a minimum of one ER visit during their pregnancy and were more likely younger age, minority race, have Medicaid coverage, and more likely to have postpartum depression (Malik et al., 2017).

Izudi et al. (2019) conducted a quasi-experimental study to determine the impact of birth preparedness and complication readiness (BPCR) education intervention on skilled birth attendance (SBA) and early postnatal care (EPNC). The rationale for this study was the rising rates of maternal mortality, especially in the South Sudan region (Izudi et al., 2019). Researchers hypothesized that BPCR would lead to an increase in SBA and EPNC. Researchers collected data from clinics in South Sudan and used a convenience sample of 385 mothers to acquire data on those that had antenatal care (ANC) with BPCR education (243 or 67.9%). Out of the 243 who attended ANC, 141 (60.3%) received the BPCD education (Izudi et al., 2019). A total of 93 mothers were acquired from this group and matched with those who had not received BPCR education (Izudi et al., 2019). The BPCR educated mothers on seeking appropriate, timely care in an obstetric emergency site if experiencing postpartum warning signs (Izudi et al., 2019).

The results suggest that women who received BPCR had higher rates of SBA, but after covariate adjustment, it did not reflect an increase in EPNC.

Phiri et al. (2015) conducted a cross-sectional study to determine factors associated with the use of postnatal care services among postpartum women in Malawi. Researchers hypothesized that health workforce performance and postpartum discharge education might increase the use of postnatal care services (Phiri et al., 2015). The rationale for this study is a lack of studies on health care organization factors that contribute to postnatal care usage among postpartum women (Phiri et al., 2015). Researchers used a random sample of 295 postpartum women to collect responses from structured questionnaires between 2012 and 2013 across six health care centers in Malawi (Phiri et al., 2015). The findings from Phiri et al. (2015) outline that 56.6% of women used postnatal care services within six after delivery. Researchers outlined that health education before hospital discharge was one of the factors associated with postnatal care utilization when compared with women who did not receive health education (Phiri et al., 2015).

Maternal education on postpartum warning signs was linked to a reduction of postpartum ER visits (Pérez-Martínez et al., 2019). Educational interventions on when to seek medical care with health care providers demonstrated success (Phiri et al., 2015). These findings relate directly to the project aimed at a postpartum discharge education intervention on postpartum warning signs that educate mothers on when to seek medical care from health care providers and when to go to the ER.

Despite the usefulness of these findings, it is important to consider limitations. For example, Pérez-Martínez et al. (2019) stated the intervention is the most probable

cause for the results but had a small sample size without random sampling, so could not confirm this through statistical significance. Izudi et al. (2019) also lacked statistical significance when inferring that the educational intervention was successful and could not state whether women sought care in other facilities. A major limitation is a location in Spain (Pérez-Martínez et al., 2019) and Sudan (Izudi et al., 2019), as health care in these countries may not be consistent with healthcare in the United States. Researchers state that future work should focus on targeted strategies to enhance knowledge on postpartum warning signs (Izudi et al., 2019; Phiri et al., 2015) and interventions targeting postpartum depression (Malik et al., 2017). These recommendations are consistent with the project as it includes warning signs for postpartum depression as well as an evidenced-based list on when to seek medical care.

In summary, a review of ER visits amongst postpartum women outlines the rates of postpartum ER use are increasing (Harris et al., 2015); many ER visits are not urgent (Abdulla et al., 2020; Batra et al., 2017; Brousseau et al., 2018b; Harris et al., 2015; Sheen et al., 2019; Ronksley et al., 2016; Weissmann-Brenner et al., 2020). Not only are non-urgent visits an inconvenience for women (Sheen et al., 2019), they represent unneeded costs for the health care organization and patients (Brousseau et al., 2018b; Luo et al., 2018; Parout et al., 2015; Ronksley et al., 2016; Sheen et al., 2019; Weissmann-Brenner et al., 2020). The most common reasons for presentation to the ER were urinary tract infections, wound infections (Batra et al., 2017), exacerbation of chronic health conditions (Bryant et al., 2016), fever, surgical site issues, and abdominal pain (Weissman-Brenner et al., 2020). The most common timing for postpartum ER visits was within the first six weeks of postpartum (Batra et al., 2017; Harris et al., 2015;

Weissmann-Brenner et al., 2020). The rates of postpartum visit nonattendance have been linked to increasing postpartum ER visits (Wilcox et al., 2016). These studies support the need to educate mothers on the importance of postpartum health care visits as this can help reduce non-urgent ER visits and management of postpartum complications promptly (Fung et al., 2015; Luo et al., 2018; Parout et al., 2015; Tsai et al., 2018; Yee et al., 2017).

Lack of postpartum studies outlines missed opportunities for screening, diagnosing, and managing postpartum complications (Wilcox et al., 2016). The rates of nonattendance outline the importance of providing mothers with appropriate postpartum discharge education while in the hospital. The rates of postpartum visit nonattendance and rate of non-urgent ER visits in the postpartum period outline the need to educate mothers on when to seek medical care in the postpartum period (de Bocanegra et al., 2017; Morgan et al., 2018; Parekh et al., 2018; Wilcox et al., 2016). One recommendation to counter non-urgent ER use is through a discharge education intervention that prompts women on when to seek medical care from their health care providers (Brousseau et al., 2018a; Brousseau et al., 2018b; Kilfoyle et al., 2017; Ronksley et al., 2016; Sheen et al., 2019). A standardized postpartum discharge education helps fulfill this recommendation by educating mothers on when to seek medical care from health care providers and when to attend the ER for urgent conditions (AWHONN, 2017). The standardized postpartum discharge education also fulfills the recommendations to include postpartum warning signs as a part of postpartum discharge education (AWHONN, 2017; WHO, 2015). Postpartum discharge education interventions on postpartum warning signs have the potential to reduce postpartum ER

visits by educating mothers on when to seek medical care from health care and when to attend the ER (Bingham et al., 2018; Pérez-Martínez et al., 2019; Phiri et al., 2015).

Examples of postpartum discharge education interventions follow in the next section. The subthemes in the following section include improving the quality of postpartum discharge education and standardized discharge education interventions. The following section also includes examples of targeted interventions using postpartum warning signs.

Examples of postpartum discharge education interventions.

The WHO and ACOG recommend that all mothers require education on postpartum complications, and this practice can be implemented through quality improvement initiatives (ACOG, 2018; WHO, 2015). Given that discharge teaching instructions regarding potential complications are inconsistent among nurses, there is a need for a postpartum discharge education intervention on postpartum complications (Suplee et al., 2016b; Suplee et al., 2017; Verbiest et al., 2018). Educating mothers on postpartum warning signs and when to consult their health care providers, and when to go to the ER for urgent conditions can help reduce non-urgent ER visits (Bingham et al., 2018). Maternal education on postpartum complications should include signs of hemorrhage, preeclampsia/eclampsia, thromboembolism, infection, and postpartum depression (AWHONN, 2017; WHO, 2015). This section of the review will include examples of postpartum discharge interventions, including improving the quality of postpartum discharge education and standardized discharge education interventions. This section will also include targeted interventions using postpartum warning signs.

Improving quality of postpartum discharge education. Malagon et al. (2017)

conducted a descriptive correlational study to assess antepartum, intrapartum, and postpartum factors that determine mother's readiness for hospital discharge. The rationale for this study came from the reduced length of hospital stays for uncomplicated deliveries and its impact on postpartum outcomes (Malagon et al., 2017). Researchers hypothesized that mothers' readiness for hospital discharge could be impacted by several factors and impact postpartum outcomes (Malagon et al., 2017). The study included a purposeful sample of 185 postpartum mothers (>18 years of age) with uneventful births on a 72-bed postpartum unit in the western United States (Malagon et al., 2017). Participants completed the Readiness for Discharge Scale (RHDS) to determine their readiness for hospital discharge and the Quality of Discharge Teaching Scale (QDTS) to determine their perception of the quality of discharge teaching (Malagon et al., 2017). Patients felt the quality of discharge teaching included nurse's skill and educational content delivery and most predicted their readiness for discharge (Malagon et al., 2017)

Wanig et al. (2016) conducted an exploratory study to determine the impact of a nurse and physician generated discharge instructions on patient perceptions on their discharge process. The rationale for this study was the limited information on the impact of postpartum discharge instructions on a patient's experience (Wanig et al., 2016). The sample consisted of all patients admitted to a 180-bed community hospital in Massachusetts (Wanig et al., 2016). Researchers used descriptive statistics to compare Press Ganey discharge-related patient satisfaction scores the year before (2011) and the year after (2013), implementing the discharge instructions (Wanig et al., 2016). The

implementation of nurse and physician generated discharge instructions led to an increase in patient satisfaction and increased readiness for discharge (Wanig et al., 2016).

Stikes et al. (2015) conducted a quality improvement project to improve maternal satisfaction with nurse communication regarding postpartum discharge after a nurse education intervention. The quality improvement intervention consisted of five steps, including evaluation of current structures and patient education materials, and improving nurse knowledge on patient education (Stikes et al., 2015). Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) was used for data collection, and mean scores were acquired to determine the impact of nurse communication and discharge education on patient satisfaction with health communication (Stikes et al., 2015). The researchers found an overall increase in patient satisfaction with nurse communication from an original 75.9% before the educational intervention to 84.6% after the intervention, and patient satisfaction with discharge education increased from 84.6% before and 98.6% after the nurse educational intervention (Stikes et al., 2015).

The findings from these studies outline successful postpartum discharge education interventions as it relates to maternal readiness for hospital discharge (Malagon et al., 2017; Wanig et al., 2016) and increased patient satisfaction (Stikes et al., 2015; Wanig et al., 2016). Although the study did not have the same patient outcome measures as the project, it outlines the effectiveness of discharge education interventions. Increased maternal feelings of readiness for hospital discharge represents a need that the project can fulfill through providing evidenced-based information on when to seek medical care with postpartum warning signs.

Limitations to these studies include the use of HCAHPS as a data collection tool as it is self-reported patient data and may not be representative of actual satisfaction measures (Stikes et al., 2015). Further, using samples of uncomplicated deliveries may not represent the needs of women with complications during pregnancy (Malagon et al., 2017; Wanig et al., 2016). Despite the limitations, the need for improvements in discharge education is apparent within these studies.

Standardized discharge education interventions. Sabitha and Shiny (2015) conducted a quasi-experimental study with an evaluative approach to determine the impact of an Information Education Communication (IEC) program on maternal knowledge. The rationale for this study includes physiological, psychological, social, and emotional adaptations during the postpartum period (Sabitha & Shiny, 2015). Researchers wanted to build on previous studies that outline education can impact women's knowledge of childbearing and adaptation in the postpartum period (Sabitha & Shiny, 2015). Researchers used a purposive sample of 100 postpartum mothers in India to determine their scores for maternal role adaptation before and after IEC intervention (Sabitha & Shiny, 2015). Women received a structured rating scale from researchers to determine maternal role adaptation in the pre-intervention phase and gave the IEC an hour after the pre-intervention test. The post-intervention test took place five days after the educational intervention. Researchers found a higher overall score for maternal role adaptation after the educational intervention (Sabitha & Shiny, 2015).

Bagherinia et al. (2017) also conducted a randomized control trial (RCT) to determine the effect of an educational package on maternal functional status and self-confidence during the postpartum period. Researchers used a sample of 136 first time

mothers in Iran to complete a questionnaire on functional status and self-confidence before the educational intervention (10-15 days postpartum) and at eight weeks postpartum (Bagherinia et al., 2017). Postpartum women were randomly assigned to the intervention (n=68) and control group (n=68); the intervention group received face-to-face education, three follow-up phone calls, and an educational booklet (Bagherinia et al., 2017). The control group received routine postpartum care (Bagherinia et al., 2017). All participants completed the functional status and maternal self-confidence questionnaire before the educational intervention and at eight weeks after the intervention (Bagherinia et al., 2017). Postpartum mothers felt higher functional status and self-confidence postpartum after the educational intervention (Bagherinia et al., 2017).

Buchko et al. (2012) conducted a quasi-experimental study to determine the effectiveness of an evidenced-based discharge process as it relates to mothers' and nurses' perception of discharge education. The intervention consisted of a discharge education booklet, individualized education plan, and implementation of education into the clinical pathway (Buchko et al., 2012). Researchers conducted this study to improve the quality and efficiency of postpartum discharge education (Buchko et al., 2012). The study design included a one-group, pre-intervention post-intervention design in determining the quality of discharge teaching and efficiency of postpartum discharge education for registered nurses. Buchko et al. (2012) used a convenience sample of nurses and mothers at a level III perinatal center. They assessed their perceptions of discharge education before and after using the educational booklet (Buchko et al., 2012). Researchers found that nurses expressed an overall improved efficiency in the discharge process, and mothers felt they were receiving a high quality of care (Buchko et al., 2012).

These studies outline successful discharge educational interventions as it relates to maternal role adaption (Sabitha & Shiny, 2015), functional status, self-confidence (Bagherinia et al., 2017), and improvement in overall efficiency and quality of care (Buchko et al., 2012). These studies provide theoretical support for using TADC to guide the project. There were several limitations in these studies, including the location in India (Sabitha & Shiny) and Iran (Bagherinia et al., 2017), which may have different cultural health care practices and health care delivery. Despite the limitation in location, Bagherinia et al. conducted an RCT, which represents a reduction of bias in the study through random sampling. Overall, these studies demonstrate successful discharge education interventions as it relates to maternal health. These studies support a project aimed at improving maternal health through the identification of postpartum warning signs. The next subtheme will focus on examples of postpartum warning sign interventions.

Targeted interventions using postpartum warning signs. Shields et al. (2016) conducted a pre- and post-intervention to determine if the implementation of a clinical pathway, called maternal early warning signs tool (MEWT), can reduce maternal morbidity. The MEWT clinical pathway tool is intended to enhance timely assessment and treatment of deteriorating clinical status regarding significant causes of maternal mortality, including sepsis, cardiopulmonary dysfunction, hypertension, and hemorrhage (Shields et al., 2016). The rationale for this study is the need for using tools like MEWT to counter maternal morbidity rates (Shields et al., 2016). Researchers hypothesized use of MEWT would lead to increased identification of maternal morbidity (Shields et al., 2016). Researchers implemented MEWT across 29 maternity wards within six pilot sites

across the United States. Researchers used the total deliveries at pilot sites (36, 832) and those at nonpilot sites (146, 359) to determine if MEWT implementation led to a decrease in severe maternal morbidity (Shields et al., 2016). The findings from Shields et al. (2016) suggest a reduction before and after MEWT implementation in composite morbidity (4.9% to 3.9%), eclampsia (2.02 to 0.37), and Dilation and curettage (D&C) (0.41% to 0.26%) when compared to nonpilot sites. Shields et al. (2016) found an increase in Intensive Care Unit (ICU) admissions after MEWT implementation in pilot sites versus no change in nonpilot sites.

Seacrist et al. (2018) conducted a qualitative descriptive study to determine the facilitators and barriers in implementing AWHONN's postpartum hemorrhage (PPH) project into practice. The rationale for implementing AWHONN's PPH is to decrease errors linked to PPH morbidity and mortality through enhanced preparedness, prevention, and response for PPH (Seacrist et al., 2018). The study aimed to determine nurse and physician experiences with implementing AWHONN's PPH into standard practice. Researchers used a sample of 21 nurses and physicians who were involved in implementing AWHONN's PPH program across six hospitals in New Jersey and Georgia between 2014 and 2015 (Seacrist et al., 2018). Data was collected through observational notes in interviews using open-ended questions to understand the experiences of nurses and physicians that were considered hospital leaders, champions, and staff while implementing AWHONN's PPH (Seacrist et al., 2018). Limitations of this study included a lack of interviewing all stakeholders due to a lack of availability and access (Seacrist et al., 2018). The findings from Seacrist et al. (2018) outline that facilitators to the successful implementation of AWHONN's PPH include positive attitudes, nurse and

physician champions, and a culture of safety (Seacrist et al., 2018). Common barriers to implementation included lack of champions, poor attitudes, and lack of resources and support (Seacrist et al., 2018).

Arnolds et al. (2019) conducted a retrospective correlational study to determine the link between maternal early warning criteria (MEWC) and maternal morbidity. MECW was developed by the National Partnership for Maternal Safety in the face of rising maternal morbidity to improve response to maternal clinical warning signs. The rationale for this study was the preventative nature of maternal morbidity and mortality and a lack of information on the effect of MECW on maternal morbidity (Arnolds et al., 2019). Researchers hypothesized that the MECW would lead to an increase in the detection of maternal morbidity (Arnolds et al., 2019). Researchers used data from electronic medical records on 400 deliveries in 2016 at the University of Chicago hospital (Arnold et al., 2019). Data collection included gathering vital signs that triggered the MEWC during their hospitalization for labor and delivery as well as reliability information for the MEWC (Arnold et al., 2019). Arnold et al. (2019) found 281 (70%) of patients triggered the MEWC at least one time, 198 (50%) with multiple triggers, and 99 (25%) had morbidity. The most common causes of morbidity that triggered the MEWC were hemorrhage, infection, and severe preeclampsia (Arnold et al., 2019).

Shields et al. (2016) and Arnold et al. (2019) both conducted intervention studies with maternal early warning signs and provides support for standardized interventions aimed at targeting warning signs. Specifically, Shields et al. (2016) used a pre- and post-intervention design, which is consistent with the design of the project and will provide a good example of a successful study with this design. Despite the intent of the tools in

these in identifying early warning signs of maternal mortality, the main conditions of hemorrhage, infection (Arnold et al., 2019), and eclampsia (Sheilds et al., 2016) are consistent with the content in AWHONN's standardized postpartum discharge education and hence provide support for the need for intervention to target these areas. Further, both MECW and MEWT were useful in identifying maternal early warning signs (Arnold et al., 2019; Shields et al., 2016), where future studies could pair these tools with educational interventions as those outlined in the project to determine if there were more significant improvements in maternal outcomes. Although Seacrist et al. (2018) conducted a non-intervention study, the findings provide insight into facilitators and barriers in implementing standardized intervention developed by AWHONN. Seacrist et al. (2018) emphasize the importance of nurse champions and persistence in the successful implementation of evidence-based interventions and help guide the primary investigator's project.

In summary, these findings are consistent with the recommendations from WHO and ACOG outlining the importance of educating mothers on postpartum warning signs. Postpartum discharge education interventions on postpartum warning signs have the potential to reduce postpartum ER visits by educating mothers on when to seek medical care from health care and when to attend the ER (Pérez-Martínez et al., 2019; Phiri et al., 2015). These studies support the TADC as a theoretical foundation for this project, given the need for emphasizing maternal role adaption, functional status, and self-confidence in postpartum discharge education (Bagherinia et al., 2017; Sabitha & Shiny, 2015). Reviewing examples of interventions using postpartum warning signs provide a foundation for education on postpartum warning signs (Arnold et al., 2019; Shields et al.,

2016). The findings from these studies helped inform a quality improvement initiative on postpartum discharge education.

Summary

Chapter 2 provided the literature supporting a postpartum discharge education and appropriate theory to guide the project. The findings in the review outlined gaps in the current state of postpartum discharge education in educating mothers on warning signs of postpartum complications (Morton et al., 2019b; Peterson et al., 2019). A review of the current state of discharge education outlined gaps in the consistency of discharge education, and that women did not feel the health care system was adequately preparing them to survive the postpartum period (McCarter & Macleod, 2019; Suplee et al., 2017; Verbiest et al., 2018). Both nurses and mothers outlined a lack of knowledge on postpartum warning signs and outlined the need for improved education in this area (Almalik, 2017; Bingham et al., 2018a; Logsdon et al., 2018; Mselle et al., 2017; Montgomery & Laury, 2015; Morton et al., 2019a; Seacrist et al., 2019; Suplee et al., 2016a; Suplee et al., 2017). Lack of knowledge on postpartum complications also contributed to preventable causes of maternal mortality (Al-Safi et al., 2011; Peterson et al., 2019) and non-urgent ER visits (Fung et al., 2015; Luo et al., 2018). The gaps in postpartum discharge education, subsequent lack of knowledge on postpartum warning signs, and non-urgent ER visits helped inform the problem statement and clinical question in this project.

This review supported the need for a standardized postpartum discharge education outlining when to seek immediate medical care in the ER for urgent postpartum warning signs (Morton et al., 2019b; Seacrist et al., 2019). Enhanced education on when to seek

medical care for postpartum warning signs is particularly important as mothers were attending the ER with non-urgent conditions (Brousseau et al., 2018a; Brousseau et al., 2018b; Ronksley et al., 2016; Sheen et al., 2019). Non-urgent ER visits represent unnecessary costs for conditions that could have can be treated through health care providers in outpatient settings (Brousseau et al., 2018a; Brousseau et al., 2018b; Ronksley et al., 2016; Sheen et al., 2019). The rates of postpartum ER visits were linked to postpartum visit nonattendance (Wilcox et al., 2016). Missed postpartum visits lead to missed opportunities for screening, diagnosing, and managing postpartum conditions such as depression and preeclampsia (Parekh et al., 2018; Wilcox et al., 2016). The literature supports the need to counter this problem through improved discharge education to educate mothers on when to seek medical care from health care providers and when to go to the ER (Fung et al., 2015; Luo et al., 2018; Parout et al., 2015; Tsai et al., 2018; Yee et al., 2017). These findings support the project as educating mothers on when to seek medical care from health care providers and when to visit the ER for urgent conditions may help reduce non-urgent visits to the ER. In other words, these studies supported the independent and dependent variables in this project.

Postpartum discharge education interventions on postpartum warning signs have the potential to reduce postpartum ER visits by educating mothers on when to seek medical care from health care and when to attend the ER (Pérez-Martínez et al., 2019; Phiri et al., 2015). These findings outlined the problem with the current state of postpartum discharge education and outlined the need for postpartum discharge education interventions.

The review of the literature provided support for variables, data collection methods, and design of the project. For example, Sheilds et al. (2019) and Arnold et al. (2019) conducted intervention studies on maternal early warning signs and provided support for the topic of the project. Batra et al. (2017), Brousseau et al. (2018a & 2018b), and Sheen et al. (2019) used the EMR to collect maternal demographics (race and age), delivery data, chief complaint at ER, final diagnosis at the ER, and timing. Further, Abdulla et al. (2020) had similar variables, including information on ER visits (dependent variable) and demographic information (independent variables). The studies also provided an example of the successful implementation of a pre-intervention post-intervention design and will help guide the project (Bagherinia et al., 2017; Sabitha & Shiny, 2015). The designs, variables, and sample outlined in these studies reflect those in the project and hence serves as a justification of successful quality improvement initiatives.

Overall, the findings from this review were consistent with the recommendations of the WHO: all postpartum mothers require education on the common postpartum danger signs (WHO, 2015). The WHO also recommends that mothers should know when to consult health care providers with any signs of postpartum complications such as hemorrhage, pre-eclampsia/eclampsia, infection, and thromboembolism (WHO, 2015). The findings are also consistent with the ACOG that state postpartum education should include information on when to seek medical care in the postpartum period (ACOG, 2018). These findings and recommendations supported the need for this project with a standardized postpartum discharge education.

The theory of adaptation during childbirth (TADC) and cognitive learning theory (CLT) helped serve in this standardized postpartum discharge education intervention in informing the content and process, respectfully. The literature supports the use of these theories as successful education interventions encompass maternal role adaption (Sabitha & Shiny, 2015), functional status, self-confidence (Bagherinia et al., 2017), which are all components of TADC. These studies support that postpartum discharge education interventions aids in adaptation in all four modes outlined in TADC and, in turn, helped inform the clinical question in this project (Bagherinia et al., 2017; Sabitha & Shiny, 2015). Given that mothers outlined their need for education on postpartum warning signs (McCarter & Mcleod, 2019; Verbiest et al., 2018), this reflects CLT as it outlines that retention and application of knowledge in new situations depend on its meaningfulness (Kretchmar, 2019). The project was built on the tenets of TADC as it included education relating to all four modes of adaptation. The project also advanced CLT as it demonstrated how to use CLT to guide an educational intervention.

The primary investigator reviewed the literature to include the current state of postpartum discharge education, the problem with non-urgent ER visits, and the potential for postpartum discharge education interventions. This review of literature also covered appropriate theoretical foundations for an educational intervention based on maternal learning needs. This review supports that education on postpartum warning signs can better prepare mothers for seeking medical care from health care providers and when to seek care from the ER.

Chapter 3 focuses on project methodology involved in a postpartum discharge education intervention, including the project methodology, design, sample, sources of

data, reliability, and validity. Chapter 3 of the proposal also includes data collection procedures, data analysis, potential bias, ethical considerations, and limitations.

Chapter 3: Methodology

The postpartum period, or fourth trimester, is critical in ensuring long term maternal well-being (American College of Obstetricians and Gynecologists, 2016). Mothers receive one postpartum visit, usually at six weeks postpartum (Kleppel et al., 2016), and up to 40% of mothers do not attend this visit (ACOG, 2018). Further, postpartum discharge education is insufficient to meet the needs of mothers in the postpartum period (Bingham et al., 2018a; Suplee et al., 2016a). Specifically, postpartum discharge education on potential complications differ between nurses, and nurses are unaware of what other nurses are teaching (Suplee et al., 2016a; Suplee et al., 2017). The gaps in postpartum discharge education outlined the need for standardized postpartum nurse discharge education based on evidenced-based guidelines (Malagon et al., 2017).

As a result of the irregularities in postpartum discharge education, mothers are unaware of the postpartum warning signs or when to seek medical care in the emergency room (ER) (Logsdon et al., 2018; Suplee et al., 2016a). Mothers are attending the ER with non-urgent conditions, which presents financial and resource expenditures as well as inconvenience for patients (Pérez et al., 2018; Sheen et al., 2019). A non-urgent visit represents medical care that can be delayed up to 24 hours without negatively impacting the medical condition (CDC, 2015; Honigman et al., 2013). Many non-urgent ER visits include medical care that can be sought in an outpatient setting and do not require emergency services (Kilfoyle et al., 2017).

These irregularities outline postpartum discharge education should include information on postpartum warning signs, when to seek medical attention from health care providers, and when to attend the ER for urgent conditions (WHO, 2015). Despite

the availability of evidence-based information on postpartum warning signs, it was not known if or to what degree the implementation of a standardized postpartum discharge education would impact non-urgent ER visits when compared to current practice among postpartum women in rural North Dakota. The Association of Women's Health, Obstetrics, and Neonatal Nurses (AWHONN) developed a standardized postpartum discharge education in the form of a checklist (Appendix B). The standardized postpartum discharge education outlines the signs and symptoms warranting medical help from health care providers and those warranting ER visits. The purpose of this quantitative, quasi-experimental, quality improvement project was to determine if AWHONN's standardized postpartum discharge education would impact non-urgent ER visits among postpartum women in a hospital in rural North Dakota over four weeks. An expectation after the standardized postpartum discharge education intervention was that postpartum women would be able to recognize when to seek care from health care providers or when to go to the ER for urgent conditions. Chapter 3 of this proposal focuses on this project's methodology, design, sampling, data collection, and data analysis. This section of the proposal covers instrumentation, validity, reliability, ethical considerations, and limitations.

Statement of the Problem

Postpartum discharge education is insufficient in addressing postpartum warning signs (Bingham et al., 2018a; Suplee et al., 2016a). The current state outlines that postpartum discharge education is not standardized on educating women on postpartum complications and in the resources used for education (Malagon et al., 2017; Suplee et al., 2016a). Further, nurses are unaware of what other nurses are teaching (Suplee et al.,

2016a; Suplee et al., 2017). As a result of the gaps in postpartum education, mothers are unaware of postpartum warning signs and are attending the ER with non-urgent conditions (Brousseau et al., 2018a; Sheen et al., 2019). Despite the availability of evidence-based information on postpartum warning signs, it was not known if or to what degree the implementation of a standardized postpartum discharge education would impact non-urgent ER visits when compared to current practice among postpartum women in rural North Dakota.

Gaps in postpartum discharge education with resulting non-urgent ER visits create opportunities for evidence-based interventions. Postpartum discharge education interventions have the potential to improve maternal knowledge on when to consult their health care providers and, in turn, can lead to reducing non-urgent ER visits (Bingham et al., 2018b; Brousseau et al., 2018a; Sheen et al., 2019). The standardized postpartum discharge education is a checklist developed by AWHONN, providing a guide for postpartum discharge education and includes teaching points on most common postpartum complications (AWHONN, 2017; Bingham et al., 2018b; Suplee et al., 2016b). The discrepancies in discharge education addressing postpartum warning signs outlined the need for an educational intervention. Incorporating AWHONN's standardized postpartum discharge education into discharge education practices may help reduce non-urgent ER visits in postpartum women.

Clinical Question

This project was aimed at answering the following clinical question: To what degree will implementation of AWHONN's standardized postpartum discharge education reduce the rate of non-urgent ER visits when compared to the current practice among

postpartum women in rural North Dakota over a four-week period? This project measured the rate of non-urgent postpartum ER visits (dependent variable) before and after a standardized postpartum discharge education intervention (independent variable). Non-urgent ER visits outline the possibility that medical needs could be met at a different site (Honigman et al., 2013; Kilfoyle et al., 2017). Most postpartum ER visits are considered non-urgent (Brousseau et al., 2018a; Sheen et al., 2019). Non-urgent ER visits create financial and resource expenditure for health care organizations as well as inconvenience and needless spending for patients (Sheen et al., 2019).

One reason for non-urgent postpartum ER visits is the lack of knowledge on when to seek medical care in the ER for postpartum warning signs (Logsdon et al., 2018). Postpartum discharge education is inconsistent in educating mothers about postpartum warning signs (Suplee et al., 2016b; Suplee et al., 2017). Standardizing postpartum discharge education has the potential to decrease non-urgent ER visits (Bingham et al., 2018; Brousseau et al., 2018a; Sheen et al., 2019). This lack of consistency supports the recommendations from the WHO, which outline that postpartum discharge education should include information on postpartum warning signs, when to seek medical attention from health care providers, and when to attend the ER for urgent conditions (WHO, 2015). Nurse experts developed the standardized postpartum discharge education as a checklist (Appendix B) at AWHONN for use for nurses and patients (T. Suplee, personal communication, May 29, 2020). This standardized postpartum discharge education was developed based on the recommendations by AWHONN, ACOG, CDC, and the Joint Commission for improvements in postpartum discharge education (Suplee et al., 2016a). The standardized postpartum discharge education will help nurses outline the postpartum

warning signs warranting immediate medical attention in the ER, and those warranting prompt medical care from health care providers. The standardized postpartum discharge education provides warning signs and teaching points for the most common causes of postpartum complications leading to maternal mortality (AWHONN, 2017). The intent of this project was to discover if implementing the standardized postpartum discharge education would reduce the rate of non-urgent ER visits in the postpartum period.

A quantitative methodology with a quasi-experimental design was used on a convenience sample of postpartum women. Quantitative methods are most suited for evidence-based interventions to implement the best evidence in clinical practice and to improve patient outcomes (Melnyk et al., 2015). A quasi-experimental design lacks randomization and includes manipulation of the independent variable to determine the impact on the dependent variable (Tymkow, 2017). Given this project measured any change in non-urgent ER visits before and after an educational intervention with a convenience sample of postpartum women, a quasi-experimental design was most appropriate. This project included a convenience sample of postpartum women in determining the impact of standardized postpartum discharge education intervention on the rate of non-urgent ER visits.

The primary investigator used the rate of non-urgent ER visits prior to project implementation from January 2020 as well as an implementation group of postpartum women who received the standardized postpartum discharge education. The project site had an average number of 122 births per month with no change from the current Coronavirus outbreak of 2019 (COVID-19) (D. Mcavoy [Manager, Family Birth Center], personal communication, June 22, 2020). The primary investigator used the electronic

medical record (EMR) to collect maternal demographic information and ER discharge diagnosis to determine non-urgent ER visits. A coding sheet outlining non-urgent versus urgent ER visits will help guide this process (see Appendix D). Rates of non-urgent ER visits were analyzed before and after standardized postpartum discharge education intervention using an independent *t*-test. A comparison of the rate of non-urgent ER visits from before and after the standardized postpartum discharge education answered the clinical question.

Project Methodology

This project used a quantitative methodology. Quantitative methods aim to use statistics to objectively measure data in numerical form (Goertzen, 2017). Quantitative methods are most suited for evidenced-based interventions to implement the best evidence in clinical practice and to improve patient outcomes (Melnyk et al., 2015). Quantitative methods aim to investigate a phenomenon using statistical means and acquire numerical data, whereas qualitative methods aim to explore experiences and behaviors without rigorous statistical means or analysis of numerical data (Basias & Pollalis, 2018). Quantitative methods include statistical analysis, such as descriptive or inferential statistics, to build on what is already known about a phenomenon (Main & Ogaz, 2016). In comparison, qualitative methods use techniques such as thematic analysis to gain insight into experiences and create opportunities for future quantitative studies (Basias & Pollalis, 2018). Given this project educated mothers on postpartum warning signs and used numerical data for statistical analysis, a quantitative methodology was most appropriate.

Statistical analysis in this project measured if the intervention had an impact on the rate of ER visits. In quantitative methods, statistical analysis can be descriptive or inferential. Descriptive statistics help organize data to determine a mean, mode, or frequency, where inferential statistics make conclusions about results from a sample population (Main & Ogaz, 2016). Thus, inferential statistics can help outline any change in the dependent variable from the independent variable (Kim, 2015). Ultimately descriptive and inferential statistics can help determine any relationship between variables (Main & Ogaz, 2016). Qualitative methods aim to explore experiences and behaviors without rigorous statistical means or analysis of numerical data. Qualitative methods use techniques such as thematic analysis to gain insight into experiences and create opportunities for future quantitative studies (Basias & Pollalis, 2018). Mixed methods include a combination of quantitative and qualitative approaches (Basias & Pollalis, 2018). (Basias & Pollalis, 2018). This quality improvement project aimed not to explore experiences; the project was aimed at determining the rate of non-urgent ER visits before and after an intervention using statistical analysis; hence, a quantitative approach was most appropriate (Basias & Pollalis, 2018).

The EMR was used to collect patient demographic information, delivery type, and ER discharge diagnosis to determine non-urgent ER visits. A coding sheet outlining non-urgent versus urgent ER visits helped guide this process (see Appendix D). The primary investigator used descriptive statistics to determine the frequency of delivery type (vaginal or cesarean), gravidity, and race. Descriptive statistics also determined the mean and standard deviation of maternal age. The primary investigator used inferential statistics to outline any change in the rate of non-urgent ER visits before and after the

standardized postpartum discharge education intervention over four weeks. Data analysis using Intellectus statistics software (2020) outlined any change in the rate of ER visits before and after the standardized postpartum discharge education intervention.

Project Design

A quasi-experimental design best reflected the intent of this project. There are four main types of quantitative designs, including descriptive, correlational, experimental, and quasi-experimental (Drummond & Murphy-Reyes, 2018). Descriptive studies describe variables without intervention or comparative group, and correlational studies describe the association between two variables without manipulation (Drummond & Murphy-Reyes, 2018). Descriptive or correlational studies were not appropriate designs given there is no intervention or manipulation between variables in this design. Experimental studies determine a cause and effect relationship between the dependent and independent variables and include randomization and control groups (Drummond & Murphy-Reyes, 2018). An experimental design was not appropriate given randomization was not possible with a target population of postpartum mothers. In a quasi-experimental design, the independent variable is manipulated to determine the impact on the dependent variable (Tymkow, 2017). A quasi-experimental design determines any change in the independent variable before and after the intervention (dependent variable) without randomization in the two groups (Handley et al., 2018; Tymkow, 2017). A quasi-experimental design was most appropriate, given it is like an experimental design but lacks randomization (Handley et al., 2018). Randomization was not possible as this project used a convenience sample of mothers to determine if the standardized

postpartum discharge education (independent variable) had an effect on the rate of non-urgent ER visits (dependent variable).

Limitations in a quasi-experimental design include threats to external validity, which question whether the intervention was responsible for the outcome or if it was due to other variables (Handley et al., 2018). The one main reason for these threats includes the lack of randomization (Knapp, 2016). The primary investigator made all possible efforts to ensure rigor in all other elements of the project, and threats to the project were acknowledged when appropriate.

The EMR was used to collect demographic information (gravity, age-range, race), delivery type, and non-urgent ER visit based on ER discharge diagnosis. As the primary investigator used a quasi-experimental design to analyze two sets of data, an independent *t*-test was most appropriate (Alessandri et al., 2017). The project design needs to reflect the clinical question and context (Köhler et al., 2017). This project included numerical data for statistical analysis and was a quality improvement initiative; hence, a quasi-experimental design fit with a quantitative methodology.

Population and Sample Selection

This project used a convenience sample of all postpartum women with full-term live births at a small hospital in rural North Dakota over a four-week timeframe. Exclusion criteria included postpartum women with preterm births, cognitively impaired postpartum women, and those women with postpartum complications. Given this project was adopted as a quality improvement by the site, all postpartum women who met the inclusion criteria were included in this project; no measures to contact or recruit participants were taken. Data on the rate of ER visits among all women with live births

over four weeks was collected using the EMR and compared with the rate in January 2020.

The project site is a small hospital in rural North Dakota, with a city population of 47,382 as of July 1, 2019 (United States Census Bureau, 2019). The project site is a level two trauma center serving the population of rural North Dakota and several neighboring rural communities. The project site had a total of 1,463 births in 2019 with ten primary postpartum rooms and an additional five postpartum overflow rooms (D. Mcavoy [Manager, Family Birth Center], personal communication, June 1, 2020). The average number of live births per month at the project site is 122 (D. Mcavoy [Manager, Family Birth Center], personal communication, June 22, 2020). The primary investigator conducted a priori power analysis using Faul et al.'s (2009) G*power version 3.1. A priori analysis outlined the sample size of 73 was necessary to have a 5% level of significance, 85% power, and 0.5 effect size (Faul et al., 2009). The primary investigator used a total of 24 postpartum registered nurses (RNs) to educate mothers using standardized postpartum discharge education.

Given the project includes a collection of protected health information (PHI), an Institutional Review Board (IRB) approval was obtained from the project site and from GCU (Appendix A). The Association of Women's Health, Obstetrics, and Neonatal Nurses (AWHONN) permission was obtained to use the standardized postpartum discharge education (checklist) for educational purposes (see Appendix C). Informed consent was not required for this project as it was a quality improvement initiative endorsed by the organization, and all mothers received the standardized postpartum

discharge education. The project site IRB approved the project, and it was hoped that they would adopt the intervention into standard practice after the project implementation.

The Health Insurance Portability and Accountability Act is a federal law used in healthcare to protect the confidentiality, integrity, and availability of electronically protected health information (U.S. Department of Health and Human Services, Office for Civil Rights, 2017). The primary investigator completed the site waiver of the HIPPA privacy authorization form as the project involved no more than minimal risk to the privacy of individuals and met all the criteria outlined in the Grand Canyon University (GCU) privacy rule (GCU, 2018). The primary investigator ensured all data was de-identified by removing protected health information in compliance with the GCU privacy rule (GCU, 2018). The primary investigator ensured the privacy of information through a password secured hard drive as well as prohibiting the sharing of PHI outlined in the demographic information. The primary investigator was the only person with possession of the external hard drive and will destroy the data after three years. The primary investigator ensured compliance with the GCU data use agreement by protecting all de-identified data on a password secured external hard drive. Additionally, the primary investigator ensured no other person had access to the de-identified data and complied with the HIPPA privacy rule.

Given this project was a quality improvement initiative intended to improve postpartum discharge education, all postpartum nurses were required to participate in the educational intervention. The postpartum manager, postpartum educator, and the women's health manager endorsed this project. The primary investigator consulted with the postpartum manager to send out an organizational email to all postpartum nurses two

weeks before the educational intervention. This email notification alerted nurses of the upcoming required educational intervention and plan for nurse education on the standardized postpartum discharge education.

The primary investigator educated all postpartum nurses responsible for postpartum discharge education during morning huddles every day for one week prior to project implementation. Nurses received education on using the standardized postpartum discharge education in small groups. The primary investigator used a PowerPoint presentation to educate postpartum nurses on using the standardized postpartum discharge education during morning huddles. Any nurse that was not present during morning huddles received one-to-one education during the day shift downtime. The primary investigator used a PowerPoint presentation to outline the need for educational intervention and educated nurses on using the standardized postpartum discharge education. A laminated copy of the standardized postpartum discharge education was posted on the postpartum unit as a reminder. Word of mouth reinforcement of educational initiative was encouraged by the postpartum educator to remind nurses to use the standardized postpartum discharge education during project implementation.

Sources of Data

The EMR was the primary source of data collection for this project. The primary investigator worked alongside the director of Health Information Management (HIM) to run customized data reports from the EMR. The customized data reports included the data elements of maternal demographics (gravidity, age-range, race), delivery type, and ER discharge diagnosis to determine the non-urgent ER visits. A coding sheet outlining non-urgent versus urgent ER visits helped guide this process (see Appendix D). The

coding sheet included the most recent International Classification of Diseases (ICD) to organize ER visits as urgent or non-urgent. The primary investigator conducted chart reviews in the EMR to ensure standardized postpartum discharge education was used for all postpartum women who met the inclusion criteria.

An EMR is an electronic database for the storage of patient medical information, including patient demographics and diagnosis (Ehrenstein et al., 2019). Cerner Powerchart was the type of EMR used at the project site. Cerner EMR is an integrated database allowing storage, documentation, and access to patient health information (National Center for Medical Records, 2020a). Powerchart is a type of Cerner EMR that allows access to patient health information from any location throughout all levels of the care continuum (National Center for Medical Records, 2020a). The Cerner Powerchart provided the necessary data for running reports. The Health Information Management (HIM) department worked alongside the Information Technology (IT) department to run customized reports.

The rate of non-urgent ER visits (dependent variable) was measured before and after implementing the standardized postpartum discharge education (independent variable) using a coding sheet (see Appendix D). The five-level triage acuity score characterizes ER visits based on urgency (Honigman et al., 2015). Levels one, two, three, four, and five represent immediate, emergent, urgent, semi-urgent, and non-urgent visits, respectively (CDC, 2015; Honigman et al., 2013). Immediate visits require immediate medical care; emergent visits require medical care within 14 minutes, urgent visits require medical care within 60 minutes, and semi-urgent visits require medical care within one to two hours (Honigman et al., 2013). A non-urgent visit represents medical

care that can be delayed up to 24 hours without negatively impacting the medical condition (CDC, 2015; Honigman et al., 2013). Non-urgent ER visits outline the possibility that medical needs can be attended to at a different site (Honigman et al., 2013). This project used level five triage acuity scores to represent non-urgent ER visits. The ER visits classified as urgent include level one, two, three, and four triage acuity score. The postpartum complications warranting urgent medical care in the ER versus non-urgent medical care are present in Appendix D. The primary investigator worked alongside the Director of HIM to run customized data reports and conducted chart reviews to determine the rate of non-urgent ER visits after implementing the standardized postpartum discharge education.

Validity

Validity determines the accuracy in measuring a concept (Heale & Twycross, 2015). The validity of the standardized postpartum discharge education was demonstrated through several measures. An expert panel of nurses and health professionals developed the standardized postpartum discharge education as a checklist based on recommendations from AWHONN, ACOG, the Center for Disease Control and Prevention (CDC), and the Joint Commission (Suplee et al., 2016b). The standardized postpartum discharge education was pilot tested across four hospitals and updated based on responses from nurses (Suplee et al., 2016b). Specifically, during the pilot test, nurses outlined the need for essential nurse teaching points for the postpartum warning signs (Suplee et al., 2016b). The AWHONN updated the standardized postpartum discharge education based on the suggestions from the pilot test (Suplee et al., 2016b). Specifically, AWHONN added essential teaching points on postpartum warning signs (Suplee et al.,

2016b). The standardized postpartum discharge education does not have specific validity statistics. Still, it encompasses postpartum warning signs for the most common postpartum complications based on the recommendations of AWHONN, ACOG, CDC, and the Joint Commission (Suplee et al., 2016b). The standardized postpartum discharge education is currently a part of a large study by AWHONN to determine the impact of the educational intervention on hospital readmission rates (T. Suplee, personal communication, May 29, 2020).

Based on the recent trends in maternal health, the WHO and ACOG recommend that all mothers require education on postpartum complications; this practice can be implemented through quality improvement initiatives (ACOG, 2018; WHO, 2015). Suplee et al. (2016a) conducted an exploratory qualitative and found inconsistencies in postpartum discharge education. The findings from Suplee et al. (2016a) outline the need to provide women with consistent evidenced-based education on postpartum warning signs through AWHONN's standardized postpartum discharge education.

The validity data on the EMR reflects the completeness and the accuracy of data (Parsons et al., 2012). The EMR demonstrated up to 98% sensitivity and 97% specificity of electronic quality measures (Parsons et al., 2012). Further, researchers conducted a comprehensive EMR review using data on 30 fields across a random sample of 207 patients on a medical-surgical floor and found excellent agreement with the data set variables (Brundin-Mather et al., 2018). The diagnosis information in the EMR is commonly accurate given they include the international classification of diseases (ICD) coding system (Ehrenstein et al., 2019). Information on demographics such as age is also typically accurate, given numerous mandates for data collection (Ehrenstein et al., 2019).

The accuracy is essential given the project collected demographic information (gravidity, age-range, race) as well as diagnosis information (chief complaint at ER and discharge diagnosis at ER). Specifically, the project site has adapted Cerner Powerchart EMR, as it has all required data elements for their organization. Cerner Powerchart has been used at the project site for over ten years with nursing staff and senior management approval.

Reliability

Reliability measures the consistency of an instrument to see if it has the same results each time it is used (Heale & Twycross, 2015). The primary investigator collected data from Cerner Powerchart at the end of each week during project implementation. Cerner Powerchart is the type of electronic medical record (EMR) used at the project site; Cerner EMR ensures health care organization compliance with the Joint Commission requirements for patient confidentiality (National Center for Medical Records, 2020a). The ability to access patient health information from any location ensures prompt storage, documentation, and access to electronic records (National Center for Medical Records, 2020a). This accessibility ensures data integrity or accuracy, completeness, and timeliness of data (Ehrenstein et al., 2019). The reliability of the EMR outlined the accuracy of measurement and consistency of documentation (Altman et al., 2018). The EMR demonstrated a Cohen's Kappa of 0.76 for overall obstetric data documentation, outlining a substantial agreement between data collectors (Altman et al., 2018). Specifically, the EMR demonstrated almost perfect agreement between data collectors for documentation of vaginal and cesarean delivery type (Cohen's Kappa 0.91, 95% confidence interval) (Altman et al., 2018). The reliability of the EMR is necessary to ensure data completeness and accuracy.

One method of ensuring completeness and timeliness of data is through appropriate staff training (Agency for Healthcare Research and Quality, 2018). The project site requires that all staff undergoes comprehensive EMR training before starting a new position, and all new staff are mentored with senior staff before independent practice to ensure appropriate documentation. All postpartum nurses receive a three-day mandatory Cerner Powerchart training before starting their position on the unit. The postpartum nurses are comprised of registered nurses (RNs) and licensed practical nurses (LPNs). The Powerchart training is provided by the ePowerchart team that is comprised of typically two registered nurses. The mandatory training ensures that all nurses are aware of appropriate accessing, documenting, and reviewing data in the Cerner Powerchart EMR. Nurses are then paired with a senior staff member on the postpartum unit for two weeks before independent practice. During this time, new nurses shadow senior nurses on documentation and transition to independent practice with senior nurse support. (S. Demory [Postpartum Educator], personal communication, June 9, 2020).

The reliability of the EMR is dependent on the accuracy, completeness, and timeliness of data (Ehrenstein et al., 2019). Diagnosis information in the EMR is commonly accurate, given the diagnosis is based on the international classification of diseases (ICD) coding system (Ehrenstein et al., 2019). Information on demographics, such as age, is also typically accurate, given numerous mandates for data collection (Ehrenstein et al., 2019). This accuracy is appropriate given the project collected demographic information (gravidity, age-range, race) as well as diagnosis information (chief complaint at ER and discharge diagnosis at ER). Completeness of data reflects any

missing data, and timeliness reflects the time between initially capturing data and the availability in the EMR (Ehrenstein et al., 2019).

The literature supports the use of standardized postpartum discharge education as a method for reducing non-urgent ER visits. The CDC (2015) conducted a national hospital ambulatory medical care survey and found that problems associated with pregnancy were among the top 10 reasons for ER visits; educational strategies encompassing when to seek medical care in the ER were among the recommended solutions to reduce ER use. To support, Brousseau et al. (2018a) found out of all postpartum visits to the ER ($n= 252$), the most common discharge diagnosis was normal postpartum examination ($n= 68, 27\%$); first time mothers were not more likely to receive a normal postpartum examination (18.1%) when compared to women with multiple past births (26.5%, $p = 0.11$). The findings from Brousseau et al. (2018a) outline that lack of knowledge on when to seek medical care in the ER contributed to non-urgent ER visits. Additionally, Pérez-Martínez et al. (2019) found that women in the intervention group who received education on postpartum warning signs had a reduction of postpartum ER visits compared to women who did not ($p = 0.354$). Although the results were not statistically significant, they support the need to repeat targeted interventions to standardize postpartum discharge education to reduce non-urgent ER visits. Further, the findings support using a standardized postpartum discharge education to improve maternal knowledge on when to seek urgent medical care in the ER for postpartum warning signs and when to seek medical care from health care providers (Brousseau et al., 2018a; Pérez-Martínez et al., 2019).

Data Collection Procedures

The project took place over five weeks, where the first week consisted of staff education, and the subsequent four weeks consisted of project implementation. Given that the project included access to protected health information (PHI) of patients, the primary investigator obtained Institutional Review Board approval before project implementation. Informed consent was not required as the project was a quality improvement initiative that was implemented on all mothers who meet the inclusion criteria in hopes of improving maternal outcomes. Postpartum nurses educated all mothers using the standardized postpartum discharge education as a part of their role in postpartum discharge education. The site IRB approved the project and indicated that an informed consent was not required. It was hopeful that the site would adapt the intervention into standard practice after the project implementation.

After the project site and Grand Canyon University IRB approval, the primary investigator completed one week of nurse education on the standardized postpartum discharge education. The primary investigator educated all postpartum nurses on the standardized postpartum discharge education every day for one week during morning huddles. Morning huddles included postpartum nurses from both night and day shifts. Any nurse that was not present for morning huddles received one to one education during the morning shift and downtime. For executing the educational intervention, this project included all postpartum nurses (24 total) responsible for discharge education in a postpartum unit in rural North Dakota. The primary investigator completed education for all regular full-time and part-time postpartum nurses; all casual or float nurses were excluded from the education.

The nurse education consisted of a face to face PowerPoint presentation outlining the gaps in discharge education, the problems with non-urgent postpartum ER visits, and the need for a postpartum education intervention. Each nurse received a printout of the PowerPoint slides. The primary investigator educated nurses on the development of the standardized postpartum discharge education and outlined how it provides a teaching guide for AWHONN's post-birth handout for discharge education. The primary investigator reviewed each teaching point on the standardized postpartum discharge education (Appendix B). The primary investigator outlined the need to document the date for scheduled postpartum visits on each of the checklists and outlined that nurses and mothers were required to sign the standardized postpartum discharge education after use. Nurses were required to give the signed standardized postpartum discharge education to mothers and document the use of the standardized postpartum discharge education in the discharge notes in the EMR. Nurses had an opportunity to ask the primary investigator questions or clarifications on using the standardized postpartum discharge education. The primary investigator repeated the nurse education with the printed PowerPoint presentation for any nurse that was not present during morning huddles during day shift downtime.

The Association of Women's Health, Obstetrics, and Neonatal nurses permitted the use of the standardized postpartum discharge education (checklist) for educational purposes (Appendix C). The primary investigator printed the standardized postpartum discharge education for all mothers beforehand and stapled them to the post-birth discharge handout to ensure that they were used for each encounter. A laminated copy of the standardized postpartum discharge education was posted in the nursing break room

and available to reprint with AWHONN's permission statement (see Appendix C). The primary investigator asked nurses to give mothers the signed standardized postpartum discharge education and document the use in the postpartum discharge documentation in the EMR.

After the week of nurse education, the first week of implementation began. The primary investigator attended morning shift huddles every day for the first week. During this time, the primary investigator reiterated using the standardized postpartum discharge education as a teaching guide for outlining the post-birth warning signs for each postpartum discharge. During this time, the primary investigator reminded nurses to sign a standardized postpartum discharge education after use, give mothers the signed standardized postpartum discharge education, and document the standardized postpartum discharge education in the Cerner Powerpoint under discharge documentation. While on-site, the primary investigator spent time with each nurse to ensure that they were using the standardized postpartum discharge education correctly for each postpartum discharge over four weeks. The next three weeks consisted of ensuring the implementation of the standardized postpartum discharge education for each postpartum discharge. The primary investigator was on site every other day for the second week, and twice a week for the last two weeks.

The primary investigator used postpartum discharge documentation to confirm that nurses used the standardized postpartum discharge education for discharge education. The primary investigator conducted EMR chart reviews to ensure discharge education with the standardized postpartum discharge education was completed. Any

charts that did not have documentation of the standardized postpartum discharge education were excluded.

The primary investigator worked alongside the project site's director of Health Information Management (HIM) to collect data through customized data reports and chart reviews in the Cerner PowerChart EMR. The primary investigator collected maternal demographics (gravidity, age-range, race), delivery type, and ER discharge diagnosis through customized data reports from the Director of HIM (Appendix E). The primary investigator received de-identified data in the customized data reports from the Director of HIM. The primary investigator ensured the accuracy of data by comparing it to the original report containing patient identifiers and comparing it against the EMR with chart reviews. The primary investigator conducted EMR chart reviews to ensure standardized postpartum discharge education was used for all postpartum women who met the inclusion criteria.

The primary investigator collected data every other day during the first two weeks and twice a week for the last two weeks. The primary investigator used an Excel spreadsheet for data collection and included the patient's unique identifier, demographic information, independent variable, and dependent variables. Demographic information included gravidity, age-range, race, and delivery type. The independent variable of non-urgent ER visits was based on the ER discharge diagnosis. The ER discharge diagnosis was classified as urgent or non-urgent based on a coding sheet (see Appendix D). During the nurse education week, the primary investigator collected this same information for all postpartum mothers who were delivered in January 2020. At the end of data collection, the primary investigator conducted chart reviews to verify all data collected was correct.

The chart reviews verified data elements of gravidity, age-range, race, delivery type, and all non-urgent ER visits for all mothers with live full-term births within four weeks.

Using the EMR for collecting patient health information (e.g., PHI) required compliance with patient safety, privacy, and ethics (Ben-Assuli, 2015). The project site used a HIPPA waiver to ensure the privacy of protected health information. The Health Insurance Portability and Accountability Act is a federal law used in healthcare to protect the confidentiality, integrity, and availability of electronically protected health information (U.S. Department of Health and Human Services, Office for Civil Rights, 2017). According to Bowman and Maxwell (2018), there are ways to avoid issues with PHI, including planning to consider potential issues, limiting access to PHI information, and preventing the release of collected PHI. For this reason, the primary investigator used unique patient identifiers to collect and store data. The primary investigator stored data on an external hard drive with a password only known to the primary investigator. The primary investigator will destroy data after three years to ensure compliance with HIPPA (U.S. Department of Health & Human Services, Office for Civil Rights Headquarters, 2018).

The primary investigator ensured that the standardized postpartum discharge education was used for all postpartum discharge education by ensuring both mothers and postpartum nurses have signed and dated the standardized postpartum discharge education after use. Mothers received the signed standardized postpartum discharge education. Nurses were required to document the standardized postpartum discharge education use in the discharge documentation in the EMR. The primary investigator

reviewed the discharge documentation in the EMR to ensure the standardized postpartum discharge education was used.

The Director of HIM provided the primary investigator with a customized report to include the data elements of gravidity, age-range, race, and delivery type to determine all postpartum births within four weeks. Additionally, the primary investigator used non-urgent ER visits from the ER discharge diagnosis to determine the rate of postpartum ER visits from all postpartum births over a four-week timeframe. The primary investigator conducted chart reviews to collect ER discharge diagnosis to determine any change in the rate of non-urgent ER visits before and after the intervention.

Data Analysis Procedures

The collection of numerical data for statistical analysis fit within a quasi-experimental design and quantitative methodology. Data analysis helped in answering if implementing a standardized postpartum discharge education led to a reduction in ER visits in postpartum women when compared to the current method of teaching based on computer-generated discharge education in rural North Dakota over a four-week period.

Data were collected from the Cerner Powerchart EMR and analyzed using the Intellectus statistics software 2020. The rate of non-urgent ER visits was the dependent variable, and the standardized postpartum discharge education was the independent variable. The primary investigator collected demographic information (gravidity, age-range, and race) from the labor and delivery admission report and delivery type from delivery and operative reports. The primary investigator also collected information on ER discharge diagnosis to determine non-urgent ER visits from the ER visit summary. The coding sheet helped guide non-urgent and urgent ER visits based on the international

classification of disease tenth revision code and classification modification (ICD-10-CM) (see Appendix D). Data were collected and organized under appropriate columns in an excel spreadsheet. The primary investigator stored the data on an external hard drive with a password only known to the primary investigator.

Data analysis included inferential and descriptive statistics. Data analysis with descriptive statistics helped organize data to determine a mean, mode, or frequency of variables (Main & Ogaz, 2016). Data on the frequency of maternal delivery type (vaginal or cesarean), gravidity, and race were all acquired through descriptive statistics. Additionally, conducting descriptive statistics outlined the mean and standard deviation of maternal age. This component of data analysis using descriptive statistics determined the characteristics of the sample in this project.

Data analysis with inferential statistics determines if there is a relationship between variables in a sample population (Main & Ogaz, 2016). An independent t -test is a parametric statistical test measuring the means of two independent groups for comparison (Kim, 2015). The ER visit summary provided data on non-urgent ER visits based on ER discharge diagnosis. The primary investigator used a coding sheet to determine urgent versus non-urgent ER visits (see Appendix D). Given that the rate of non-urgent ER visits is a ratio level of measurement, the primary investigator conducted data analysis with a parametric statistical test, the independent t -test (Sylvia, 2014). The underlying assumptions of a t -test include normal distribution and equal variance (Kim, 2015). The normal distribution suggests that the means of the samples are normally distributed, where equal variance suggests the differences of the samples are equal (Nahm, 2016). The primary investigator used the independent t -test to determine the rates

of postpartum ER visits (dependent variable) before and after the standardized postpartum discharge education intervention (independent variable) to determine any change in rate after the intervention. Results from this analysis helped answer if implementing a standardized postpartum discharge education led to a reduction in non-urgent ER visits in postpartum women.

The primary investigator conducted a priori power analysis using G*power version 3.1. A two-tailed *t*-test analysis was used to determine sample size. The priori analysis outlined the sample size of 73 was required to have a 5% level of significance, 85% power, and 0.5 effect size (Faul et al., 2009).

Before conducting inferential statistical tests, the primary investigator set a p-value. A p-value determines statistical significance after certain assumptions are set (ACMHN, 2017). With a p-value set to 0.05, results < 0.05 suggest statistical significance; any result where p-value > 0.05 suggests that the results may have occurred by chance or some other unintentional mechanism (ACMHN, 2017).

Potential Bias and Mitigation

There could have been several sources of bias, including sampling, methodology, data collection, and data analysis. Convenience sampling could have been a potential bias in this project. A convenience sample may produce threats to external validity, question whether the intervention was responsible for the outcome, or if it was due to other variables (Handley et al., 2018).

One main reason for these threats includes the lack of randomization (Knapp, 2016). The primary investigator made all possible efforts to ensure rigor in all other elements of the project, and threats to the project were acknowledged where appropriate.

Additionally, demographic information was collected to outline sample baseline characteristics.

Sampling bias may have been apparent through inclusion and exclusion criteria, as well as the sample size, which may limit generalizations outside the sample. This project only included postpartum women with full-term live births and excluded postpartum women with preterm deliveries and cognitively impaired women. Further, based on a sample size calculator, the required sample size was 73 (Faul et al., 2009). If the project sample was less than 73, this could have contributed to bias.

The sample of mothers attending the ER could have had undiagnosed underlying health conditions, making them more likely to visit the ER. The potential for undiagnosed conditions represents a threat to internal validity, which reflects whether the intervention was responsible for the outcome (Handley et al., 2018). In other words, the undiagnosed underlying health condition may have been a factor for attending the ER and not necessarily the standardized postpartum discharge education intervention.

The COVID-19 pandemic led to a nationwide decline of ER visits by 42%, with the highest decrease in individuals younger than the age of 14 (Hartnett et al., 2020). North Dakota falls in the region eight area, which experienced the lowest decrease in ER visits when compared to one year prior (Hartnett et al., 2020). As of May 29, 2020, North Dakota was considered a low-risk level for exposure and transmission based on low case counts (North Dakota Department of Health and Department of Commerce, 2020). Despite the lowest reduction in ER visits and current low-risk levels, the COVID-19 pandemic may have impacted the rate of ER visits. The project site did not experience

any change in live births due to the pandemic (D. Mcavoy [Manager, Family Birth Center], personal communication, June 22, 2020).

A methodological assumption was that the population had equal variance and normal distribution. The assumptions of equal variance and normal distribution are true when considering the samples in an independent *t*-test (Kim, 2015). Normal distribution ensures that the means of the population are similarly distributed, and equal variance suggests the differences of the samples are equal (Kim, 2015). Normal distribution and equal variance ensure that characteristics of the sample population of mothers are similar.

The primary investigator collected maternal demographic information. Demographics included maternal gravidity, age-range and race, and delivery type to outline the characteristics of the sample population of mothers. Having a similar population at baseline helps prevent alternative explanations for the outcomes.

Further, data collection and analysis were dependent on the availability of data. The reliability of the EMR is dependent on the accuracy, completeness, and timeliness of data (Ehrenstein et al., 2019). Incomplete data can contribute to internal validity threats.

Ethical Considerations

Interventions involving human subjects pose a risk to patients (Office for Human Research Protections, 2018). The Belmont report was created to address ethical issues concerning patients and includes respect for persons, beneficence, and justice (Office for Human Research Protections, 2018). Planning for potential issues, limiting access to PHI information, and preventing the release of collected PHI are all necessary components to ensure patient privacy and confidentiality (Bowman & Maxwell, 2018). Given that this project included the collection of PHI, the primary investigator demonstrated respect for

persons. For example, the primary investigator ensured the privacy of information through a password secured hard drive as well as prohibiting the sharing of PHI outlined in the demographic information. The password for the external hard drive will only be known to the primary investigator who is the only one with possession of the hard drive and will delete all data after three years in compliance with HIPPA (U.S. Department of Health & Human Services, Office for Civil Rights Headquarters, 2018).

Beneficence involves avoiding harm and maximizing benefits (Office for Human Research Protections, 2018). Aside from collecting PHI, it was important to consider that mothers are considered a vulnerable population and require extra caution to protect from harm (Presidential Commission for the Study of Bioethical Issues, 2016). Despite this risk in the project, the goal was to improve discharge education with the standardized postpartum discharge education. It can ultimately improve maternal outcomes if mothers know when to seek medical care from health care providers and urgent care in the ER. Beneficence was demonstrated through the theory of adaptation during childbirth (TADC) as these outlined opportunities to alter external stimuli towards adaptation in all four modes (Tulman & Fawcett, 2003). Conducting this project helped address each mode of adaptation through the standardized postpartum discharge education, hence emphasizing beneficence. Justice ensures fairness and equality, which were maintained throughout the project (Office for Human Research Protections, 2018). The primary investigator treated all nurses and mothers with respect and fairness throughout the project. Further, all postpartum mothers during the project timeframe received information on postpartum warning signs and where to seek medical care, hence promoting equality.

The project site granted IRB approval and site authorization for collecting information from the EMR. The site IRB and site authorization outlined the specific de-identified patient information that was collected from the EMR (patient demographics, delivery information, and information on ER visits). Examples of patient identifiers include patient names, date of birth, address, phone number, and insurance information (Ehrenstein et al., 2019). The site authorization outlined that the name of the project site would not be used in any publications, and that data was protected to the best of the primary investigator's ability.

In addition to the site IRB approval, the primary investigator received GCU IRB approval to conduct the project at the site. The project site IRB deemed the project exempt from review and did not require informed consent. The project was a quality improvement initiative that was implemented on all mothers in hopes of improving outcomes. The site IRB approved the project, and it was hoped that they would adopt the intervention into standard practice after the project implementation. There was no intended harm for nurses or postpartum women and no expected conflicts of interest, and any potential issues are transparent in the final project manuscript.

Limitations

Potential limitations in this project included sample size, alternative explanations, time, and location. The sample size was dependent on the number of deliveries over four weeks in a small hospital in rural North Dakota, and, in turn, could have been too small. The size of the sample influences the project results. For example, a sample size that is too small may impact the internal or external validity of a project (Handley et al., 2018). In other words, with too little participants, it would have been difficult to determine

whether the intended concept was measured (internal validity) and difficult to provide generalizations to a larger population (external validity). Another limitation was that postpartum women may have attended an ER at a different location. Information on data from out-of-network sites was not available within the same EMR network and could have contributed to incomplete data (Ehrenstein et al., 2019).

Another potential limitation was time. Although the project aimed to educate mothers on postpartum warning signs and when to seek medical care from the ER, this may not have captured all ER visits in the postpartum period. Postpartum complications can occur up to one year after giving birth (CDC, 2019a). Women may seek care in the ER after the timeframe of the project, and hence may change the actual rate of ER visits.

Delimitations include that this project was conducted in a small hospital in rural North Dakota. This delimitation outlines that the sample was inclusive of individuals residing in rural North Dakota. This may not be representative of postpartum women residing in urban settings.

Despite the limitations, the findings from this project may contribute to existing literature. Given this project had a sufficient sample size, the findings from this project had potential for generalizations to postpartum women with uncomplicated pregnancies. The convenience sampling of uncomplicated deliveries limits generalizability to mothers with complicated deliveries (Handley et al., 2018).

Additionally, the project site is a small rural hospital in North Dakota, which may not be representative of urban hospitals in larger cities. Postpartum women living in large urban areas may have easier access to hospitals nearby versus mothers living in rural communities. The findings from this project can help support previous and future quality

improvement initiatives on improving postpartum discharge education. Future projects can focus on building and implementing a standardized postpartum discharge education across larger populations and multiple locations.

Summary

The primary investigator outlined the project methodology in Chapter 3 of this proposal. This project consisted of a quasi-experimental design to analyze a standardized postpartum discharge education intervention (independent variable) on the rate of ER visits (dependent variable). This design was most appropriate, given the lack of randomization with a convenience sample of postpartum women and the measurement of data before and after an intervention (Alessandri et al., 2017). A priori power analysis using the G*power version 3.1 was conducted, which outlined the sample size of was required to have a 5% level of significance, 85% power, and 0.5 effect size (Faul et al., 2009).

The EMR was used to collect maternal demographic information, delivery type, and non-urgent ER visit from the ER discharge diagnosis. The reliability of the EMR is dependent on the accuracy, completeness, and timeliness of data (Ehrenstein et al., 2019). The project site had a comprehensive staff training program to ensure data integrity. Additionally, using the EMR for collecting patient information (e.g., PHI) requires compliance with patient safety, privacy, and ethics (Ben-Assuli, 2015). Ethical considerations, including the privacy of protected health information and HIPAA compliance, were made apparent. Threats to validity were made apparent. A convenience sample may create threats to external validity, question whether the intervention was responsible for the outcome, or if the outcome was due to other variables (Handley et al.,

2018). Limitations such as the utilization of ER sites and lack of availability of out-of-network data in the EMR were apparent (Ehrenstein et al., 2019).

Data was analyzed using Intellectus statistics software (2020), an independent t -test to analyze the rate of postpartum ER visits before and after the standardized postpartum discharge education intervention. The rate of ER visits is a ratio level of measurement, which is tested through parametric statistical tests such as a t -test (Sylvia, 2014). An independent t -test is a parametric statistical test measuring the means of two independent groups for comparison (Kim, 2015). The results answered if implementing a standardized postpartum discharge education led to a reduction in non-urgent ER visits in postpartum women in a small hospital in rural North Dakota, over a four-week period. Chapter 4 of this proposal will present the findings of the project results.

Chapter 4: Data Analysis and Results

The purpose of this quantitative, quasi-experimental, quality improvement project was to determine if AWHONN's standardized postpartum discharge education would impact non-urgent ER visits among postpartum women in a hospital in rural North Dakota over four weeks. Despite the availability of evidence-based information on postpartum warning signs, it was not known if or to what degree the implementation of a standardized postpartum discharge education would impact non-urgent ER visits when compared to current practice among postpartum women in rural North Dakota. This project's findings will also add to the existing literature on the benefits of standardized postpartum discharge education and potential methods to reduce non-urgent ER visits.

Postpartum discharge education should include education on postpartum warning signs (American College of Obstetrics and Gynecology, 2018; Association of Women's Health, Obstetrics, and Neonatal Nurses [AWHONN], 2017; Centers for Disease Control and Prevention, 2015). The current state of postpartum discharge education has shown inconsistencies, and the content in postpartum discharge education fails to fulfill the needs of mothers in the postpartum period (Bingham et al., 2018; Suplee et al., 2016). Mothers are unaware of when to seek medical care in the ER for urgent conditions and when to consult their health care provider for non-urgent conditions (Logsdon et al., 2018; Suplee et al., 2016). Mothers attend the ER with non-urgent conditions, which poses financial burdens and an overall inconvenience for patients (Pérez et al., 2018; Sheen et al., 2019). The gaps in postpartum discharge education and maternal lack of knowledge on postpartum complications outlines the need for standardized postpartum discharge education (Suplee et al., 2016a). Discrepancies in postpartum discharge

education emphasize the need to educate mothers on when to go to the ER for urgent postpartum complications and when to consult healthcare providers.

A quantitative methodology was most appropriate for this project as the aim was to use statistics to objectively measure data in numerical form (Goertzen, 2017).

Quantitative methods use statistical analysis, such as descriptive or inferential statistics, to build on what is already known about a phenomenon (Main & Ogaz, 2016).

Quantitative methods are most suited for evidence-based interventions to implement the best evidence in clinical practice and improve patient outcomes (Melnyk et al., 2015).

This method was appropriate as the primary investigator used Intellectus statistics to analyze numerical data with descriptive and inferential statistical analysis. The statistical analysis results determined the rate of non-urgent ER visits before and after the implementation of standardized postpartum discharge education.

The clinical question was: To what degree will implementation of AWHONN's standardized postpartum discharge education reduce the rate of non-urgent ER visits when compared to the current practice among postpartum women in rural North Dakota over a four-week period? This project's results had the potential to improve postpartum discharge education and reduce the rate of non-urgent ER visits through enhanced education on postpartum warning signs. Chapter 4 covers descriptive data, data analysis procedures, results, and a summary of data collection and data analysis procedures.

Descriptive Data

The participants for this project included a convenience sample of postpartum mothers who met the inclusion criteria. Participants included all postpartum women with full-term live births who delivered over a four-week timeframe during the project. Any

postpartum women without live births, preterm births, or cognitively impaired mothers were excluded from this project. The rate of non-urgent ER visits from January 2020 was used for analysis. Based on a priori power analysis, a sample of 73 postpartum mothers was required to achieve a 5% level of significance, 85% power, and 0.5 effect size (Faul et al., 2009). The primary investigator had no direct contact with postpartum women at any point during the project. Required data were collected using an electronic medical record (EMR) chart reviews.

The primary investigator received an exemption from the site IRB before submitting it to GCU IRB for approval. The exemption from the site IRB took place over one week, after which the primary investigator completed all required GCU IRB documents for approval. Upon approval, the primary investigator completed the site's extranet confidentiality agreement to gain access to Cerner Powerchart EMR from the site's health information management (HIM) team. The primary investigator worked alongside the Director of HIM to run a customized report to determine the postpartum women who meet the inclusion criteria. The customized report's data elements included maternal age, race, gravidity, delivery type, and ER discharge diagnosis. Data accuracy was confirmed with chart reviews.

The customized data reports from the HIM department and chart reviews determined maternal demographics and the ER discharge diagnosis of mothers who attended the ER in the four-weeks during the project. The primary investigator used a rate of non-urgent ER visits from January 2020. The sample size of 83 in the implementation group was adequate based on a priori analysis requiring 73 postpartum women.

Maternal age. This project included 83 mothers who received the standardized postpartum discharge education (i.e., *education*). Table 1 outlines the summary statistics for maternal age in the *education* group. The mean age for mothers was 27 years, and the age ranged from the youngest mother aged 17 to the oldest mother aged 38.

Table 1
Summary Statistics Table for Maternal Age

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	Min	Max
Age	27.69	4.66	83	17	38

Note. N=83 in the *education* group

Maternal race. Table 2 outlines the race distribution of mothers included in this project. This table outlines that the most frequently observed race in the *education* group was white ($n = 70$, 84%). Maternal race demographics also included Black ($n = 3$, 3.6 %), Hispanic ($n = 5$, 6 %), and American Indian ($n = 5$, 6%) mothers. There were no Asian mothers ($n = 0$, 0%) in the *education* group. Figure 1 illustrates the maternal race distribution.

Gravidity. Table 2 outlines maternal gravidity, or the number of times they have been pregnant. Maternal gravidity ranged from one pregnancy ($n = 18$, 21.7%) to six pregnancies ($n = 5$, 6%) in the *education* group. The most common gravidity in the *education* group was two pregnancies ($n = 20$, 24.1 %).

Delivery type. Table 2 outlines the maternal delivery type in the *education* group. The table outlines that most mothers had vaginal deliveries ($n = 60$, 72.3%). There was a total of 23 Cesarean deliveries (27.7%).

Table 2
Frequency Table for Delivery Type, Gravidity, and Race

Variable	<i>n</i>	%
Delivery Type		
Cesarean	23	27.71
Vaginal	60	72.29
Gravidity		
1	18	21.69
2	20	24.10
3	17	20.48
4	17	20.48
5	6	7.23
6	5	6.02
Race		
Asian	0	0.00
Black	3	3.61
Hispanic	5	6.02
American Indian	5	6.02
White	70	84.34

Note. N= 83. Adapted from Intellectus Statistics (2020). *Intellectus Statistics* [Online computer software]. Retrieved from <http://analyze.intellectusstatistics.com/>

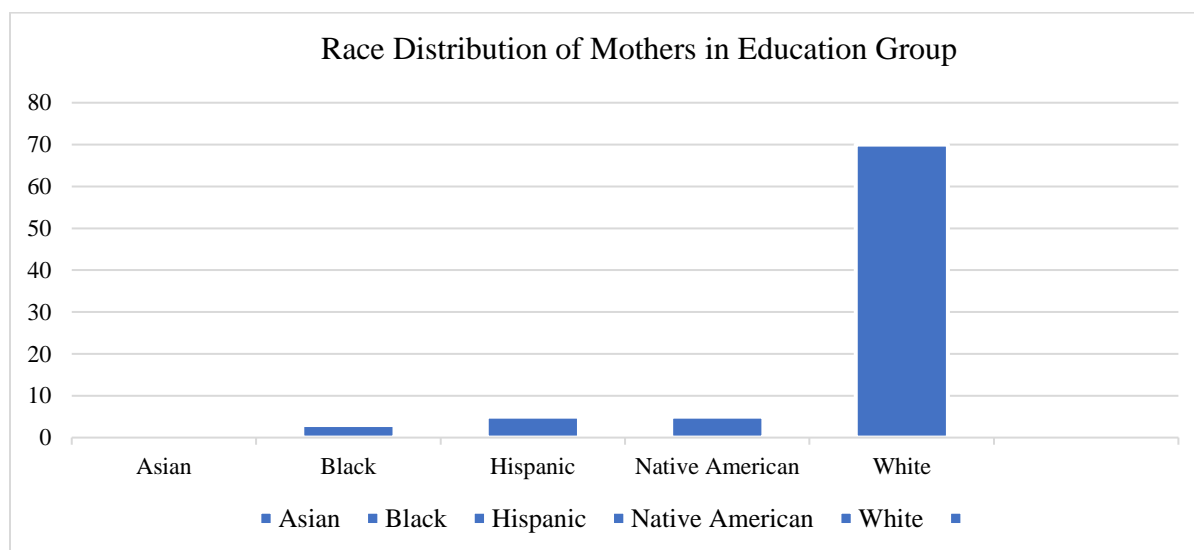


Figure 1. Race Distribution of Mothers.

Data Analysis Procedures

Data was collected from the EMR with chart reviews and customized data reports from the HIM department. Data from the HIM department was given to the primary investigator de-identified using unique personal identifiers. The primary investigator compared the results from the customized data reports to those against the original report containing patient identifiers to ensure accuracy. The primary investigator conducted chart reviews to ensure the accuracy of the data.

The data elements were organized into an excel spreadsheet using unique personal identifiers. No identifiable data were collected or recorded to ensure the protection of individuals and compliance with HIPPA. Maternal demographics such as age, race, gravidity, and delivery type were organized in the excel spreadsheet using unique patient identifiers. Chart reviews were conducted to verify the data elements and ensure the standardized postpartum discharge education was used for all mothers during the four-weeks for discharge education. Chart reviews using the data on postpartum discharge documentation outlined the standardized postpartum discharge education was used for 83 out of 90 discharges over a four-week timeframe. All postpartum women who received the standardized postpartum discharge education were included in this project (N= 83). The data in the excel spreadsheet were reviewed for accuracy twice before and once after transferring data into Intellectus statistics software (2020).

The primary investigator collected data from customized data reports from the HIM department and through EMR chart reviews. The primary investigator collected maternal age, race, gravidity, delivery type, and ER discharge diagnosis every other day

for the first two weeks and twice a week for the last two weeks of project implementation.

The Intellectus statistics software (2020) was used for data analysis. The primary investigator collected and analyzed data from postpartum women who received the standardized postpartum discharge education against a comparison rate from January 2020. Demographic information was analyzed with Intellectus statistics using descriptive statistics. The mean and standard deviation of maternal age is also outlined in Table 1. The minimum and maximum age were collected to determine the age range (Table 2). The frequency of maternal delivery type, gravidity, and race are outlined in Table 2.

Based on a priori analysis with G power analysis, a minimum sample size of 73 mothers was needed for significant results. The primary investigator was able to acquire an adequate sample size, with 83 postpartum women. A priori analysis was critical as a small sample size can threaten the internal or external validity of the project results (Cor, 2016). With a small sample size, it is difficult to determine whether the intended concept (i.e., non-urgent ER visits) is being measured (internal validity). Small sample sizes also make it challenging to provide generalizations to a larger population (external validity).

Another potential threat to internal validity was that mothers could have had underlying undiagnosed health conditions, making them more likely to visit the ER. No information on past medical history was collected, which may have impacted the results. An additional factor that may impact a mother's choice to attend the ER is the current Coronavirus-19 pandemic. As of August. 1, 2020, there were 177 cases of Coronavirus-19, with 121 recovered and 55 total active cases; the first case in the state of North Dakota was recorded in March 2020 (North Dakota Department of Health, 2020). This

data outlined an upward trend of Coronavirus-19 cases in the project location. This upward trend could have potentially impacted a mother's decision to attend the ER with postpartum warning signs given the potential contact with Coronavirus-19 positive patients or staff in the hospital. The number of active cases of Coronavirus-19 was a limitation to the project results as it may have contributed to a decrease in the rate of non-urgent ER visits.

The reliability of the project was ensured through several measures. All postpartum nurses were taught in the same manner using a PowerPoint handout to ensure consistency of education. The education included the same recommended verbiage for essential teaching points outlined in the standardized postpartum discharge education. Education for postpartum nurses was conducted during morning huddles and one-to-one during downtime in the day shift. The primary investigator attended morning shift reports every day for the first week to ensure consistent use of the standardized postpartum discharge education. The primary investigator reminded nurses on the importance of signing the standardized postpartum discharge education, giving mothers a signed copy, and documenting the use in the EMR. The primary investigator attended morning shift report every other day for the second week and twice a week for weeks three and four of implementation to ensure consistent implementation and documentation.

An independent *t*-test was conducted to compare the rate of non-urgent ER visits before and after implementing the standardized postpartum discharge education. Non-urgent ER visits were identified by comparing the ER discharge diagnosis against the coding sheet (Appendix D). The findings are outlined in the following results section.

Results

The clinical question was: To what degree will implementation of AWHONN's standardized postpartum discharge education reduce the rate of non-urgent ER visits when compared to the current practice among postpartum women in rural North Dakota over a four-week period? The primary investigator used Intellectus Statistics (2020) for statistical analysis. A two-tailed independent samples *t*-test was conducted to examine whether there was a change in the mean of non-urgent ER visits after implementation of the standardized postpartum discharge education. The primary investigator tested assumptions through the Levene's test and the Shapiro-Wilk test. A Mann-Whitney *U* test was conducted in addition to the independent *t*-test.

Homogeneity of Variance. Levene's test was conducted to assess whether the variance of non-urgent ER visits was equal between the categories of *education* and *no education*. The result of Levene's test for Non-urgent ER visits was not significant based on an alpha value of 0.05, $F(1, 169) = 2.90, p = .091$. This result suggests it is possible that the variance of non-urgent ER visits is equal for each category of *education*, indicating the assumption of homogeneity of variance was met.

Shapiro-Wilk test. A Shapiro-Wilk test was conducted to determine whether the distribution of non-urgent ER visits was significantly different from a normal distribution. The following variables had distributions which significantly differed from normality based on an alpha of 0.05: Non-urgent ER visits ($W = 0.11, p < .001$). Howell (2013) indicates that violations of normality are not problematic when the sample size exceeds 50 cases. A Mann Whitney *U* test was also conducted to verify the findings of the *t*-test since the Shapiro Wilk test did not support normality.

Two-tailed independent samples t-test. The result of the two-tailed independent samples *t*-test was not significant based on an alpha value of 0.05, $t(169) = -1.70$, $p = .091$, indicating there was no significant difference in non-urgent ER visits. This finding suggests the mean of non-urgent ER visits was not significantly different between the *education* and *no education* categories of education. The effect size, d , is 0.26 suggesting there is a small effect. The results are presented in Table 3. A bar plot of the means is presented in Figure 2.

Table 3
Independent Samples t-Test for Non-urgent ER visits by Education

Variable	Education		No Education		<i>t</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Non-urgent ER visits	0.00	0.00	0.03	0.18	-1.70	.091	0.26

Note: $N = 171$. Degrees of Freedom for the *t*-statistic = 169. d represents Cohen's d . Table adapted from Intellectus Statistics (2020). *Intellectus Statistics* [Online computer software]. Retrieved from <http://analyze.intellectusstatistics.com/>

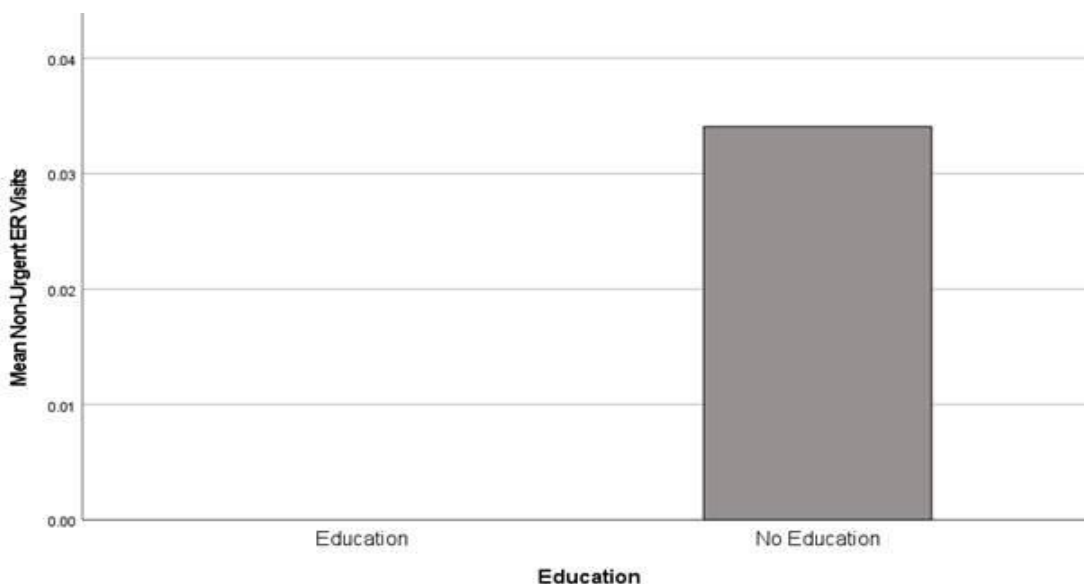


Figure 2. The Mean of Non-urgent ER Visits by Levels of Education.

Note: adapted from Intellectus Statistics (2020). *Intellectus Statistics* [Online computer software]. Retrieved from <http://analyze.intellectusstatistics.com/>

Two-tailed Mann-Whitney U test. A two-tailed Mann-Whitney U two-sample rank-sum test was conducted to examine whether there were significant differences in non-urgent ER visits between the levels of education. The two-tailed Mann-Whitney two-sample rank-sum test is an alternative to the independent samples t -test but does not share the same assumptions (Conover & Iman, 1981). There were 83 observations in the group *education* and 88 observations in the group *no education*.

The result of the two-tailed Mann-Whitney U test was not significant based on an alpha value of 0.05, $U = 3527.5$, $z = -1.69$, $p = .091$. The mean rank for group *education* was 84.50, and the mean rank for the group *no education* was 87.41. This finding suggests that the distribution of Non-urgent ER visits for group *education* ($Mdn = 0.00$) was not significantly different from the distribution of non-urgent ER visits for the *no education* ($Mdn = 0.00$) category. Table 4 presents the result of the two-tailed Mann-Whitney U test. The findings from the Mann-Whitney Test ($p=0.91$) confirm the findings from the independent t -test ($p=0.91$).

Table 4
Mann-Whitney Test for Non-urgent ER visits by Education

Variable	Mean Rank		U	z	p
	Education	No Education			
Non-Urgent ER Visits	84.50	87.41	3527.50	-1.69	.091

Note. $N = 83$ in *education*, $N = 89$ in *no education*. Table adapted from Intellectus Statistics (2020). *Intellectus Statistics* [Online computer software]. Retrieved from <http://analyze.intellectusstatistics.com/>

The results from the independent samples t -test (Table 3) and Mann-Whitney test (Table 4) outlined the findings are not statistically significant ($p = .091$) and have a small

effect size ($d= 0.26$). The p -value indicates the likelihood that the outcome occurred by chance (Main & Ogaz, 2016). In other words, there is more than a five percent 5% chance that the findings were due to chance.

Summary

Chapter 4 outlined the data analysis procedures and the results from inferential and descriptive statistical analysis. Data collected from EMR chart reviews and customized data reports were used for data analysis. Data elements included maternal demographics (age range, race, gravidity, delivery type), and ER discharge diagnosis on postpartum women in a small hospital in rural North Dakota. The data collection and analysis were aimed at answering the clinical question which was: To what degree will implementation of AWHONN's standardized postpartum discharge education reduce the rate of non-urgent ER visits when compared to the current practice among postpartum women in rural North Dakota over a four-week period?

Chapter 4 outlined the data analysis using descriptive and inferential statistical analysis with Intellectus statistics. Data analysis included both descriptive and inferential statistics. The descriptive statistical analysis outlines the frequency of delivery type, gravidity, and race. Descriptive statistics also illustrate the maternal age range and the mean and standard deviation of maternal age. Inferential statistical analysis was completed using an independent t -test. The independent t -test compared the rate of non-urgent ER visits before and after implementing the standardized postpartum discharge education. A Mann-Whitney U test was conducted to support the findings from the independent t -test given normality was not supported.

The tables and figures illustrated the findings from data analysis. The findings suggest no statistically significant link between using standardized postpartum discharge education and reducing non-urgent ER visits. Although not statistically significant, the findings create new opportunities for future quality improvement initiatives to reduce non-urgent ER visits. Chapter 5 will summarize the project, a summary of the findings, and a conclusion. Implications for future projects and recommendations from the results of this project are also discussed in Chapter 5.

Chapter 5: Summary, Conclusions, and Recommendations

The postpartum period is critical in ensuring long term maternal well-being (American College of Obstetricians and Gynecologists, 2018). Postpartum discharge education is a critical part of maternal well-being (Association of Women's Health, Obstetrics, and Neonatal Nurses, 2017). However, the current state of postpartum discharge education regarding postpartum complications is inconsistent among nurses (Suplee et al., 2016b).

Postpartum women are unaware of when to attend the emergency room (ER) when facing postpartum complications and when to seek medical care from their health care provider (Suplee et al., 2016a). Postpartum women are attending the ER with non-urgent conditions, posing financial burdens for the healthcare system, and an inconvenience for mothers (Brousseau et al., 2018a; Sheen et al., 2019). Lack of knowledge on postpartum complications has also contributed to preventable causes of maternal mortality (Association of Women's Health, Obstetrics, and Neonatal Nurses, 2019; Centers for Disease Control, 2019a). The inconsistencies in postpartum discharge education and non-urgent ER visits create opportunities for standardized postpartum discharge education interventions to include postpartum complications (Centers for Disease Control, 2019a; Suplee et al., 2016a).

Postpartum discharge education should include teaching on postpartum complications to reduce non-urgent ER visits (American College of Obstetricians and Gynecologists, 2018; World Health Organization, 2015). Implementing a standardized postpartum discharge education intervention fulfills these recommendations as it encompasses teaching points on when to seek care in the ER for urgent conditions and

when to consult their health care providers (Association of Women's Health, Obstetrics, and Neonatal Nurses, 2017). Informing women on when to seek medical care from health care providers and when to attend the ER when facing postpartum complications is appropriate to help reduce non-urgent ER visits (Bingham et al., 2018a).

Conducting this project was needed to determine if implementing standardized postpartum discharge education on postpartum complications helped to reduce the rate of non-urgent ER visits after project implementation. The project was conducted at a small hospital in rural North Dakota, with 83 postpartum women. This project's findings could provide a foundation for future studies on reducing non-urgent ER visits through standardized postpartum discharge education. Evidenced-based postpartum discharge education interventions can improve the quality of maternal health in the postpartum period (Malagon et al., 2017). Chapter 5 provides a comprehensive summary, conclusions, implications, and recommendations from this project.

Summary of the Project

The clinical question guiding this project was: To what degree will implementation of AWHONN's standardized postpartum discharge education reduce the rate of non-urgent ER visits when compared to the current method of educating postpartum women in rural North Dakota over a four-week period?

A quasi-experimental, preintervention postintervention design was used for this project to determine if implementing a standardized postpartum discharge education intervention would reduce the rate of non-urgent ER visits in the postpartum period. Data were collected on 83 postpartum women with full-term live births at a small hospital in

rural North Dakota. Data collection included running customized data reports and conducting chart reviews in the electronic medical record (EMR).

The rate of non-urgent ER visits among postpartum women who received standardized postpartum discharge education was analyzed with non-urgent ER visits from a comparison rate in January 2020. The independent variable in this project was the standardized postpartum discharge education. The dependent variable was the rate of non-urgent ER visits. Maternal demographics, including age, race, gravidity, and delivery type, were also collected to determine maternal characteristics.

Summary of Findings and Conclusion

A total of 90 charts were reviewed from all postpartum women who met the inclusion criteria of full-time live births over a four-week timeframe in a small hospital in rural North Dakota. All postpartum women with complicated births or preterm deliveries were excluded. Out of 90 charts, 83 had documented the use of the standardized postpartum discharge education for discharge education. The final sample size was 83. The rate of non-urgent ER visits in postpartum women was determined after implementing a standardized postpartum discharge education intervention and analyzed with a comparison rate from January 2020.

Comparing the rates of non-urgent ER visits among postpartum women who received the standardized postpartum discharge education against those who did not (i.e., comparison rate) assisted in answering the clinical question. The dependent variable was the standardized postpartum discharge education, and the independent variable was the non-urgent ER rate. Maternal demographics, such as age, race, delivery type, and

gravity, were also gathered to determine any maternal characteristics associated with non-urgent ER visits.

This section will outline whether the clinical question was answered through the project findings. The clinical question was: To what degree will implementation of AWHONN's standardized postpartum discharge education reduce the rate of non-urgent ER visits when compared to the current practice among postpartum women in rural North Dakota over a four-week period? Determining any change in the rate of non-urgent ER visits was necessary to determine if the standardized postpartum discharge education intervention reduced the rate of non-urgent ER visits. The result of the independent *t*-test was not significant based on an alpha value of 0.05, $t(169) = -1.70$, $p = .091$, indicating there was no significant difference in non-urgent ER visits. This finding suggests the mean of non-urgent ER visits was not significantly different between the comparison and project implementation group. Table 3 outlines the comparison of these rates. The comparison rate ($M = 0.03$, $SD = 0.18$) of non-urgent ER visits was not significantly less than the rate of non-urgent ER visits among postpartum women who received the standardized postpartum discharge education ($M = 0.00$, $SD = 0.00$, $p = 0.91$). There was a difference of 0.03 in the mean between the two groups. The results outline no significant difference in the rate of non-urgent ER visits between postpartum women who received the standardized postpartum discharge education (i.e., *education*) and those who did not (i.e., *no education*).

A non-urgent ER visit represents medical care that can be delayed up to 24 hours without negatively impacting the medical condition (Centers for Disease Control and Prevention, 2015; Honigman et al., 2013). Although there were no non-urgent ER visits

in the intervention group, the most common non-urgent ER visit making up the comparison rate were hematoma of the obstetric wound, anemia, and unspecified abdominal pain. These reasons are consistent with the literature outlining the most common diagnoses for non-urgent ER visits were urinary tract infections, surgical site issues, exacerbation of chronic health conditions, non-urgent wound issues, and unspecified abdominal pain (Batra et al., 2017; Bryant et al., 2016; Weissman-Brenner et al., 2020). The top reasons for ER visits, regardless of urgency, are cited as normal postpartum examination (27%), hypertension (21%), and wound infection (9%) (Brousseau et al., 2018a).

Postpartum complications warranting urgent ER visits include postpartum hemorrhage, hypertensive disorders, preeclampsia, and eclampsia (Association of Women's Health, Obstetrics, and Neonatal Nurses, 2017). Additionally, postpartum complications of venous thromboembolism, pulmonary embolism, infection, sepsis, postpartum depression, and cardiac disease also warrant urgent ER visits (Association of Women's Health, Obstetrics, and Neonatal Nurses, 2017). This recommendation is important to note as the warning signs for these postpartum complications are included in the standardized postpartum discharge education. In other words, the Association of Women's Health, Obstetrics, and Neonatal Nurses (AWHONN) recommends women seek care in the ER if experiencing warning signs associated with these postpartum complications (AWHONN, 2017). This advice aligns with the recommendations from the American College of Obstetricians and Gynecologists (ACOG), Centers for Disease Control and Prevention (CDC), World Health Organization (WHO), and the Joint Commission, that outline that postpartum women need to be educated on the postpartum

warning signs and when to seek medical care in the ER. Educating mothers on when to seek medical care for postpartum warning signs can reduce preventable maternal mortality from postpartum complications (AWHONN, 2017; ACOG, 2018; CDC, 2015; WHO, 2015).

Although there were no non-urgent visits in the intervention group, the literature outlines the maternal characteristics of non-urgent ER use. For example, younger age is associated with non-urgent ER use (Bryant et al., 2016; Honigman et al., 2013). Additionally, non-Hispanic Black women were most likely to use the ER for non-urgent ER visits. The literature also suggests that first-time mothers may be better prepared for adjustment in the postpartum period after an educational intervention (Bagherinia et al., 2017). Lastly, vaginal deliveries were most likely associated with postpartum visit non-attendance, which demonstrates missed opportunities for early detection of postpartum conditions and could contribute to non-urgent ER use (Wilcox et al., 2016).

The need for consistent, standardized postpartum discharge education based on evidence-based guidelines was necessary to advance scientific knowledge outlined in Chapter 1 (Malagon et al., 2017). This project provides an example of implementing a standardized postpartum discharge education intervention encompassing maternal education on postpartum complications. This project fulfilled the recommendations that maternal education should include teaching on postpartum complications requiring prompt medical attention from health care providers and the ones requiring immediate attention in the ER (Bingham et al., 2018a; Brousseau et al., 2018a). Lastly, this example of a standardized postpartum discharge education advances the theory of adaptation

during childbirth (TADC) as it incorporates the physical, psychological, and social components of postpartum warning signs (Tulman & Fawcett, 2003).

Implications

This project provides an example of conducting a quality improvement initiative to improve maternal health in the postpartum period. Specifically, this project will add to the literature addressing the inconsistencies in postpartum discharge education through evidence-based interventions. Although not statistically significant, this project also creates practice opportunities for future projects using this standardized postpartum discharge education on a larger scale.

This standardized postpartum discharge education advances postpartum education as it provides postpartum nurses with a consistent method of educating mothers on the most common postpartum complications. Providing postpartum women with evidence-based information on when to consult their health care provider and when to attend the ER for urgent postpartum complications may be a necessary step in early detection and treatment. Early detection and prompt treatment of postpartum complications may be necessary for addressing preventable causes of maternal mortality.

Theoretical implications. The theory of adaptation during childbirth (TADC) and cognitive learning theory (CLT) provided the theoretical foundations for this project. The theory of adaptation during childbirth outlines mothers' needs in the postpartum period through the four modes of physiological, role function, self-concept, and interdependence (Tulman & Fawcett, 2003). This theory suggests opportunities to alter external stimuli are necessary to promote maternal adaptation in all four modes (Tulman & Fawcett, 2003). This project included implementing a standardized postpartum

discharge education intervention, including postpartum warning signs and emphasizing when mothers should attend the ER for urgent conditions. The postpartum warning signs included in the educational intervention encompasses all four modes of adaptation. Although this project's findings outline no significant difference in the rate of non-urgent ER visits after the standardized postpartum discharge education, it provides an example of including maternal needs for adaptation into postpartum discharge education. This project's findings will help advance TADC as it includes a standardized postpartum discharge education encompassing all four modes of adaptation (Sabitha, & Shiny, 2015; Tulman & Fawcett, 2003).

Cognitive learning theory (CLT) helped guide the educational intervention in this project. This theory is useful in situations involving the acquisition of knowledge, understanding, and memory processing hence guided the process of the standardized postpartum discharge education intervention (Braungart & Braungart, 2013). The educational intervention ensured participants were active in their knowledge construction and focused on learner motivations and role models as guiding principles for learning (Bandura, 1971; Braungart & Braungart, 2013). For example, using postpartum nurses' academic and practical experience was necessary to guide the educational process. Additionally, CLT outlines the importance of organization, goal setting, and clear expectations within a teaching environment (Braungart & Braungart, 2013). The primary investigator ensured that the standardized postpartum discharge education aligned with the organization's goals and outlined the importance of reducing non-urgent ER visits by educating mothers on when to seek medical care for postpartum warning signs.

Practical implications. Data analysis outlined no significant difference in the rate of non-urgent ER visits after the implementation of the standardized postpartum discharge education. The effect size, d , was 0.26, outlining a small effect size. Despite the lack of statistical significance, this standardized postpartum discharge education fulfills the recommendations by AWHONN (2017) and ACOG (2018) that suggest postpartum discharge education should include teaching on warning signs associated with postpartum complications. This is significant as educating mothers on when to seek medical care in the ER for urgent postpartum warning signs and when to consult their health care providers is necessary for early detection and treatment for postpartum complications (ACOG, 2018; de Bocanegra et al., 2017; Parekh et al., 2018). Furthermore, given that postpartum discharge education should be evidence-based, the standardized postpartum discharge education raised awareness of nursing staff on incorporating evidence-based education into their postpartum discharge education practices. Utilizing the standardized postpartum discharge education provides postpartum nurses with a consistent method of educating mothers on postpartum warning signs, which is a current gap in postpartum education (Suplee et al., 2016a). Consistent education on postpartum warning signs is especially important as educating mothers on postpartum complications is one method to countering preventable causes of maternal mortality (ACOG, 2018; AWHONN, 2017).

Future implications. Given this project did not have statistically significant results, this project provides an example of a standardized postpartum discharge education intervention encompassing the most common postpartum complications outlined by AWHONN. This project was consistent with recommendations from the

literature suggesting postpartum discharge education interventions such as standardized postpartum discharge education have the potential to reduce non-urgent ER visits in the postpartum period (Bingham et al., 2018b; Brousseau et al., 2018a). Conducting this project on a larger scale may be necessary to determine a true association between standardized postpartum discharge education and non-urgent ER visits.

This project included a sample size of 83 postpartum women from one small hospital in rural North Dakota over a four-week timeframe. The majority of this sample consisted of white women ($n = 70$, 84.3%) and a small percentage of Black women ($n = 3$, 3.6%), Hispanic women ($n = 5$, 6%), American Indian women ($n = 5$, 6%), and zero women from the Asian race. The convenience sample was derived from one small hospital in rural North Dakota. The age range of women who received the standardized postpartum discharge education was from 17 years to 38 years of age. Although the sample size was appropriate based on a priori analysis, there was no statistical significance between the rate of non-urgent ER visits before and after the intervention, and the effect size was small ($d = 0.26$). Future studies can focus on repeating this project on a larger scale in urban communities over a larger time period.

A major strength of the project was achieving an adequate sample size based on a priori analysis. The sample size is important when considering the findings' internal and external validity (Cor, 2016). The project included a convenience sample of 83 postpartum mothers with uncomplicated full-term deliveries. Convenience sampling is a threat to internal validity as it questions whether the intervention was responsible for the outcome or if it was due to other variables (Handley et al., 2018). Using only postpartum

women with uncomplicated full-term deliveries may not apply to postpartum women with preterm or complicated deliveries.

Additionally, white women residing in rural North Dakota made up most of the sample and may not represent urban areas with a more racially diverse population. There were zero women from the Asian race, and only a small representation of Black, Hispanic, and American Indian women. Postpartum women living in large urban areas may have easier access to hospitals nearby versus mothers living in rural communities. Future studies can focus on repeating this intervention with random sampling in areas with a more racially diverse sample.

A major weakness of this project was the lack of data collection on maternal past medical history. Mothers with underlying health conditions may have a greater likelihood of attending the ER in the postpartum period. Undiagnosed conditions represent a threat to internal validity, reflecting whether the intervention was responsible for the outcome (Cor, 2016). Additionally, the sample included mothers with uncomplicated full-term deliveries, which may not apply to women with preterm or complicated deliveries. Future studies can focus on collecting more maternal demographic information to determine any links for non-urgent ER visits.

Another weakness of this project is the timing during the Coronavirus-19 pandemic. The Coronavirus-19 pandemic during project implementation may have contributed to decreased ER visits. Despite the weaknesses listed here, the project represents a successful example of implementing a standardized postpartum discharge education intervention. Future studies can repeat this project under non-pandemic circumstances.

The project sample depended on confirmed documentation of the standardized postpartum discharge education in the postpartum discharge documentation. Although 90 women met the inclusion criteria, only 83 women comprised the final sample due to a lack of documentation on standardized postpartum discharge education for seven women. Future studies may benefit from incorporating the standardized postpartum discharge education into the EMR as a part of postpartum discharge documentation.

Recommendations

The WHO states that all postpartum mothers require education on the common postpartum danger signs and when to consult health care providers with any signs of postpartum complications such as hemorrhage, preeclampsia/eclampsia, infection, and thromboembolism (WHO, 2015). Despite this recommendation, discharge education's current state of discharge suggests that discharge teaching instructions regarding potential complications are inconsistent among nurses (Suplee et al., 2016b). Evidenced-based postpartum discharge education interventions have the potential to increase maternal knowledge on postpartum warning signs, help counter inconsistencies in postpartum discharge education, and may contribute to reducing preventable causes of maternal mortality (AWHONN, 2017; Suplee et al., 2016b).

Recommendations for future projects. Recommendations for future projects include including a more representative, different settings, more maternal demographics, and repeating the project under non-pandemic circumstances.

This project included a convenience sample of postpartum women and took place in a small hospital in a rural community. Repeating this project on a larger scale and in urban settings may be necessary to see a true association between standardized

postpartum discharge education and non-urgent ER visits. Additionally, the project took place over a four-week timeframe; conducting the project over a larger period of time would be appropriate for future larger-scale studies.

This project included a sample of 83 postpartum women in a rural area. Although the sample size was sufficient based on a priori analysis, it may not represent all postpartum mothers not residing in rural areas. The majority of this sample consisted of white women ($n = 70$, 84.3%) and a small percentage of Black women ($n = 3$, 3.6%), Hispanic women ($n = 5$, 6%), American Indian women ($n = 5$, 6%), and zero women from the Asian race. This project sample was not racially diverse. Future studies should repeat this project using a more representative and racially diverse sample in urban areas to increase variety in maternal demographics, particularly race. Having a more representative sample may aid in increasing generalization in future studies with statistically significant results.

This project was conducted in a small hospital in rural North Dakota, with an average of 122 births per month. This setting may not represent larger urban hospitals with a greater number of deliveries and more resources for postpartum women. Future interventions can repeat this project in a larger urban hospital with a greater number of deliveries to increase the generalization of findings.

Collecting data on past medical history and current medical conditions may be appropriate to determine if this impacts the rate of non-urgent ER visits in the postpartum period. For example, collecting data on whether mothers had postpartum complications in previous pregnancies may contribute to the findings. Future studies should include

maternal past medical history to determine if this impacts the rate of urgent and non-urgent ER visits.

The current Coronavirus-19 pandemic may have contributed to the project findings. Postpartum women may have had an emphasized reduction in the rate of ER visits as a method to avoid contact with the virus. Future studies should focus on repeating this project under non-pandemic circumstances to determine if there is a true reduction in non-urgent ER visits from the standardized postpartum discharge education.

Recommendations for practice. This project's findings outline that there was no significant reduction in the rate of non-urgent ER visits after the implementation of the standardized postpartum discharge education. The findings from this project add to the literature on the benefits of standardized postpartum discharge education. Given that postpartum discharge education should be based on evidence-based recommendations, the project helped create nursing awareness on implementing evidenced-based education into practice. The findings also contribute to the literature on methods to provide consistency to postpartum discharge education through evidence-based interventions. The Coronavirus-19 pandemic may have contributed to a reduction in non-urgent ER visits. Conducting the intervention under non-pandemic circumstances may yield different results. Despite the findings, the project reflects the recommendations of ACOG, AWHONN, CDC, and the WHO outlining the need for evidence-based maternal education on postpartum complications.

Evidenced-based postpartum discharge education can ensure the best evidence is used in clinical practice and improve patient outcomes (Melnyk et al., 2015). The current state of postpartum discharge education has shown inconsistencies in the messages and

resources used for education (Malagon et al., 2017; Suplee et al., 2016b). Further, education on postpartum complications varies between nurses and organizations (Suplee et al., 2016a). Standardizing postpartum discharge education can address these flaws in postpartum discharge education by creating awareness and providing consistent, evidence-based education on postpartum warning signs for all mothers (Suplee et al., 2016a). Evidence-based discharge education interventions on postpartum complications could reduce the global problem of preventable maternal mortality (ACOG, 2018; AWHONN, 2017; CDC, 2015).

Given health care spending on non-urgent ER visits cost approximately \$38 billion annually, educational interventions on when to seek care in the ER for urgent conditions is necessary (New England Healthcare Institute, 2010). Educational interventions can help reduce crowding problems, long wait times, and resource utilization in non-urgent visits (New England Healthcare Institute, 2010). With pregnancy problems among the top 10 reasons for ER visits among females, educational strategies targeted within this population may help counter the rates of non-urgent ER visits (CDC, 2015). For example, postpartum discharge education interventions have the potential to improve maternal knowledge on when to consult their health care providers and, in turn, can lead to reducing non-urgent ER visits (Bingham et al., 2018b; Brousseau et al., 2018a; Sheen et al., 2019). Reducing non-urgent ER visits can improve financial and resource expenditure for health care organizations and spending and inconvenience for patients (Pérez et al., 2018).

Postpartum visits provide opportunities for early screening, diagnosis, and treatment of postpartum complications (ACOG, 2018; Parekh et al., 2018). Postpartum

visit non-attendance is a consequence of inadequate postpartum discharge education. It presents another gap in postpartum healthcare (de Bocanegra et al., 2017). This gap outlines the need for educational interventions to ensure postpartum women attend their postpartum follow-up visits. Providing mothers with a scheduled postpartum visit before hospital discharge and outlining the importance of attending the visit may be an ideal solution for maternal well-being. Ensuring postpartum women attend postpartum follow up visits is necessary for timely screening, diagnosis, and treatment for postpartum complications (Wilcox et al., 2016).

References

- Abdulla, L., McGowan, E. C., Tucker, R. J., & Vohr, B. R. (2020). Disparities in preterm infant emergency room utilization and rehospitalization by maternal immigrant status. *The Journal of Pediatrics*, 220, 27–33. <https://doi.org/10.1016/j.jpeds.2020.01.052>
- Adams, Y. J. & Ray, H. E. (2019). Knowledge of postpartum care and postbirth warning signs among midwives in Ghana. *Birth*, 2019(0), 1-8. Retrieved from <https://doi.org/10.1111/birt.12472>
- Adams, Y.J., Stommel, M., Ayoola, A., Horodynski, M., Malata, A., Smith, B. (2017). Use and evaluation of postpartum care services in rural Malawi. *Journal of Nursing Scholarship*, 49(1), 87-95. doi: 10.1111/jnu.12257. Retrieved from: <http://xs6th8dt4r.search.serialssolutions.com/?V=1.0&sid=PubMed:LinkOut&pmid=27779814>
- Agency for Healthcare Research and Quality. (2018). *Improving Data Collection across the Health Care System*. Retrieved from <https://www.ahrq.gov/research/findings/final-reports/iomracereport/reldata5.html>
- Alessandri, G., Zuffianò, A., & Perinelli, E. (2017). Evaluating intervention programs with a pretest-posttest design: A structural equation modeling approach. *Frontiers in Psychology*, 8(223), 1-12. Retrieved from <https://doi.org/10.3389/fpsyg.2017.00223>

- Alkema, L., Chou, D., Hogan, D... Say, L. (2016). Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *The Lancet*, 387(10017), 462-272. [https://doi.org/10.1016/S0140-6736\(15\)00838-7](https://doi.org/10.1016/S0140-6736(15)00838-7)
- Almalik, M.M. (2017). Understanding maternal postpartum needs: A descriptive survey of current maternal health services. *Journal of Clinical Nursing*, 26 (1), 23-24. doi: 10.1111/jocn.13812. Retrieved from: <https://onlinelibrary.wiley.com/doi/abs/10.1111/jocn.13812>
- Al-Safi, Z., Imudia, A.N., Filetti, L.C., Hobson, D.T., Bahado-Singh, R.O., & Awonuga, A.O. (2011). Delayed postpartum preeclampsia and eclampsia: demographics, clinical course, and complications. *Obstetrics & Gynecology*, 118(5), 1102-1107. doi: 10.1097/AOG.0b013e318231934c.
- Altman, M. R., Colorafi, K., & Daratha, K. B. (2018). The reliability of electronic health record data used for obstetrical research. *Applied Clinical Informatics*, 9(1), 156–162. <https://doi.org/10.1055/s-0038-1627475>
- American College of Obstetricians and Gynecologists. (2018). Optimizing postpartum care. *Obstetrics and Gynecology*, 131(5), e140-e150. Retrieved from <https://www.acog.org/-/media/project/acog/acogorg/clinical/files/committee-opinion/articles/2018/05/optimizing-postpartum-care.pdf>

- Arnolds, D. E., Smith, A., Banayan, J. M., Holt, R., & Scavone, B. M. (2019). National partnership for maternal safety recommended maternal early warning criteria are associated with maternal morbidity. *Anesthesia and Analgesia*, *129*(6), 1621–1626. <https://doi.org/10.1213/ANE.0000000000003889>
- Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN). (2017). *POST-BIRTH Warning Signs Course*. Retrieved from <http://learning.awhonn.org/diweb/catalog/launch/package/3/sid/68007736>
- Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN). (2019). *POST-BIRTH Education Program*. Retrieved from <https://www.awhonn.org/page/POSTBIRTH>
- Association of Women’s Health, Obstetrics, and Neonatal Nurses. (2020). *About us*. Retrieved from <https://awhonn.org/about-us/>
- Australian College of Mental Health Nurses. (2017). What do the stats mean? Improving reporting of quantitative nursing research. *International Journal of Mental Health Nursing*, *26*, 311–31. doi: 0.1111/inm.12352
- Bagherinia, M., Mirghafourvand, M, Shafaie, F.S. (2017). The effect of educational package on functional status and maternal self-confidence of primiparous women in postpartum period: a randomized controlled clinical trial. *Journal of Maternal-Fetal and Neonatal Medicine*, *30*(20), 2469-2475. doi: 10.1080/14767058.2016.1253061.
- Bandura, A. (1971). *Social learning theory*. Retrieved from http://www.asecib.ase.ro/mps/Bandura_SocialLearningTheory.pdf

- Basias, N., & Pollalis, Y. (2018). Quantitative and Qualitative Research in Business & Technology: Justifying a Suitable Research Methodology. *Review of Integrative Business and Economics Research*, 7(1), 91-105. Retrieved from: https://sibresearch.org/uploads/3/4/0/9/34097180/riber_7-s1_sp_h17-083_91-105.pdf
- Batra, P., Fridman, M., Leng, M., & Gregory, K. D. (2017). Emergency department care in the postpartum period: California births, 2009-2011. *Obstetrics and Gynecology*, 130(5), 1073–1081. <https://doi.org/10.1097/AOG.0000000000002269>
- Belfort, M.A. (2020). Overview of postpartum hemorrhage. In C.J. Lockwood & V.A. Barss (Ed.) *UpToDate*. Retrieved from https://www.uptodate.com/contents/overview-of-postpartum-hemorrhage?search=postpartum%20hemorrhage&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1
- Ben-Assuli, O. (2015). Electronic health records, adoption, quality of care, legal and privacy issues and their implementation in emergency departments. *Health Policy*, 119(3), 287–297. <https://doi-org.lopes.idm.oclc.org/10.1016/j.healthpol.2014.11.014>
- Berens, P. (2020). Overview of the postpartum period: Disorders and complications. In C.J. Lockwood & V.A. Barss (Ed.) *UpToDate*. Retrieved from https://www.uptodate.com/contents/overview-of-the-postpartum-period-disorders-and-complications?search=postpartum%20breast%20issues&source=search_result&selectedTitle=3~150&usage_type=default&display_rank=3

- Bingham, D., Scheich, B., Bateman, B.T. (2018a). Structure, process, and outcome data of AWHONN's postpartum hemorrhage quality improvement project. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 47(5), 707 – 718.
[https://www.jognn.org/article/S0884-2175\(18\)30233-8/fulltext](https://www.jognn.org/article/S0884-2175(18)30233-8/fulltext)
- Bingham, D., Suplee, P. D., Morris, M. H., & McBride, M. (2018b). Healthcare strategies for reducing pregnancy-related morbidity and mortality in the postpartum period. *The Journal of Perinatal & Neonatal Nursing*, 32(3), 241–249. Retrieved from
<https://doi.org/10.1097/JPN.0000000000000344>
- Bonet, M., Nogueira Pileggi, V., Rijken, M. J., Coomarasamy, A., Lissauer, D., Souza, J. P., & Gülmezoglu, A. M. (2017). Towards a consensus definition of maternal sepsis: Results of a systematic review and expert consultation. *Reproductive Health*, 14(1), 67.
<https://doi.org/10.1186/s12978-017-0321-6>
- Bowman, M.A., & Maxwell, A.R. (2018). A beginner's guide to avoiding protected health information (PHI) issues in clinical research – With how-to's in REDCap data management software. *Journal of Biomedical Informatics*, 85(1), 49-55.
<https://doi.org/10.1016/j.jbi.2018.07.008>
- Braungart, M., & Braungart, R. (2013). Educational and Learning Theories. In Butts, J. B., & Rich, K. L. (Eds.). (2013). *Philosophies and theories for advanced nursing practice*. Sudbury, MA: Jones & Bartlett. ISBN-13: 9781284041347. Retrieved from
https://www.gcumedia.com/digital-resources/jones-and-bartlett/2013/philosophies-and-theories-for-advanced-nursing-practice-butts-philosophies-and-theories-for-advanced-nursing-practice_ebook_2e.php

- Britton, J.R. (2015). Healthcare reimbursement and quality improvement: Integration using the Electronic Medical Record. *International Journal of Health Policy and Management*, 4(8), 549–551. <https://doi-org.lopes.idm.oclc.org/10.15171/ijhpm.2015.93>
- Brousseau, E. C., Danilack, V., Cai, F., & Matteson, K. A. (2018a). Emergency room visits for postpartum complications. *Journal of Women's Health*, 27(3), 253–257. <https://doi.org/10.1089/jwh.2016.6309>
- Brousseau, E.C., Danilack, V., Cai, F., & Matteson, K.A. (2018b). Emergency department visits for postpartum hypertension. *Hypertension in Pregnancy*, 36(2), 212-216. <https://doi.org/10.1080/10641955.2017.1299171>
- Brundin-Mather, R., Soo, A., Zuege, D.J., Niven, D.J., Fiest, K., Doig, C.J...Stelfox, H.T. (2018). Secondary EMR data for quality improvement and research: A comparison of manual and electronic data collection from an integrated critical care electronic medical record system. *Journal of Critical Care*, 47, 295–301. doi: 10.1016/j.jcrc.2018.07.021.
- Bryant A, Blake-Lamb T, Hatoum I, Kotelchuck M. (2016). Women’s use of health care in the first 2 years postpartum: occurrence and correlates. *Maternal Child Health*, 20(1), 81–91. <https://eds-a-ebSCOhost->
- Buchko, B. L., Gutshall, C. H., & Jordan, E. T. (2012). Improving quality and efficiency of postpartum hospital education. *The Journal of Perinatal Education*, 21(4), 238-247. doi:10.1891/1058-1243.21.4.238
- Center for Disease Control and Prevention. (2015). *National hospital ambulatory medical care survey: 2015 emergency department summary tables*. Retrieved from https://www.cdc.gov/nchs/data/nhamcs/web_tables/2015_ed_web_tables.pdf

Centers for Disease Control and Prevention. (2016). *Pregnancy mortality surveillance system*.

Retrieved from <http://www.cdc.gov/reproductivehealth/maternalinfanthealth/pmss.html>

Centers for Disease Control and Prevention. (2019a). Enhancing Reviews and Surveillance to

Eliminate Maternal Mortality (ERASE MM). Retrieved from

<https://www.cdc.gov/reproductivehealth/maternal-mortality/erase-mm/index.html>

Centers for Disease Control. (2019b). *Pregnancy-Related Deaths*. Retrieved from

[https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-](https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-relatedmortality.htm)

[relatedmortality.htm](https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-relatedmortality.htm)

Centers for Disease Control and Prevention. (2020b). *ICD-10-CM*. National Center for Health

Statistics. Retrieved from <https://icd10cmtool.cdc.gov/?fy=FY2020>

Conover, W. J., & Iman, R. L. (1981). Rank transformations as a bridge between parametric and

nonparametric statistics. *The American Statistician*, 35(3), 124-129.

<https://doi.org/10.1080/00031305.1981.10479327>

Cor, M. K. (2016). Trust me, it is valid: Research validity in pharmacy education

research. *Currents in Pharmacy Teaching and Learning*, 8(3), 391–400. [https://doi-](https://doi-org.lopes.idm.oclc.org/10.1016/j.cptl.2016.02.014)

[org.lopes.idm.oclc.org/10.1016/j.cptl.2016.02.014](https://doi-org.lopes.idm.oclc.org/10.1016/j.cptl.2016.02.014)

Creanga A., Berg C., Syverson, C., Seed, K., Bruce, F.C., Callaghan, W.M. (2015). Pregnancy-

related mortality in the United States, 2006–2010. *Obstetrics & Gynecology*, 125 (1), 5–

12. Retrieved from

[https://journals.lww.com/greenjournal/fulltext/2015/01000/Pregnancy_Related_Mortality](https://journals.lww.com/greenjournal/fulltext/2015/01000/Pregnancy_Related_Mortality_in_the_United_States,.3.aspx)

[_in_the_United_States,.3.aspx](https://journals.lww.com/greenjournal/fulltext/2015/01000/Pregnancy_Related_Mortality_in_the_United_States,.3.aspx)

- de Bocanegra, T. H., Braughton, M., Bradsberry, M., Howell, M., Logan, J., & Schwarz, E. B. (2017). Racial and ethnic disparities in postpartum care and contraception in California's Medicaid program. *American Journal of Obstetrics and Gynecology*, 217(47), 1-7. <https://doi-org.lopes.idm.oclc.org/10.1016/j.ajog.2017.02.040>
- Drummond, K. E. & Murphy-Reyes, A. (2018). Quantitative research designs: Experimental, quasi-experimental, and descriptive. In Drummond, K.E. & Murphy-Reyes, A. (Eds.), *Nutrition research: Concepts and applications* (pp. 155-183). Retrieved from https://samples.jbpub.com/9781284101539/9781284101539_CH06_Drummond.pdf
- Ehrenstein, V., Kharrazi, H., Lehmann, H., Taylor, C. (2019). Electronic health records. In Gliklich, R.E., Leavy, M.B., Dreyer, N.A., (Eds). *Tools and technologies for registry interoperability, registries for evaluating patient outcomes: A user's guide* (3rd ed.). Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK551878/>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160. DOI: 10.3758/BRM.41.4.1149
- Fung, C. S. C., Wong, C. K. H., Fong, D. Y. T., Lee, A., & Lam, C. L. K. (2015). Having a family doctor was associated with lower utilization of hospital-based health services. *BMC Health Services Research*, 15(1), 1–9. <https://doi-org.lopes.idm.oclc.org/10.1186/s12913-015-0705-7>
- Goertzen, M.J. (2017). Introduction to quantitative research and data. *Library Technology Reports*, 53(4), 1. Retrieved from <https://journals.ala.org/index.php/ltr/article/view/6325/8275>

- Handley, M.A., Lyles, C.R., McCulloch, C., Adithya, C. (2018). Selecting and improving quasi-experimental designs in effectiveness and implementation research. *Annual Review of Public Health, 39*(1), 5-25. Retrieved from https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-040617-014128#_i5
- Harris, A., Chang, H.Y., Wang, L... Bennet, W. (2015). Emergency room utilization after medically complicated pregnancies: A Medicaid claims analysis. *Journal of Women's Health, 24* (5), 745–54. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4589304/>
- Hartnett, K.P., Kite-Powell, A., DeVies, J... Gundlapalli, A.V. (2020). Impact of the COVID-19 pandemic on emergency department visits — United States, January 1, 2019–May 30, 2020. Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report, 2020 (69), 699-704. DOI: <http://dx.doi.org/10.15585/mmwr.mm6923e1external> icon.
- Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-Based Nursing, 18*(1):66-67. <http://dx.doi.org/10.1136/eb-2015-102129>
- Honigman, L. S., Wiler, J. L., Rooks, S., & Ginde, A. A. (2013). National study of non-urgent emergency department visits and associated resource utilization. *The Western Journal of Emergency Medicine, 14*(6), 609–616. <https://doi.org/10.5811/westjem.2013.5.16112>
<https://www.medicalrecords.com/mrcbase/emr/cerner-powerchart>
- Howell, D. C. (2013). *Statistical methods for psychology* (8th ed.). Belmont CA: Wadsworth Cengage Learning.
- Intellectus Statistics [Online computer software]. (2020). Intellectus Statistics. Retrieved from <https://analyze.intellectusstatistics.com/>

- Izudi, J., Akwang, D. G., McCoy, S. I., Bajunirwe, F., & Kadengye, D. T. (2019). Effect of health education on birth preparedness and complication readiness on the use of maternal health services: A propensity score-matched analysis. *Midwifery*, 78, 78–84. <https://doi-org.lopes.idm.oclc.org/10.1016/j.midw.2019.08.003>
- Jain, J. & Moroz, L. (2017). Strategies to reduce disparities in maternal morbidity and mortality: Patient and provider education. *Seminars in Perinatology*, 41(4), 323-328. doi 10.1053/j.semperi.2017.04.010.
- Kilfoyle, K. A., Vrees, R., Raker, C. A., & Matteson, K. A. (2017). Non-urgent and urgent emergency room use during pregnancy: An observational study. *American Journal of Obstetrics and Gynecology*, 216(2), 181. <https://doi-org.lopes.idm.oclc.org/10.1016/j.ajog.2016.10.013>
- Kim, T. K. (2015). T test as a parametric statistic. *Korean Journal of Anesthesiology*, 68(6), 540–546. doi:10.4097/kjae.2015.68.6.540
- Kleppel, L., Suplee, P. D., Stuebe, A. M., & Bingham, D. (2016). National initiatives to improve systems for postpartum care. *Maternal and Child Health Journal*, 66 (1), 66-70. doi:10.1007/s10995-016-2171-1
- Knapp, T.R. (2016). Why is the one-group pretest–posttest design still used? *Clinical Nursing Research*, 25(5), 467-472. Retrieved from <https://doi.org/10.1177/1054773816666280>
- Köhler, T., Landis, R. S., & Cortina, J. M. (2017). Establishing methodological rigor in quantitative management learning and education research: The role of design, statistical methods, and reporting standards. *Academy of Management Learning & Education*, 16(2), 173–192. <https://doi-org.lopes.idm.oclc.org/10.5465/amle.2017.0079>

- Kretchmar, J. (2019). Cognitive Theories. *Salem Press Encyclopedia*. Retrieved from <https://search-ebshost.com.lopes.idm.oclc.org/login.aspx?direct=true&db=ers&AN=89164114&site=eds-live&scope=site>
- Levene, H. (1960). Contributions to Probability and Statistics. *Essays in honor of Harold Hotelling*, I. Olkin et al. eds., Stanford University Press, 278-292.
- Logsdon, M. C., Davis, D. W., Myers, J. A., Masterson, K. M., Rushton, J. A., & Lauf, A. P. (2018). Do new mothers understand the risk factors for maternal mortality? *The American Journal of Maternal Child Nursing*, 43(4), 201–205. <https://doi.org/10.1097/NMC.0000000000000434>
- Luo, F.Y., Crawford, S. Drouin, O. & Chada, R. (2018). Can we predict and prevent emergency room visits for postpartum hypertensive complications in patients with hypertensive disorders in pregnancy? *Journal of Community Hospital Internal Medicine Perspectives*, 33(13), 1-5. <https://doi.org/10.1080/14767058.2018.1547703>
- Mahajan, A., Kemp, A., Hawkins, T. L.-A., Metcalfe, A., Dowling, S., & Nerenberg, K. (2020). Postpartum hypertensive disorders in the Emergency room – A retrospective review of local practice in Calgary, Alberta. *Pregnancy Hypertension: An International Journal of Women's Cardiovascular Health*, 19 (2020), 212–217. <https://doi-org.lopes.idm.oclc.org/10.1016/j.preghy.2019.11.009>
- Main, E. K., McCain, C., L. Morton, C.H., Holtby, S., & Lawton, E. S. (2015). Pregnancy-related mortality in California: Causes, characteristics, and improvement opportunities. *Obstetrics and Gynecology*, 125 (4), 938-947. Doi:10.1097/AOG.0000000000000746

Main, M. & Ogaz, V. (2016). Common statistical tests and interpretation in nursing research.

International Journal of Faith Community Nursing, 2(3), 4-9. Retrieved from

<http://digitalcommons.wku.edu/cgi/viewcontent.cgi?article=1035&context=ijfcn>

Malagon, M. G., Connelly, C. D., & Bush, R. A. (2017). Predictors of readiness for hospital

discharge after birth: Building evidence for practice. *Worldviews on Evidence-Based*

Nursing, 14(2), 118–127. Retrieved from <https://doi->

[org.lopes.idm.oclc.org/10.1111/wvn.12208](https://doi-)

Marco, C.A., Thomas, K., Rzecznik, W. (2019). *Postpartum emergencies*. Emergency Medicine

Reports. Retrieved from <https://www.reliasmedia.com/articles/145171-postpartum->

[emergencies](https://www.reliasmedia.com/articles/145171-postpartum-)

Mayo Clinic. (2018). *Amniotic fluid embolism*. Mayo Foundation for Medical Education and

Research. Retrieved from <https://www.mayoclinic.org/diseases-conditions/amniotic->

[fluid-embolism/symptoms-causes/syc-20369324](https://www.mayoclinic.org/diseases-conditions/amniotic-)

Mayo Clinic. (2020). *Preeclampsia*. Mayo Foundation for Medical Education and Research.

Retrieved from <https://www.mayoclinic.org/diseases-conditions/preeclampsia/symptoms->

[causes/syc-](https://www.mayoclinic.org/diseases-conditions/preeclampsia/symptoms-)

[20355745#:~:text=Blood%20pressure%20that%20exceeds%20140,Severe%20headaches](https://www.mayoclinic.org/diseases-conditions/preeclampsia/symptoms-)

McCarter, D., & MacLeod, C. E. (2019). What do women want? Looking beyond patient

satisfaction. *Nursing for Women's Health*, 23(6), 478–484.

<https://doi.org/10.1016/j.nwh.2019.09.002>

- Melnyk, B.M., Morrison-Beedy, D., & Cole, R. (2015). Evidence through quantitative research. In Melnyk, B.M., & Fineout-Overholt, E. (2015). *Evidence-Based Practice in Nursing and Healthcare: A Guide to Best Practice*. Philadelphia, PA. Wolters- Kluwer. Retrieved from http://gcumedia.com/digital-resources/wolters-kluwer/2014/evidence-based-practice-in-nursing-and-healthcare_a-guide-to-best-practice_ebook_3e.php
- Merriam-Webster. (n.d.). Gravity. In *Merriam-Webster.com medical dictionary*. Retrieved from <https://www.merriam-webster.com/medical/gravity>
- Montgomery, T. M., & Laury, E. (2019). A call for comprehensive care in the fourth trimester. *Nursing for Women's Health*, 23(3), 194-199. <https://doi-org.lopes.idm.oclc.org/10.1016/j.nwh.2019.03.006>
- Morgan, I., Hughes, M. E., Belcher, H., & Holmes, L. (2018). Maternal sociodemographic characteristics, experiences and health behaviors associated with postpartum care utilization: Evidence from Maryland PRAMS dataset, 2012-2013. *Maternal & Child Health Journal*, 22(4), 589–598. <https://doi-org.lopes.idm.oclc.org/10.1007/s10995-018-2428-y>
- Morton, C.H., Peterson, N. (2014). Improving outcomes of preeclampsia in California: From review of maternal death to quality care collaboratives. *Journal of Obstetrics, Gynecological, and Neonatal Nursing*, 43(1), 74-75. <https://doi.org/10.1111/1552-6909.12453>

- Morton, C.H., Seacrist, M.J., VanOtterloo, L.R., & Main, E.K. (2019a). Quality improvement opportunities identified through case review of pregnancy-related deaths from preeclampsia/eclampsia. *Journal of Obstetric, Gynecological, and Neonatal Nursing*, 48(3), 275-287. <https://doi.org/10.1016/j.jogn.2019.02.008>
- Morton, C.H., VanOtterloo, L.R., Seacrist, M.J., & Main, E.K. (2019b). Translating maternal mortality review into quality improvement opportunities in response to pregnancy-related deaths in California. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 48 (3), 252 – 262. DOI: [https://www.jognn.org/article/S0884-2175\(19\)30044-9/fulltext](https://www.jognn.org/article/S0884-2175(19)30044-9/fulltext)
- Mselle, L.T., Aston, M., Kohi, T. W...Jefferies, K. (2017). The challenges of providing postpartum education in Dar es Salaam, Tanzania: Narratives of nurse-midwives and obstetricians. *Qualitative Health Research*, 27(12):1792-1803. doi: 10.1177/1049732317717695
- Nahm, F.S. (2016). Nonparametric statistical tests for the continuous data: The basic concept and the practical use. *Korean Journal of Anesthesiology*, 69(1), 8-14. doi: 10.4097/kjae.2016.69.1.8.
- National Center for Medical Records. (2020a). Cerner EMR software. Retrieved from <https://www.medicalrecords.com/mrcbase/emr/cerner-emr-software#:~:text=The%20Cerner%20electronic%20medical%20record,acute%20and%20ambulatory%20care%20setting.>
- New England Healthcare Institute. (2010). *A matter of urgency: Reducing emergency department overuse*. Retrieved from https://www.nehi.net/writable/publication_files/file/nehi_ed_overuse_issue_brief_032610_finaledits.pdf

- North Dakota Department of Health and the Department of Commerce. (2020). *ND smart restart* (VERSION 200522-12.1-14:30). Retrieved from <https://ndresponse.gov/sites/www/files/documents/covid-19/ND%20Smart%20Restart/Additional%20Resources/NDSmartRestartPlan.pdf>
- Office for Human Research Protections. (2018). *The Belmont Report*. Department of Health, Education, and Welfare. Retrieved from https://www.hhs.gov/ohrp/sites/default/files/the-belmont-report-508c_FINAL.pdf
- Parekh, N., Jarlenski, M., & Kelley, D. (2018). Prenatal and postpartum care disparities in a large Medicaid program. *Maternal & Child Health Journal*, 22(3), 429–437. <https://doi.org/10.1007/s10995-017-2410-0>
- Parsons, A., McCullough, C., Wang, J., & Shih, S. (2012). Validity of electronic health record-derived quality measurement for performance monitoring. *Journal of the American Medical Informatics Association*, 19(4), 604–609. <https://doi.org/10.1136/amiajnl-2011-000557>
- Pérez, F. E., Augé, K. N., González, G. J., Pust, B. A., Panadés, P. A., & Collado, C. R. (2018). Inadequate visits to the emergency department by pregnant women. *Journal of Obstetrics and Gynaecology*, 38(2), 161–166. Retrieved from <https://doi.org/10.1080/01443615.2017.1328672>
- Pérez-Martínez, E., Sebastián-Viana, T., Velasco-Vázquez, D., & Del Gallego-Lastra, R. (2019). Postpartum complications in women attended by midwives instead of obstetricians. *Midwifery*, 75(2019), 80–88. <https://doi.org/10.1016/j.midw.2019.04.009>

- Petersen, E.E., Davis, N.L., Goodman, D., Cox, S., Mayes, N., Johnston, E...Barfield, W. (2019). Vital signs: Pregnancy-related deaths, United States, 2011–2015, and strategies for prevention, 13 States, 2013–2017. *Maternal Mortality Weekly Review*, 68(18), 423–429. <http://dx.doi.org/10.15585/mmwr.mm6818e1> external icon
- Phiri, P. W. C., Rattanapan, C., & Mongkolchati, A. (2015). Determinants of postnatal service utilisation among mothers in rural settings of Malawi. *Health and Social Care in the Community*, 23(5), 493-501. <https://doi-org.lopes.idm.oclc.org/10.1111/hsc.12165>
- Pourat, N., Davis, A.C., Chen, X., Vrungos, S., Kominski, G.F. (2015). In California, primary care continuity was associated with reduced emergency room use and fewer hospitalizations. *Health Affairs*, 34(7), 1113–1120. doi:10.1377/hlthaff.2014.1165
- Presidential Commission for the Study of Bioethical Issues. (2016). *Vulnerable populations background*. Retrieved from: <https://bioethicsarchive.georgetown.edu/pcsbi/sites/default/files/3%20Vulnerable%20Populations%20Background%209.30.16.pdf>
- Ronksley, P.E., Liu, E.Y., McKay, J.A...Forster, A.J. (2016). Variations in resource intensity and cost among high users of the emergency room. *Academic Emergency Medicine*, 23(6), 722–730. doi: 10.1111/acem.12939
- Sabitha, K.R., & Shiny, P. (2015). Effectiveness of information, education, and communication (IEC) programme on maternal role adaptation during postpartum period in a selected hospital, Mangalore. *International Journal of Nursing Education*, 7(3), 233–235. <https://doi-org.lopes.idm.oclc.org/10.5958/0974-9357.2015.00171.3>

- Scovell, S., Alguire, P.C. (2020). Overview of lower extremity chronic venous disease. In J.F. Eidt, J.L. Mills, & K.A. Collins (Ed.) *UpToDate*. Retrieved from https://www.uptodate.com/contents/overview-of-lower-extremity-chronic-venous-disease?search=postpartum%20breast%20issues&topicRef=127985&source=see_link
- Seacrist, M., Bingham, D., Scheich, B., & Byfield, R. (2018). Barriers and facilitators to implementation of a multistate collaborative to reduce maternal mortality from postpartum hemorrhage. *Journal of Obstetrics, Gynecology, and Neonatal Nursing*, 47(5), 688-697. <https://doi.org/10.1016/j.jogn.2017.11.009>
- Seacrist, M.J., VanOtterloo, L.R., Morton, C.H., Main, E.K. (2019). Quality improvement opportunities identified through case review of pregnancy-related deaths from obstetric hemorrhage. *Journal of Obstetrics, Gynecology, and Neonatal Nursing*, 48(3), 288-299. DOI: <https://doi.org/10.1016/j.jogn.2019.03.002>. Retrieved from: [https://www.jognn.org/article/S0884-2175\(19\)30043-7/fulltext](https://www.jognn.org/article/S0884-2175(19)30043-7/fulltext)
- Sharma, K. J., & Kilpatrick, S. J. (2017). Postpartum hypertension: Etiology, diagnosis, and management. *Obstetrical & Gynecological Survey*, 72(4), 248–252. <https://doi.org/10.1097/OGX.0000000000000424>
- Sheen, J.J., Smith, H. A., Tu, B., Liu, Y., Sutton, D., & Bernstein, P. S. (2019). Risk factors for postpartum emergency department visits in an urban population. *Maternal & Child Health Journal*, 23(4), 557–566. Retrieved from [https://doi-org.lopes.idm.oclc.org/10.1007/s10995-018-2673-0](https://doi.org.lopes.idm.oclc.org/10.1007/s10995-018-2673-0)

- Shields, L. Wiesner, S., Pelletreau, B., Hedriana, H. (2016). Use of maternal early warning trigger (MEWT) tool reduces maternal morbidity. *American Journal of Obstetrics and Gynecology*, 214(1), S5–S6. <https://doi-org.lopes.idm.oclc.org/10.1016/j.ajog.2015.10.028>
- Smith, C.C. (2020). Clinical manifestations and evaluation of edema in adults. In M. Emmet & L. Kunins (Ed.) *UpToDate*. Retrieved from https://www.uptodate.com/contents/clinical-manifestations-and-evaluation-of-edema-in-adults?search=postpartum%20breast%20issues&topicRef=8181&source=see_link
- Stikes, R., Arterberry, K. & Logsdon, C. (2015). A nurse leadership project to improve health literacy on a maternal-infant unit. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 44(5), 665 – 676. [https://www.jognn.org/article/S0884-2175\(15\)35316-8/fulltext](https://www.jognn.org/article/S0884-2175(15)35316-8/fulltext)
- Suplee, P. D., Kleppel, L., & Bingham, D. (2016a). Discharge education on maternal morbidity and mortality provided by nurses to women in the postpartum period. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 45(6), 894-904. doi: 10.1016/j.jogn.2016.07.006
- Suplee, P. D., Kleppel, L., Santa-Donato, A., & Bingham, D. (2016b). Improving postpartum education about warning signs of maternal morbidity and mortality. *Nursing for Women's Health*, 20(6), 552-567. doi: 10.1016/j.nwh.2016.10.009
- Suplee, P., Bingham, D., & Kleppel, L. (2017). Nurses' knowledge and teaching of possible postpartum complications. *MCN, The American Journal of Maternal/Child Nursing*, 42(6), 338. doi:10.1097/NMC.0000000000000371

- Sylvia, M. (2014). Basic Statistical Concepts and Power Analysis. In Sylvia, M. L., & Terhaar, M. F. (2014). *Clinical analytics and data management for the DNP*. New York, NY: Springer. ISBN-13: 9780826129734. Retrieved from http://gcumedia.com/digital-resources/springer-publishing-company/2014/clinical-analytics-and-data-management-for-the-dnp_ebook_1e.php
- Tsai, M., Xirasagar, S, Carrol, S.... Jauch, E. (2018). Reducing high-users' visits to the emergency room by a primary care intervention for the uninsured: A retrospective study. *The Journal of Health Care Organization, Provision, and Financing*, 55, 1–12. DOI: 10.1177/0046958018763917
- Tulman, L. & Fawcett, J. (2003). A theory of adaptation during childbirth. In Tulman, L. & Fawcett, J. (Eds). *Women's health during and after pregnancy: A theory-based study of adaptation to change*. pp. 3-12. Retrieved from <https://books.google.com/books?id=Z8afZBRBXqsC&printsec=frontcover#v=onepage&q&f=false>
- Tymkow, C. (2017). Clinical scholarship and evidence-based practice. In Zaccagnini, M. E., & White, K. W. (2017). *The Doctor of Nursing practice essentials: A new model for advanced practice nursing* (3rd ed.) Sudbury, MA: Jones and Bartlett. ISBN-13: 9781449687137. Retrieved from http://www.gcumedia.com/digital-resources/jones-and-bartlett/2015/the-doctor-of-nursing-practice-essentials_3e.php

U.S. Department of Health & Human Services, Office for Civil Rights Headquarters. (2018).

Does the HIPAA Privacy Rule require covered entities to keep patients' medical records for any period of time? Retrieved from <https://www.hhs.gov/hipaa/for-professionals/faq/580/does-hipaa-require-covered-entities-to-keep-medical-records-for-any-period/index.html>

United States Census Bureau. (2019). QuickFacts: North Dakota. Retrieved from

<https://www.census.gov/quickfacts/northdakota>

Verbiest, S., Tully, K., Simpson, M., & Stuebe, A. (2018). Elevating mothers' voices:

recommendations for improved patient-centered postpartum. *Journal of Behavioral Medicine*, 41(5), 577–590. <https://doi-org.lopes.idm.oclc.org/10.1007/s10865-018-9961-4>

Weissmann-Brenner, A., Heusler, I., Manteka, R., Dulitzky, M., & Baum, M. (2020). Postpartum

visits in the gynecological emergency room: How can we improve? *BMC Pregnancy & Childbirth*, 20(1), 1–8. <https://doi-org.lopes.idm.oclc.org/10.1186/s12884-020-02927-7>

Wilcox, A., Levi, E., & Garrett, J. (2016). Predictors of non-attendance to the postpartum follow-

up visit. *Maternal & Child Health Journal*, 20, 22–27. <https://doi-org.lopes.idm.oclc.org/10.1007/s10995-016-2184-9>

World Health Organization. (2015). *Postnatal care guidelines*. Postnatal Care for Mothers and

Newborns. Retrieved from

https://www.who.int/maternal_child_adolescent/publications/WHO-MCA-PNC-2014-Briefer_A4.pdf

World Health Organization. (2019). *Maternal-mortality ratio (per 100,000 live births)*. Retrieved

from <https://www.who.int/healthinfo/statistics/indmaternalmortality/en/>



Appendix A

Grand Canyon University Institutional Review Board Letter

3300 West Camelback Road, Phoenix Arizona 85017 602.639.7500 Toll Free 800.800.9776 www.gcu.edu

DATE: August 21, 2020
TO: Baljit Pannu
FROM: Grand Canyon University Institutional Review Board

STUDY TITLE: Impact of Standardized Postpartum Discharge Education in Reducing
Non-Urgent Emergency Room Visits

IRB

REFERENCE #: IRB-2020-2554

SUBMISSION

TYPE: Submission Response for Initial Review Submission Packet

ACTION: Determination of Exempt Status

DECISION

DATE: August 21, 2020

REVIEW

CATEGORY: Category 1

Thank you for submitting your study materials.

GCU is not the IRB of record as prior IRB approval as been obtained from [REDACTED] Hospitals Institutional Review Board (IRB). Exempt approval was obtained on August 20, 2020.

Grand Canyon University Institutional Review Board has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations. You now have GCU IRB approval to collect data.

If applicable, please use the approved recruitment script and informed consent(s) that are included in your published documents.

We will put a copy of this correspondence on file in our office.

If you have any questions, please contact the IRB office at irb@gcu.edu or 602-639-7804. Please include your study title and reference number in all correspondence with this office.

Dr. Cynthia Bainbridge
Assistant Dean, Research and Dissertations

Director, Institutional Review Board College of Doctoral Studies

Appendix B

AWHONN's Standardized Postpartum Discharge Education

POST-BIRTH WARNING SIGNS: STANDARDIZED POSTPARTUM DISCHARGE EDUCATION CHECKLIST



POST-
BIRTH

This checklist is a teaching guide for nurses to use when educating all women about the essential warning signs that can result in maternal morbidity and/or mortality.

Instructions:

- Instruct ALL women about all of the following potential complications. All teaching should be documented on this form or in your facility's electronic health record.
- Focus on risk factors for a specific complication first; then review all warning signs.
- Emphasize that women do not have to experience ALL of the signs in each category for them to seek care.
- Encourage the woman's significant other or her designated family members to be included in education whenever possible.
- The information included on this checklist is organized according to complications that can result in severe maternal morbidity or maternal mortality. Essential teaching points should be included in all postpartum discharge teaching.
- The parent handout, "Save Your Life", is designed to reinforce this teaching. This handout is organized according to AWHONN's acronym, POST-BIRTH, to help everyone remember the key warning signs and when to call 911 or a health provider. A portion of this handout is below for reference.

<p>Call 911 if you have:</p>	<p>Pain in chest Obstructed breathing or shortness of breath Seizures Thoughts of hurting yourself or your baby</p>
<p>Call your healthcare provider if you have: (If you can't reach your healthcare provider, call 911 or go to an emergency room)</p>	<p>Bleeding, soaking through one pad/hour, or blood clots, the size of an egg or bigger Incision that is not healing Red or swollen leg, that is painful or warm to touch Temperature of 100.4°F or higher Headache that does not get better, even after taking medicine, or bad headache with vision changes</p>

Below is a suggested conversation-starter:

"Although most women who give birth recover without problems, any woman can have complications after the birth of a baby. Learning to recognize these POST-BIRTH warning signs and knowing what to do can save your life. I would like to go over these POST-BIRTH warning signs with you now, so you will know what to look for and when to call 911 or when to call your healthcare provider. Please share this with family and friends and post the "Save Your Life" handout in a place where you can get to it easily (like your refrigerator)."



This program is supported by funding from Merck, through Merck for Mothers, the company's 10-year, \$500 million initiative to help create a world where no woman dies giving life. Merck for Mothers is known as MSD for Mothers outside the United States and Canada.
 ©2017 Association of Women's Health, Obstetric, and Neonatal Nurses. All rights reserved. Requests for permission to use or reproduce should be directed to permissions@awhonn.org



POST-BIRTH Warning Signs: Postpartum Discharge Education

Pulmonary Embolism	Essential Teaching for Women
What is Pulmonary Embolism?	Pulmonary embolism is a blood clot that has traveled to your lung.
Signs of Pulmonary Embolism	<ul style="list-style-type: none"> • Shortness of breath at rest (e.g., tachypneic shallow, rapid respirations) • Chest pain that worsens when coughing • Change in level of consciousness
Obtaining Immediate Care	Call 911 or go to nearest emergency room RIGHT AWAY .

RN initials _____ Date _____

Family/support person present? YES / NO

Cardiac (Heart) Disease	Essential Teaching for Women
What is Cardiac Disease?	Cardiac disease is when your heart is not working as well as it should and can include a number of disorders that may have different signs and symptoms.
Signs of Potential Cardiac Emergency	<ul style="list-style-type: none"> • Shortness of breath or difficulty breathing • Heart palpitations (feeling that your heart is racing) • Chest pain or pressure
Obtaining Immediate Care	Call 911 or go to nearest emergency room RIGHT AWAY .

RN initials _____ Date _____

Family/support person present? YES / NO

Hypertensive Disorders of Pregnancy	Essential Teaching for Women
What is Severe Hypertension?	Hypertension is when your blood pressure is much higher than it should be.
Signs of Severe Hypertension	<ul style="list-style-type: none"> • Severe constant headache that does not respond to over-the-counter pain medicine, rest, and/or hydration
What is Preeclampsia/Eclampsia?	Preeclampsia is a complication of pregnancy that includes high blood pressure and signs of damage to other organ systems. Eclampsia is the convulsive phase of preeclampsia, characterized by seizures.
Signs of Preeclampsia	<ul style="list-style-type: none"> • Severe constant headache that does not respond to pain medicine, rest, and/or hydration • Changes in vision, seeing spots, or flashing lights • Pain in the upper right abdominal area • Swelling of face, hands, and/or legs more than what you would expect • Change in level of consciousness
Signs of Eclampsia	<ul style="list-style-type: none"> • Seizures
Obtaining Immediate Care	Call 911 for seizures. Call healthcare provider immediately for any other signs. If symptoms worsen or no response from provider/clinic, call 911 or go to nearest emergency room.

RN initials _____ Date _____

Family/support person present? YES / NO

Obstetric Hemorrhage	Essential Teaching for Women
What is Obstetric Hemorrhage?	Obstetric hemorrhage is when you have an excess amount of bleeding after you have delivered your baby.
Signs of Obstetric Hemorrhage	<ul style="list-style-type: none"> • Bleeding through more than 1 sanitary pad/hour • Passing 1 or more clots the size of an egg or bigger • Character of clots/differentiation of bright red bleeding from dark with clots
Obtaining Immediate Care	Call healthcare provider immediately for signs of hemorrhage. If symptoms worsen or no response from provider/clinic, call 911 or go to nearest emergency room.

RN initials _____ Date _____

Family/support person present? YES / NO



Page 1 of 2



POST-BIRTH Warning Postpartum Discharge Education

Venous Thromboembolism	Essential Teaching for Women
What is Venous Thromboembolism?	Venous thromboembolism is when you develop a blood clot usually in your leg (calf area).
Signs of Venous Thromboembolism	<ul style="list-style-type: none"> • Leg pain, tender to touch, burning, or redness, particularly in the calf area • Swelling of one leg more than the other
Obtaining Immediate Care	Call healthcare provider immediately for above signs of venous thromboembolism. If symptoms worsen or no response from provider/clinic, call 911 or go to nearest emergency room.

RN initials _____ Date _____

Family/support person present? YES / NO

Infection	Essential Teaching for Women
What is Infection?	An infection is an invasion of bacteria or viruses that enter and spread through your body, making you ill.
Signs of Infection	<ul style="list-style-type: none"> • Temp is $\geq 100.4^{\circ}\text{F}$ ($\geq 38^{\circ}\text{C}$) • Bad smelling blood or discharge from the vagina • Increase in redness or discharge from episiotomy or C-Section site or open wound not healing
Obtaining Immediate Care	Call healthcare provider immediately for above signs. If symptoms worsen or no response from provider/clinic, call 911 or go to nearest emergency room.

RN initials _____ Date _____

Family/support person present? YES / NO

Postpartum Depression	Essential Teaching for Women
What is Postpartum Depression (PPD)?	Postpartum depression is a type of depression that occurs after childbirth. PPD can occur as early as one week up to one year after giving birth.
Signs of Postpartum Depression	<ul style="list-style-type: none"> • Thinking of hurting yourself or your baby • Feeling out of control, unable to care for self or baby • Feeling depressed or sad most of the day every day • Having trouble sleeping or sleeping too much • Having trouble bonding with your baby
Obtaining Immediate Care	Call 911 or go to nearest emergency room if you feel you might harm yourself or your baby. Call healthcare provider immediately for other signs of depression (sadness, withdrawn, difficulty coping with parenting).

RN initials _____ Date _____

Family/support person present? YES / NO

	Essential Teaching for Women
<p style="text-align: center;">Follow-Up Appointment</p>	<ul style="list-style-type: none"> • Discuss importance of follow-up visit with doctor, nurse practitioner or midwife in 4–6 weeks (or sooner if health status warrants it) • Provide correct phone number for appointment • Emphasize importance of notifying all healthcare providers of delivery date up to one year after birth of baby • Confirm date for postpartum appointment prior to discharge

RN initials _____ Date _____

Family/support person present? YES / NO

I have received and understand the POST-BIRTH Warning Signs education and handout.

Patient Signature: _____ Date/Time: _____

The patient received the POST-BIRTH Warning Signs education and a copy of the “Save Your Life” handout.

Nurse Initials and Signature: _____

Date/Time: _____

16003



Appendix C

Permission to use Standardized Postpartum Discharge Education



PERMISSIONS AGREEMENT

Date: 6/11/2020

To: Baljit K. Pannu RN, BSN, MN
Bdosanjh87@gmail.com

From: Jill Leonard, Permissions Manager, AWHONN
1800 M St NW, #740 South
Washington, DC 20036 USA

Conditions of Agreement

Permission is hereby granted to use the AWHONN POST-BIRTH Warning Signs Patient Handout and POST BIRTH Nurse Checklist for educational purposes in your capstone doctoral program at Grand Canyon university and carried out at XXX in North Dakota.

If the XXX Hospital adopts the AWHONN PBWS materials as part of its policy after your research project is complete, then Trinity Hospital will be required to make minimum purchases of AWHONN POST BIRTH Warning Signs education as outlined at <https://awhonn.org/education/hospital-products/post-birth-warning-signs-educationprogram/>.

Credit Line to be used under the image on all slides/screen: Reprinted with permission from the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN).

-
1. You will include a source line/citation with reference to AWHONN as the source.
 2. You warrant that the material shall not be used in any way that is derogatory to the title, content, or authors of the material or to AWHONN.
 3. Permission is granted for one-time use only and is non-transferable. Rights herein do not apply to future reproductions, editions, revisions, or other derivative works. Permission is non-exclusive, and is valid in the English language only and is valid only for the medium set forth as agreed upon.
 4. Permission is granted only to the extent the material is owned by AWHONN. AWHONN makes no warranty regarding the extent of

Appendix D

Postpartum Emergency Room Visit Coding Sheet

Postpartum Complication	Definition of postpartum complication	International classification of disease tenth revision code, classification modification (ICD-10-CM)
Urgent postpartum complications warranting ER visits Postpartum hemorrhage	Excessive bleeding after delivery of baby (AWHONN, 2017; Belfort, 2020). Blood loss of >1000ml suggests postpartum hemorrhage (Belfort, 2020).	O72.0 Retained placenta O72.1 Other immediate postpartum hemorrhage O72.2 Delayed and secondary postpartum hemorrhage O72.3 Postpartum coagulation defects* R58 Hemorrhage concealed N93.9 Hemorrhage uterus (abnormal)
Hypertension Disorders of Pregnancy Postpartum Hypertension	Severe high blood pressure (consistently >140 mm Hg systolic and >90 diastolic mm Hg) on two or more occasions, with readings four hours apart (Sharma & Kilpatrick, 2017)	O10.03 Hypertension complicating puerperium essential O10.43 Hypertension complicating puerperium secondary O11.5 Hypertension complicating puerperium with pre-eclampsia O13.9 Hypertension complicating puerperium pregnancy-induced O16.5 Hypertension complicating puerperium
Pre-eclampsia	Postpartum complication including high blood pressure (> 140/90) and damage to other organs (Mayo Clinic, 2020)	O14.0 Mild to moderate pre-eclampsia O14.05 Mild to moderate pre-eclampsia, complicating the puerperium O14.15 Severe pre-eclampsia, complicating the puerperium O14.25 HELLP syndrome, complicating the puerperium** O14.95 Unspecified pre-eclampsia, complicating the puerperium
Eclampsia	Convulsive stage of pre-eclampsia (AWHONN, 2017)	O15 Eclampsia O15.2 Eclampsia complicating the puerperium

		O15.9 Eclampsia, unspecified as to time period
Venous Thromboembolism	Development of a blood clot in a vein (typically in leg) (AWHONN, 2017)	O88 Obstetric embolism O88.03 Air embolism in the puerperium O88.2 Obstetric thromboembolism O88.3 Obstetric pyemic and septic embolism O88.8 Other obstetric embolism O88.1 Amniotic fluid embolism***
Pulmonary Embolism	Blood clot that has travelled to the lungs (AWHONN, 2017)	O88.23 Obstetric pulmonary embolism puerperal**** O88.03 Obstetric pulmonary air embolism puerperal O88.13 Obstetric pulmonary amniotic fluid embolism puerperal O88.33 Obstetric pulmonary septic embolism puerperal O88.83 Obstetric pulmonary fat embolism puerperal
Infection	Invasion of bacteria or viruses throughout the body making individuals ill. Often represented by high fevers ($\geq 100.4^{\circ}\text{F}$) (AWHONN, 2017).	O85 Puerperium generalized Infection O86.4 Puerperium Infection O86.09 Infection obstetric surgical wound O98.93 Maternal infection O98.43 Viral hepatitis complicating the puerperium O98.53 Other viral diseases complicating the puerperium O98.83 Other maternal infectious and parasitic diseases complicating the puerperium O98.93 Unspecified maternal infectious and parasitic disease complicating the puerperium
Sepsis	Sepsis is a response to untreated infection that damages organs and tissues (Bonet et al., 2017)	O85 Puerperal sepsis A41 Other sepsis
Postpartum Depression	Depression occurring after birth; Postpartum depression can occur	F53 Mental and behavioral disorders associated with the puerperium, not elsewhere classified

	one week postpartum to one year postpartum (AWHONN, 2017)	F53.0 Postpartum depression F53.1 Puerperal psychosis O90.6 Postpartum mood disturbance
Cardiac Disease	Cardiac disease is when the heart is not working optimally and can include several different disorders (AWHONN, 2017).	O90.3 Cardiomyopathy postpartum O89.1 Cardiac complications of anesthesia during the puerperium O90.3 Peripartum cardiomyopathy
Non-urgent postpartum complications (warrants medical care through primary provider)		
Urinary Tract infection	Urinary tract infection is an infection of the urinary tract including urethra and bladder (Berens, 2020).	N39 Urinary tract infection O86.20 Infection urinary tract puerperium O86.22 Infection urethra O86.4 Infection urinary (asymptomatic)
Breast issues	Breast issues include issues with lactation, breast engorgement, and cracked nipples. (Brousseau et al., 2018a)	O92 Other disorders of breast and disorders of lactation associated with pregnancy and the puerperium O91.03 postpartum complication associated with lactation O91.03 Engorgement, breast, postpartum O92.02 Retraction, nipple, associated with puerperium O92.12 Cracked nipple associated with puerperium O92.13 Cracked nipple associated with lactation O92.2 Other and unspecified disorders of breast associated with pregnancy and the puerperium O92.29 Other disorders of breast associated with pregnancy and the puerperium O92.3 Agalactia (failed lactation) O92.4 Hypogalactia (low breastmilk supply) O92.5 Suppressed lactation O92.6 Excessive lactation O92.70 Unspecified disorders of lactation

		<p>O92.79 Other disorders of lactation N64.53 Retraction nipple N64.59 Engorgement breast N64.9 Disorder of breast, unspecified</p>
Postpartum Anemia	<p>Postpartum anemia is low hemoglobin after delivery and is often caused by iron deficiency or excessive blood loss during delivery. Non-urgent postpartum anemia includes hemoglobin of <11g/dl but >7g/dl, where any value < 7g/dl, requires blood transfusion. (Belfort, 2020).</p>	<p>O90.81 Anemia of the puerperium D64.9 Anemia, unspecified</p>
Non-urgent wound issues	<p>Non-urgent wound complications include localized issues with cesarean or episiotomy incision without infection (Berens, 2020).</p>	<p>O90.0 Disruption of cesarean delivery wound O90.1 Disruption of perineal obstetric wound O90.2 Hematoma of obstetric wound</p>
Generalized edema	<p>Edema is noticeable swelling due to an increase of body fluid and can occur after surgery (Smith, 2020)</p>	<p>O12.0 Gestational edema O12.04 Gestational edema in childbirth O12.05 Gestational edema in puerperium R60.1 Generalized edema</p>
Varicose veins	<p>Varicose veins can occur during and after pregnancy and include dilation, elongation, and tortuous veins (Scovell & Alguire, 2020).</p>	<p>O87.4 Varicose veins (legs) O87.8 Varicose veins vulva or perineum</p>
Common Postpartum Pain	<p>Common postpartum pain includes perineum pain, uterine pain (from uterine contractions after birth), cesarean incision pain, indigestion pain, muscle pain, hemorrhoid pain (increased abdominal pressure during birth), and breast pain. Breast pain can be due to breasts filling, nipple trauma, poor latch, and clogged ducts (Marco, Thomas, Rzecznik, 2019)</p>	<p>G89.18 Postoperative pain not otherwise specified M25.9 Joint pain M79.18 Musculoskeletal N64.59 Engorgement breast N64.4 breast pain N94.6 Dysmenorrhea (painful period) N94.89 Uterine pain, Female genital organ pain O91.03 Engorgement, breast, postpartum O92.79 postpartum engorgement O87.2 Hemorrhoids, puerperium O22.4 Pregnancy, delivery, and puerperium complicated by hemorrhoids O90.2 cesarean delivery wound hematoma</p>

		O90.0 disruption of cesarean wound R10.2 Pelvic or perineal pain R52 Generalized pain not otherwise specified
Abdominal Pain nonspecific	Pain in the abdomen (without infection) is common after normal childbirth (Stevens, 2020).	R10.9 Unspecified abdominal pain R14.1 Gas pain
Other nonspecific	Nonspecific postpartum conditions (CDC, 2020)	O90.8 Other complications of the puerperium, not elsewhere classified O90.89 Other complications of the puerperium, not elsewhere classified O90.9 Complication of the puerperium, unspecified
(AWHONN, 2017)		(CDC, 2020)

*Postpartum coagulation defects are complications of untreated postpartum hemorrhage (CDC, 2020)

** Hemolysis, elevated liver enzymes, low platelet count (HELLP) syndrome is a complication of pre-eclampsia (CDC, 2020)

*** Amniotic fluid embolus is a clot formed from amniotic fluid entering the bloodstream (Mayo Clinic, 2018)

****Puerperal and puerperium also known as postpartum (CDC, 2020)

Source for Postpartum warning signs: Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN). (2017). *POST-BIRTH Warning Signs Course*. Retrieved from <http://learning.awhonn.org/diweb/catalog/launch/package/3/sid/68007736>

Source for ICD-10-CM: Centers for Disease Control and Prevention. (2020b). *ICD-10-CM*. National Center for Health Statistics. Retrieved from <https://icd10cmtool.cdc.gov/?fy=FY2020>

Appendix E

Data Collection Tool

The screenshot shows an Excel spreadsheet with the following content:

Impact of Standardized Postpartum Discharge Education Intervention in Reducing Non-urgent Emergency Room Visits
Primary Investigator: Baljit Pannu
Site:
Date of Data Collection:

Demographics		Dependent Variable			Independent Variable			
Patient Unique ID#	Age	Race	Delivery Type	Gravidity	Education Y/N	ER visit Y/N	ER Discharge Diagnosis	Urgent/ Non-Urgent

ProQuest Number:28264213

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent on the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 28264213

Published by ProQuest LLC (2021). Copyright of the Dissertation is held by the Author.

All Rights Reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346