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Improving Postpartum Hypertension Discharge Education: A Pilot Project

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Abstract

Problem: Hypertensive disorders of pregnancy (HDP) are a leading cause of maternal morbidity, mortality, and postpartum readmission. Several evidence-based algorithms and protocols have been implemented in the inpatient setting to treat severe blood pressure and prevent complications. However, there remains an opportunity to improve the postpartum care transition and discharge education for patients with these conditions in an attempt to decrease 30-day postpartum hypertension readmissions.

Methods: This pilot project utilized a descriptive design and took place on a postpartum unit at a Midwest metropolitan high-risk obstetrical teaching hospital. Interventions included patient-specific discharge education, distribution of a home blood pressure cuff, scheduling a blood pressure follow-up appointment prior to discharge, and a follow-up telephone call two days after discharge. Data was collected via retrospective and prospective electronic medical record review.

Results: The total sample size was 50 (25 retrospective and 25 prospective) participants. Although the 30-day postpartum hypertension readmission rate did not decrease, patient follow-up and home blood pressure monitoring increased. The follow-up telephone calls proved to be an opportunity to address patient concerns and questions that may not have been addressed otherwise.

Implications for Practice: Although they did not decrease the readmission rate in this sample, improvements in discharge education, home blood pressure monitoring and the follow-up phone calls were found to be beneficial as they led to improved patient outcomes, readmission when indicated, and increased patient follow-up and contact with a healthcare provider.

Improving Postpartum Hypertension Discharge Education: A Pilot Project

In the United States, maternal mortality increased from 7.2 deaths to 16.9 deaths per 100,000 live births from 1987 to 2016 (Centers for Disease Control and Prevention [CDC], 2020). The CDC reports two thirds of these deaths were preventable (Williams, 2019). Hypertensive disorders of pregnancy (HDP) occur in 12-22% of pregnancies and contribute to 17% of maternal mortalities in the United States (Williams, 2019) and 14% of maternal mortalities globally (MacDonald, 2019). The categories of HDP are chronic hypertension, gestational hypertension, preeclampsia, preeclampsia superimposed on chronic hypertension, and eclampsia (Leeman et al., 2016). Preeclampsia is a complication of pregnancy, occurring after 20 weeks gestation and characterized by new-onset hypertension and proteinuria (American College of Obstetricians and Gynecologists [ACOG], 2020). In the United States, rates of hypertension and preeclampsia are on the rise. Between, 1987 and 2004, the rate of preeclampsia increased by 25% (ACOG, 2020). Increased obesity rates as well as advanced maternal age contribute to the rise in HDP (Wilkerson & Ogunbodede, 2019), yet preeclampsia can occur in patients who do not have risk factors (ACOG, 2020).

Hypertensive disorders were the number one cause of postpartum readmission in a multi-state analysis of postpartum readmissions in the United States from 2004 to 2011 (Clapp et al., 2016). Hospital readmissions are associated with increased healthcare costs and decreased quality of life for patients and their families. Maternal blood pressure peaks three to six days postpartum, after most patients have been discharged (O'Meara & Lepic, 2016), and preeclampsia and its complications can occur as late as six weeks after delivery (Drews & Tsigas, 2013). Risk factors for late postpartum preeclampsia include

advanced maternal age, black race, Latino ethnicity, obesity, and gestational diabetes mellitus (Bigelow et al., 2014). Hypertensive disorders of pregnancy can often be managed in the outpatient setting if there is no evidence of preeclampsia with severe features. Severe features include blood pressure greater than 160 mm Hg systolic or 110 mm Hg diastolic, proteinuria, elevated liver enzymes, decreased platelets, pulmonary edema, visual or cerebral disturbances, and severe persistent right upper quadrant abdominal pain (ACOG, 2020). Early recognition and prompt treatment of postpartum preeclampsia is critical to prevent complications such as eclamptic seizures, stroke, pulmonary edema, thromboembolism, or death (Andrus & Wolfson, 2010).

Several evidence-based algorithms and protocols have been implemented in the inpatient setting to promptly treat preeclampsia and severe blood pressures. There remains an opportunity to improve the postpartum care transition and discharge education for patients with HDP. The purpose of this clinical scholarship project was to decrease postpartum hypertension 30-day readmissions by improving patient education, providing home blood pressure cuffs, conducting follow-up phone calls, and promoting patient adherence to medications, follow-up, and home blood pressure monitoring. Patient education focused on adherence to antihypertensive medications and follow-up, home blood pressure monitoring, and early identification of symptoms of hypertension and preeclampsia for which to notify a healthcare provider. The evidence-based practice framework guiding this pilot project was the Iowa Model. The aim of the project was to decrease 30-day postpartum hospital readmissions for patients with HDP by 10% at a Midwestern metropolitan high-risk obstetrical hospital. The primary outcome measure was the 30-day postpartum HDP readmission rate. Secondary outcome measures were

whether the participant went to their follow-up blood pressure check appointment, whether the participant was monitoring their blood pressure at home, whether the provider noted the participant was monitoring their blood pressure at home in the follow-up appointment progress note, and patient demographic information including age, race, and insurance status. The study question was: In postpartum patients aged 18 and older with HDP, what are the effects of improved HDP discharge education and self-management resources on the 30-day postpartum HDP readmission rate over two months?

Review of the Literature

The literature review process involved extensive review of the following scholarly databases and search engines: PubMed, CINAHL, Academic Search Complete, and the University of Missouri – St. Louis Library Summons search engine. The following search terms and phrases were used: p*reeclampsia, postpartum preeclampsia, maternal hypertension, postpartum hypertension, preeclampsia follow-up, postpartum readmission, maternal hypertension readmission, postpartum preeclampsia readmission, maternal mortality, hypertensive disorders of pregnancy, postpartum education, postpartum preeclampsia management*, and *home blood pressure monitoring*. The Boolean operators AND and OR were used to refine search results. Inclusion criteria were scholarly and peer-reviewed publications, year 2010 to present, and English language. Exclusion criteria were studies or research prior to the year 2010, publications from other countries, except for the United Kingdom and Australia, and publications in any other language except English. Use of the ancestry method generated four references. The final number of publications selected for this literature review was 13.

This literature review discusses interventions to improve patient HDP discharge education, quality of care, and transition of care to ultimately decrease postpartum HDP readmissions. There are a significant number of evidence-based recommendations regarding HDP screening and treatment, but there is limited research addressing clinical interventions to prevent and reduce postpartum hypertension readmissions associated with HDP (O'Meara & Lepic, 2016). One meta-analysis concluded that provider and patient education, verbal and printed resources, prompt post-discharge follow-up, text message and telephone follow-up, and postnatal furosemide possess the potential to decrease postpartum HDP readmissions and associated morbidity and mortality (O'Meara & Lepic, 2016). Additional recommendations for improving care for postpartum patients with preeclampsia include improved patient education, teach-back methods, scheduling a postpartum blood pressure check appointment prior to discharge, and home blood pressure monitoring (Drews & Tsigas, 2013).

Patient education is crucial to improving awareness, recognition, and treatment of postpartum HDP. Among nurses providing patient education there are wide variations in how much discharge education is done and which maternal warning signs are reviewed with patients (Suplee et al., 2016). Implementation of standardized education better equips patients to recognize health changes and warning signs and is an important component in decreasing maternal morbidity and mortality (Suplee et al., 2016). To benefit from evidence-based management strategies for HDP, patients must be able to recognize the signs and symptoms of preeclampsia and hypertension and know when to seek medical care (Drews & Tsigas, 2013). The Missouri Alliance for Innovation on Maternal Health initiative recommends that every pregnant and postpartum patient be

provided standardized education on the signs and symptoms of hypertension and preeclampsia, including when to seek medical care and what symptoms to report to providers (Williams, 2019). The American College of Obstetricians and Gynecologists (ACOG) Task Force on Hypertension in Pregnancy (2013) recommends that postpartum discharge instructions include information about the signs and symptoms of preeclampsia and the urgency of reporting these symptoms to a health care provider. The Joint Commission (2019) recommends that printed education detailing the signs and symptoms of HDP during hospitalization, the signs and symptoms of HDP post-discharge that require immediate care, and when to follow-up, be provided to all patients and their families or partners.

The manner and method in which patient education is provided is important. The California Maternal Quality Care Collaborative (2013; with permission from The Preeclampsia Foundation) published a discharge handout for patients with a diagnosis of preeclampsia. The discharge handout lists patient-specific antihypertensive medications and frequency of administration, the follow-up appointment date and time, and the signs, symptoms, and blood pressure readings that warrant healthcare provider notification (California Maternal Quality Care Collaborative, 2013). Individualized discharge instructions benefit patients and their families by providing patient-specific instructions.

Postpartum patients who are unable to recognize the signs and symptoms of hypertension or preeclampsia and do not seek medical care, are at risk for severe morbidity and mortality as a result of untreated preeclampsia. Most patients presenting with postpartum eclampsia or stroke experienced preeclampsia symptoms for hours or days before the disease process worsened (ACOG, 2020). Without education, new

mothers may unknowingly presume symptoms are normal in the postpartum period (Drews & Tsigas, 2013). Another important component of preeclampsia discharge education is ensuring patients know where to seek care and to notify all healthcare providers that they have recently given birth, since hypertension parameters and treatments are significantly different between the general adult population and postpartum patients.

Antihypertensive medications are an important component of postpartum HDP management. The American College of Obstetricians and Gynecologists recommend postpartum patients with a HDP be prescribed a long-acting oral antihypertensive until gestational hypertension resolves (Sharma & Kilpatrick, 2017). A systematic review concluded that the use of antihypertensive medications in pregnant women halved the risk of developing severe hypertension but had little to no effect on developing preeclampsia (Abalos et al., 2018). A study evaluating the effectiveness of a postpartum care transition clinic for HDP concluded that patient incomprehension and noncompliance with discharge medications require universal efforts to improve postpartum care and education for this high-risk group of patients (Celi et al., 2019), indicating an opportunity to improve patient education about antihypertensive medications.

A timely post-discharge follow-up appointment for blood pressure monitoring is important for early identification of postpartum HDP and to screen patients for symptoms. There are clear recommendations on prenatal appointment frequencies, yet there is a lack of consensus on when and how often postpartum follow-up appointments for HDP should occur. A single blood pressure follow-up appointment may be

inadequate to detect postpartum HDP exacerbations. The American College of Obstetricians and Gynecologists (2013) recommends postpartum blood pressure surveillance for at least 72 hours (inpatient or equivalent outpatient surveillance) after delivery and again seven to 10 days postpartum, or earlier if symptoms are present. The Society for Maternal-Fetal Medicine recommends a postpartum appointment within 72 hours for patients with severe hypertension and an office visit within one to three weeks for all patients with HDP (Patient Safety and Quality Committee et al., 2020). The California Maternal Quality Care Collaborative recommends follow-up appointments be scheduled prior to discharge (Drews & Tsigas, 2013).

Home blood pressure monitoring in the postpartum period can result in early identification of postpartum HDP. The California Maternal Quality Care Collaborative recommends that patients with a history of preeclampsia monitor their blood pressure at home with instructions to call their provider if pressures reach or exceed 140/90 (Drews & Tsigas, 2013). The Society for Maternal-Fetal Medicine recommends patients with HDP monitor blood pressure at home until the follow-up visit seven to 10 days postpartum (Patient Safety and Quality Committee et al., 2020). Barriers to home blood pressure monitoring include the cost of equipment, insurance coverage of equipment, correct use of equipment, and patient understanding and ability to identify elevated blood pressures that require treatment. The American Heart Association (2020) published a patient education handout that illustrates the correct procedures for patient blood pressure monitoring.

Post-discharge telephone calls are an effective intervention to improve postpartum HDP transition of care. Patient reminders, such as telephone calls or text messages, have

been associated with increased patient appointment adherence (Williams, 2019). A study evaluating hospital discharge phone calls concluded that they are a valuable tool to improve the quality and continuity of care after discharge and reduce preventable readmissions (Schuller et al., 2017).

The goals of postpartum management of HDP are to educate patients about the importance of taking antihypertensive medications as prescribed to prevent hypertensive crises, encourage home blood pressure monitoring and follow-up, and provide education about the symptoms and blood pressure readings to notify a provider so patients can seek care sooner rather than later, potentially avoid hospitalization, and decrease the risk of life-threatening complications.

Methods

The Iowa Model was selected to guide this project because of its applicability in implementing evidence-based practice (Dang et al., 2019). The Iowa Model provides a step-by-step process to implementing evidence-based practice and includes opportunities to evaluate and redesign as needed (Dang et al., 2019). Upon completion of the project and data analysis, a decision was made regarding the appropriateness of adopting the interventions into routine practice (Dang et al., 2019).

An opportunity to improve patient HDP education on an inpatient postpartum hospital unit was identified. Prior to project implementation, the unit utilized two evidence-based recommendations to decrease readmissions, including general follow-up phone calls on all discharged patients approximately 48 hours after discharge and a discharge education handout that lists symptoms to notify a healthcare provider of. The education handout was not patient or hypertension specific, and the follow-up telephone

call script did not include questions regarding blood pressure or hypertension symptoms. Discharge instructions were lengthy, in small print, and generally not patient specific.

The goals of this project were to improve patient self-management, home blood pressure monitoring, follow-up, and the early identification of elevated blood pressures and symptoms of preeclampsia so that patients could seek medical care and management in the outpatient setting when appropriate and prevent both readmission and life-threatening complications. The evidence-based practice recommendations implemented in this project were: individualized verbal and written patient-specific education about medications, follow-up, symptoms to report and seek emergent care for, and how to monitor blood pressure at home; distribution of a blood pressure cuff to participants who did not have a functioning blood pressure cuff for home use; distribution of a blood pressure documentation log that participants were encouraged to use and bring to their follow-up appointment; and a follow-up telephone call two days after discharge to screen for symptoms, ensure prescription medications were obtained and being taken as prescribed, discuss blood pressure readings and encourage participants to monitor blood pressure if they had not been, ensure follow-up appointment was scheduled, and remind the participant of the importance of attending the appointment. These interventions were cost-effective and did not require extensive patient resources, an important element for a patient population that is affected by social determinants of health and limited resources. The retrospective and prospective 30-day HDP readmission rates were compared to determine whether or not these practice changes were beneficial.

Design

This pilot project utilized a descriptive design and involved retrospective and prospective electronic medical record reviews.

Setting

The project took place in a 28-bed postpartum mother-baby unit in a 584-bed high-risk obstetrical nonprofit teaching hospital in a Midwest metropolitan area of approximately 2.8 million residents. The unit staff was comprised of approximately 68 staff nurses and approximately 50 women's healthcare providers, including resident, fellow, and attending physicians and advanced practice nurses. In 2021, there were 2,545 delivering obstetric patients at this facility. The majority of obstetric patients are ages 21-30, Medicaid participants, and black race. Hypertension or preeclampsia account for 80-90% of postpartum readmissions at this facility. There is an average of 83 pregnant or postpartum patients per month with at least one severe range blood pressure episode (Meyer & Wilson-Griffin, n.d.).

Sample

The target population was a convenience sample of adult inpatient postpartum females aged 18 and older who had a current diagnosis of preeclampsia or gestational hypertension, were admitted on the postpartum unit, and were a patient of an in-network provider, so that documentation of the follow-up appointment could be accessed via the electronic medical record. Exclusion criteria were patients with a primary language other than English due to the lack of educational materials in other languages at this time, patients younger than age 18, and patients who received care from an obstetric provider outside of the healthcare network, due to the inability to access electronic medical record documentation of the follow-up blood pressure check follow-up appointment. The total

sample size was 50 participants: 25 retrospective and 25 prospective participants. Eligible prospective participants were identified by the primary investigator via daily reviews of the unit census. Retrospective participants were selected using a random sample generator from an electronic medical record report of patients meeting inclusion criteria who were discharged in the two month period immediately prior to project implementation.

Approval Process

Approval from the primary investigator's Doctor of Nursing Practice committee, the University of Missouri-St. Louis' graduate school and institutional review board (IRB), hospital unit leadership, and healthcare institution IRB were obtained prior to project implementation and data collection. A risk of this project was the identification of participants, yet this risk was minimized because the only patient identifiers collected were the medical record number (MRN) and patient's telephone number. All patient identifiers on data collection tools were removed upon completion of prospective data collection. Informed consent documents containing the participant's name were kept in a locked cabinet behind a locked door on a locked unit in the healthcare facility. The data collection spreadsheet was a password-protected document on a password-protected computer that only the primary investigator had access to. Retrospective and prospective medical record reviews and participation in one-to-one provider-to-patient education posed minimal risk to participants.

Data Collection/Analysis

Pre-implementation retrospective data was collected via electronic medical record review and included: participant demographic information (age, race, and insurance

status), participant's HDP diagnosis (gestational hypertension and/or preeclampsia), date of discharge, whether the participant attended the blood pressure follow-up appointment, whether there was documentation in the follow-up appointment progress note that the participant was monitoring their blood pressure at home, whether a 30-day readmission occurred, and the cause of readmission. Prospective data collection occurred 31 days after patient discharge to identify if a hypertension-related readmission occurred. Prospective data was collected via electronic medical record review and included: participant MRN, participant telephone number, participant demographic information (age, race, and insurance status), whether a blood pressure cuff was given or the participant already had access to one, the date of discharge, participant HDP diagnoses, follow-up phone call date and information (whether the participant was currently monitoring blood pressure, was reminded to monitor blood pressure, or was unable to be reached in three telephone call attempts), whether the participant went to their blood pressure follow-up appointment, whether there was documentation in the follow-up appointment progress note that the participant was monitoring their blood pressure at home, whether or not a readmission occurred, and the cause of readmission.

Data analysis consisted of descriptive and inferential statistics and was completed using Intellectus Statistics (2021). The Fischer's exact test was utilized to determine whether a correlation between improvements in discharge education and readmission rates existed. A Fisher's exact test analyzes the relationship between two nominal variables (Intellectus Statistics, 2021).

Procedures

The primary investigator (a staff registered nurse on the unit) met with the interdisciplinary team, including the perinatal quality coordinator, postpartum nurse manager, and a high-risk obstetrical nurse practitioner. Patient educational tools and the informed consent were developed by the primary investigator. Permission was obtained from the American Heart Association (2020) to use their *How to Get Your Blood Pressure Checked* patient education illustration. All aforementioned approvals to conduct the pilot project were obtained. Project implementation occurred over a two-month period. Eligible patients, based on inclusion and exclusion criteria, were approached about the project and informed consent was obtained if the patient opted to participate. The primary investigator counseled the participants, administered the discharge education, and individualized the education materials by adding the patient's specific medications, OB/GYN provider contact information, and follow-up appointment date and time. The primary investigator distributed a home blood pressure monitor to the participant if they did not have access to one at the time of discharge, along with a blood pressure documentation log, and reviewed how to correctly and accurately measure one's blood pressure and when to notify the provider of elevated or exceptionally low blood pressure measurements. The participants were instructed to bring the blood pressure log to their follow-up appointments. The primary investigator conducted the follow-up telephone call with participants two days after hospital discharge and discussed the routine postpartum follow-up telephone call questions, in addition to reviewing the participant's blood pressure readings since discharge, reviewing medications and inquiring whether they were obtained and being taken as prescribed, screening the participant for signs and symptoms of preeclampsia and hypertension, ensuring a follow-

up appointment was obtained and reminding the participant of the appointment, and addressing participant questions and concerns. The primary investigator reviewed the electronic medical records of study participants 31 days after discharge to identify if the participant went to their blood pressure follow-up appointment, if there was documentation in the follow-up appointment progress note that the patient was monitoring their blood pressure at home, whether a 30-day HDP readmission occurred, and the cause of readmission. Pre-intervention retrospective data was collected via electronic medical record review. Data was analyzed. Retrospective and prospective readmission rates, home blood pressure monitoring, and follow-up appointment attendance rates were compared.

Results

A total of 25 retrospective electronic medical record reviews (N_r= 25) were conducted and a total of 25 participants (N_p = 25) made up the prospective sample for a total sample size of 50 (N=50). In both the retrospective and prospective samples, the most common HDP diagnosis was preeclampsia (n_r=13, 52%; n_p =18, 72%), followed by gestational hypertension (n_r=12, 48%; n_p=7, 28%). In both samples, the most common age range was 18-29 (n_r=15, 60%; n_p=14, 56%), followed by ages 30-39 (n_r=8, 32%; n_p=10, 40%), and age 40 and older (n_r=2, 8%; n_p=1, 4%). The predominant race was black (n_r=17, 68%; n_p=22, 88%), followed by white (n_r=8, 32%; n_p=3, 12%). The majority of patients had Medicare insurance coverage (n_r=15, 60%; n_p=19, 76%), followed by private health insurance (n_r=10, 40%; n_p=6, 24%).

Twenty blood pressure cuffs were administered during project implementation; five patients already had access to a home blood pressure cuff. The follow-up phone calls

revealed that the majority of patients who received the postpartum hypertension education were monitoring their blood pressure at home (n_p=19, 76%). Three participants (n_p=3, 12%) had not yet monitored their blood pressure at home and three participants (*np*=3, 12%) were unable to be reached after three phone call attempts. More patients in the prospective sample (n_p=17, 68%) went to their blood pressure follow-up appointment than in the retrospective sample (n_r=13, 52%). Three participants in the prospective sample ended up following-up with a provider outside of the healthcare network so their appointment documentation was unable to be viewed. An increased number of patients were noted to be monitoring their blood pressure at home in the follow-up appointment progress note in the prospective sample (n_p=8, 32%) than the retrospective sample (n_r=7, 28%). The retrospective sample had a 12% (n_r=3) all-cause 30-day readmission rate and zero HDP-related readmissions (n_r=0, 0%). The prospective sample had a lower readmission rate at 8% (n_p=2). However, both readmissions (n_p=2, 8%) were hypertension related.

A Fischer's exact test was conducted to determine whether there was a correlation between the improved postpartum HDP discharge education and the number of hypertension-related readmissions (see Table 2). The results of this test were not significant based on an alpha value of 0.05, OR=0.00, p = 0.490. The postpartum HDP discharge education was not associated with a decrease in hypertension-related readmissions. A second Fischer's exact test was conducted to determine whether there was a correlation between the improved postpartum HDP discharge education and patients attending their blood pressure follow-up appointment (see Table 3). The results were significant based on an alpha value of 0.05, p = 0.041, suggesting there is a

correlation between the improved education and patient follow-up. A third Fischer's exact test was conducted to determine whether a correlation existed between HDP diagnosis and 30-day readmission (see Table 4). The findings were not significant based on a alpha value of 0.05, $p = 0.140$, suggesting there is not a correlation between these two variables.

Discussion

In regard to the purpose and aim of the study, the 30-day postpartum HDP readmission rate was not decreased as intended. Regarding the study question, improved HDP education and self-management resources for postpartum patients with HDP did not result in decreased postpartum 30-day HDP readmissions in this study. A possible explanation is that because of the study interventions, the patients identified symptoms or blood pressure readings that warranted emergency intervention and presented to the hospital as instructed. Although the readmission rate did not decrease, the study was clinically significant because there was improved patient education and transition of care.

One of the prospective sample participants with a HDP readmission identified elevated blood pressure one day after discharge while monitoring her blood pressure with the administered blood pressure cuff and then presented to the hospital Women's Evaluation Unit. As reviewed during the discharge education intervention, the participant identified a severe blood pressure reading and took the appropriate action. The second prospective sample participant with a HDP readmission had not yet monitored her blood pressure at the time of the follow-up telephone call and was therefore reminded to during the call, screened for HDP warning signs, and reminded to attend follow-up appointment. This participant did attend her blood pressure follow-up appointment where elevated

blood pressures were identified, and she was instructed to present to the hospital for monitoring.

There was a significant increase (52% to 68%) in postpartum blood pressure follow-up rate between the retrospective and prospective samples and an increase (28% to 32%) in the number of patients noted to be monitoring their blood pressure at home in the provider's follow-up appointment documentation. In the prospective sample, 76% of participants were monitoring their blood pressure at home at the time of the follow-up phone call. It is unknown how many patients were monitoring their blood pressure at home in retrospective sample, because that information is not documented as part of the routine follow-up telephone calls. Two participants were both unable to be reached by telephone and did not attend their follow-up appointment. Three participants did not attend their follow-up appointment but were reached by telephone, in which they were screened for symptoms, reviewed recent blood pressure readings with the primary investigator, and reminded to take medications as prescribed. Merely telephone follow-up with a registered nurse is preferred to no follow-up with a healthcare provider.

During the majority of telephone calls, participants had additional questions or concerns that the primary investigator was able to address. During a few calls, the participant had already missed their follow-up appointment or notified the primary investigator they were unable to keep the appointment. In these cases, the primary investigator assisted the patients in rescheduling. A few participants reported they had not yet picked up their prescription antihypertensive medications from the pharmacy. The telephone calls became an opportunity for the primary investigator to reinforce education on the importance of medication management for HDP and encourage the participants to

obtain the medications. Lastly, one participant expressed concern about her infant during the telephone conversation. The conversation resulted in the primary investigator recommending the participant to take her infant to the emergency department due to concern for infection. The follow-up telephone calls were found to be beneficial in the postpartum period as an opportunity to screen for HDP symptoms, discuss blood pressure readings, ensure medications were obtained and being taken as prescribed, ensure follow-up was obtained, and address patient questions and concerns.

The demographics of the study sample were representative of the unit's general patient population. Of the two readmitted participants in the prospective sample, there was no correlation between demographics. One participant was greater than or equal to age 40, white race, had private insurance coverage, and was routinely monitoring her blood pressures after discharge. The second participant was age 18-29 age group, black race, had Medicaid insurance coverage, and had not yet monitored her blood pressure at the time of the follow-up phone call. Both participants went to their blood pressure follow-up appointment. This suggests that postpartum HDP discharge education and transition of care should be universal and not directed at specific demographics.

Readmissions may not have been the optimal primary outcome measure for this project. In this instance, the increase in readmissions was a positive outcome as the participants sought care in a timely manner and avoided emergency transportation, an intensive care unit admission, and death. Although decreasing readmissions is important, contact with a healthcare provider during the follow-up phone call and follow-up appointment, and the ability to monitor blood pressures at home made a significant difference in improving the care and outcomes for the participants. Episodes of contact

with a healthcare provider may have been a more appropriate primary outcome measure for this pilot project.

Strengths of this study include interventions that were evidence-based and minimal variation in education and telephone calls, as all interventions were completed by the primary investigator. Potential weaknesses were the small sample size, short timeline, and the three participants in the prospective sample whose follow-up appointment documentation was unable to be viewed due to following-up with a provider outside of the healthcare network. Although the goal was to obtain an appointment prior to discharge, this was not always possible when patients were discharged on the weekend and offices were closed. These three participants notified the primary investigator during the follow-up telephone call that they were going to follow-up with an out-of-network provider they had previously seen and was more convenient.

Recommendations for further research include a larger sample size and timeline, implementing similar interventions in the antepartum period, and modifying the primary outcome measure. Implications for practice include patient-specific discharge education, standardizing HDP education in the antepartum and postpartum period among all maternal health providers and nursing staff, post-discharge telephone calls, home blood pressure monitoring in the postpartum period for high-risk patients, improving access to and insurance coverage of home blood pressure cuffs, and utilizing telehealth for postpartum follow-up.

Conclusion

The goal of this pilot project was to improve HDP discharge education, follow-up, and patient self-management to decrease 30-day HDP readmissions on an inpatient

postpartum unit. The evidence-based practice recommendations implemented in this project were: individualized verbal and written patient-specific education about medications, follow-up, symptoms to report and seek emergent care for, and how to monitor blood pressure at home; distribution of a blood pressure cuff to participants who did not have a functioning blood pressure cuff for home use; distribution of a blood pressure documentation log that participants were encouraged to use and bring to their follow-up appointment; and a follow-up telephone call two days after discharge to screen for symptoms, ensure prescription medications were obtained and being taken as prescribed, discuss blood pressure readings and encourage participants to monitor blood pressure if they had not been, ensure a follow-up appointment was scheduled, and remind the participant of the importance of attending the appointment. The retrospective and prospective 30-day HDP readmission, follow-up appointment, and home blood pressure monitoring rates were compared to determine whether these practice changes were beneficial.

Although there was an increase in the 30-day HDP readmission rate between the retrospective and prospective samples, there was a significant increase in patient follow-up and a significant portion of participants who adhered to home blood pressure monitoring. The follow-up telephone calls were found to be beneficial in reinforcing education and addressing patient concerns. Regardless of their effect on readmission rates, improvements in postpartum education, follow-up, and transition of care for patients with a diagnosis of HDP improved patient outcomes by promoting early identification of warning signs and prompting patients to seek appropriate care.

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Table 1

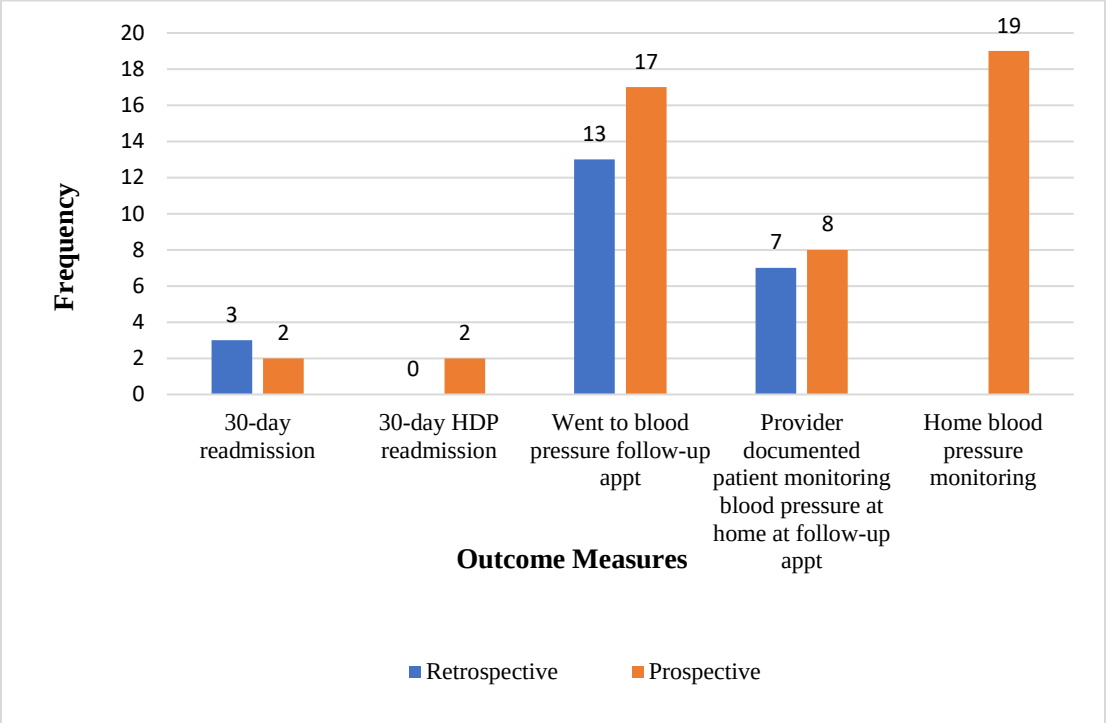
Frequency Table of Diagnosis and Demographic Information of Study Participants

Variable	Sample			
	Retrospective		Prospective	
	n	%	*n*	%
HDP Diagnosis				
Gestational hypertension	12	48	7	28
Preeclampsia	13	52	18	72
Age				
18-29	15	60	14	56
30-39	8	32	10	40
≥ 40	2	8	1	4
Race				
Black	17	68	22	88
White	8	32	3	12
Insurance				
Medicaid	15	60	19	76
Private	10	40	6	24

Note. $N = 50$. ($n = 25$ for each sample).

Figure 1

Comparison of Retrospective and Prospective Outcome Measures



Note. $N = 50$ ($n = 25$ for each sample). Unknown frequency for home blood pressure monitoring in retrospective sample.

Table 2

Fischer Exact Test of 30-day HDP Readmissions among Retrospective versus Prospective Samples

	Sample			
30-day HDP Readmission	Retrospective	Prospective	OR	*p*
Yes	0 [1.00]	2 [1.00]	0.00	0.490
No	25 [24.00]	23 [24.00]		

Note. $N = 50$. Values formatted as Observed [Expected].

Table 3

Fischer Exact Test of Blood Pressure Follow-up Appointments among Retrospective versus Prospective Sample

	Sample		
Went to Blood Pressure Follow-up Appt	Retrospective	Prospective	*p*
Yes	13 [15.00]	17 [15.00]	0.041
No	12 [15.00]	5 [8.50]	
Unable to view	0 [1.50]	3 [1.50]	

Note. $N = 50$. Values formatted as Observed [Expected].

Table 4

Fischer Exact Test of HDP Diagnosis and 30-day HDP Readmission

	HDP Diagnosis		
30-day HDP Readmission	Preeclampsia	Gestational Hypertension	*p*
Yes	0 [1.24]	2 [0.76]	0.140
No	31 [29.76]	17 [18.24]	

Note. Values formatted as Observed [Expected]. $N = 50$.