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Quality Improvement: Patient Education for Management of Hypertension in Pregnancy

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Clinical Research

Scholarship in Medicine Final Report

By checking this box, I indicate that my mentor has read and reviewed my draft proposal prior to submission

Abstract

Objective: We introduced maternal hypertension education tools that address illiteracy in underserved populations. Through these tools, we aim to improve patients' knowledge of their conditions. We also aim to determine if healthcare providers perceive a benefit to the use of the tools. Ultimately, we hope these changes will lead to better short- and long-term health outcomes for mother and child.

Methods: Pregnant women with any form of hypertension at Five Rivers Center for Women's Health (FRHC) were surveyed during OB visits. The Patient Questionnaire includes objective knowledge questions on their condition and self-reported comprehension questions. Forty-five women were surveyed during the pre-intervention phase, during which they received standard of care hypertension education.

We introduced education tools and trained providers at FRHC to use during OB visits with applicable patients. Forty-five patients received hypertension education using the new tools and completed questionnaires at the end of their OB visit.

Healthcare providers completed a Provider Survey prior to the introduction of the new tools and again post-intervention. The Provider Survey includes questions on their perception of patient understanding and confidence after delivering education. They also reported the amount of time needed to complete patient education during a visit before and after the new tools were used.

Results: At pre-intervention, women rated their knowledge of hypertension as high (4.2 ± 1.0) but they scored low on actual knowledge (1.7 ± 1.3). Post-intervention, women again rated their knowledge of hypertension as high (4.5 ± 0.7) and were similarly low on actual knowledge (2.2 ± 1.0). However, actual knowledge increase was significantly different ($p < 0.05$)

Sixteen providers complete the Provider Survey before implementation of the new tools. They rated the current standard of care education as needing improvement (2.6 ± 1.1 [scale from 0-5]), patient comprehension after current education as moderate (2.5 ± 0.6), and patient confidence after current education as moderate (2.7 ± 0.6). They reported that patient education took 17.8 ± 8.5 minutes. Ten providers completed the post-intervention Provider Survey. They rated education with the new tools higher (4.1 ± 0.7), patient comprehension higher (3.5 ± 0.5), and patient confidence higher (3.6 ± 0.5) than at pre-intervention ($p < 0.001$). In addition, they reported education taking only 7.8 ± 4.3 minutes with the new tools ($p < 0.001$).

Discussion: Patients' actual knowledge of hypertension increased after implementation of the new tools. Education with the tools improved providers' perception of education in all categories and decreased time needed for education by 10 minutes.

Key Words: hypertension in pregnancy, patient education, quality improvement, health literacy

Introduction/Literature Review

Hypertension in pregnancy is a leading cause of maternal and perinatal mortality worldwide. Ten million women develop preeclampsia around the world each year. About 76,000 pregnant women die from preeclampsia and related hypertensive disorders each year. Additionally, 500,000 babies die from related complications each year.¹

Preeclampsia affects about 3% of pregnancies, and all other hypertensive disorders complicate approximately 5–10% of pregnancies in the United States. Sadly, rates of preeclampsia, gestational hypertension, and chronic hypertension continue to increase in developed countries.²

The American College of Obstetricians and Gynecologists (ACOG) Task Force classification divides hypertension during pregnancy in four categories:

1. *Preeclampsia* is diagnosed as hypertension in association with thrombocytopenia, impaired liver function, renal insufficiency, pulmonary edema, or new-onset cerebral or visual disturbances.
2. *Gestational hypertension* is blood pressure elevation after 20 weeks of gestation in the absence of proteinuria or the aforementioned systemic findings;
3. *chronic hypertension* is hypertension that predates pregnancy; and
4. *superimposed preeclampsia* is chronic hypertension in association with preeclampsia.³

Patient education is a key factor in addressing hypertensive disorders in pregnancy, according to the ACOG Task Force. ACOG recommends health care providers inform women of the risks, signs and symptoms of preeclampsia and stress the importance of contacting health care providers if these are evident. Providers can strengthen patient education by using strategies that facilitate the successful transfer of information to women with varying degrees of health literacy. Recommended strategies to facilitate this process include using plain nonmedical language, taking time to speak slowly, reinforcing key issues in print using pictorially based information, and requesting feedback to indicate that the patient understands, and, where applicable, her partner.³ A 2002 study reported that patients given a graphics-based preeclampsia education tool had a better understanding of their condition than those receiving standard educational materials or none at all.^{4,5}

Patient education is crucial in the early detection and treatment of severe hypertensive crises as well as the proper management of current conditions. Quality education supports patient comprehension and retention of important facts such as associated risk factors, symptom recognition, and proper management instructions. A 2016 report showed when women with maternal hypertension received educational materials at discharge, more cases of severe hypertension were treated within 60 minutes than when educational materials were not used.⁶ Proper health literacy also instills confidence in patients which empowers them to act when necessary. Early action increases the possibility for earlier and more effective treatment and thus improved health outcomes.

Educational materials with minimal or simple text and visual aids may be necessary for patients with a lower level of health or reading literacy. Current educational materials are limited to brochures and handouts that include lengthy, often technical, information about hypertensive conditions.

Hypothesis/Specific Aims/Research Questions

We introduced maternal hypertension education tools that address illiteracy in underserved populations. Through these tools, we aim to improve patients' knowledge of their conditions. In addition, we aim to determine whether healthcare providers perceive a benefit after using the tools. Ultimately, we hope these changes will lead to better short- and long-term health outcomes for mother and child.

Methods

Participants must have received one of the four diagnoses (preeclampsia, gestational hypertension, chronic hypertension, superimposed preeclampsia) at any point during their current pregnancy. Patient must be currently pregnant or recently postpartum. Applicable women at the FRHC were identified by providers during regularly scheduled OB visits. Women were excluded if illiteracy disallowed basic comprehension of the Patient Questionnaire, e.g., a language barrier.

Timeline:

1. Education Tool Development
2. Pre-Intervention Phase
3. Provider Training
4. Post-Intervention Phase
5. Data Compilation & Analysis

Education Tool Development—

We used two education tools that address literacy and communication barriers that commonly arise during regularly scheduled OB visits. Our aim was to introduce graphics-based, interactive tools to encourage engaged conversation between patient and physician.

- Tool 1: 'A Guide to Managing your High Blood Pressure' is an interactive brochure developed specifically for this project. The brochure includes graphics and simple text. Providers follow the outline of the brochure during patient education. The last page encourages providers to verbalize and note personalized answers to critical healthcare questions. This activity promotes clear dialogue and active learning. Patients take the personalized brochure home for reference (Appendix 1).
- Tool 2: A preeclampsia 'Signs and Symptoms' sheet from the Preeclampsia Foundation. This tool outlines the critical symptoms of preeclampsia that require medical attention and includes illustrations of symptoms. It is available in both English and Spanish

(Appendix 2). The sheet can be easily hung up at home for quick reference by patients and serves as an appropriate companion tool.

Pre-Intervention Phase--

Healthcare providers at FHRC provided standard of care patient education during OB visits. At the end of the visits, applicable patients were offered Patient Questionnaires to complete. Patients were informed that the questionnaire was optional. The questionnaires were completed without outside resources or help. Forty-five women completed questionnaires during this phase.

In addition, during the pre-intervention phase, sixteen residents completed Provider Surveys. Completed Patient Questionnaires and Provider Surveys were anonymous and were left in a collection box at FRHC.

Provider Training—

A 20-minute training was conducted during an all-provider meeting. The training addressed:

- The importance of verbally explaining information;
- Going through the information in the ‘A Guide to Managing your High Blood Pressure’ tool and filling out the information prompts at the end of the brochure. The patient should take home the brochure for reference;
- Giving each patient a preeclampsia ‘Signs and Symptoms’ sheet to take home and hang up for reference;
- The importance of asking open-ended questions to ensure that the patients understand what they are told.

Post-Intervention Phase--

Trained providers performed patient education using the new education tools during OB visits. At the end of the visits, patients were offered the Patient Questionnaires to complete. Patients were informed the questionnaire was optional. The questionnaires were completed without outside resources or help. Forty-five women completed questionnaires during this phase.

In addition, during the post-intervention phase, 10 providers who used the new education tools completed Provider Surveys. Completed Patient Questionnaires and Provider Surveys were anonymous and were left in a collection box at FRHC.

Data Compilation & Analysis--

Pre- and post-intervention Patient Questionnaires were collected and responses were entered into an excel spreadsheet. Pre- and post-intervention patient responses were compared using unpaired t-tests. Significance tests were evaluated at $p < 0.05$.

Patient questionnaires provided:

- A “Self-Reported Comprehension Rating” indicating the average response to three questions on a 6-point scale (0-5):

- how *empowered* do you feel to follow the management suggestions given by your healthcare providers?
- how confident do you feel about your *understanding* of your condition?
- how confident do you feel about your *ability to manage* your condition?
- An “Objective Knowledge Score” indicating the average score for responses to three knowledge questions on a 6-point scale (0-5):
 - What are some possible negative health consequences associated with your condition?
 - How were you told to manage your condition?
 - What symptoms should you report to your healthcare provider?

Pre- and post-intervention Provider Surveys were collected and responses were entered into an excel spreadsheet. Pre- and post-intervention provider responses were compared using unpaired t-tests. Significance tests were evaluated at $p < 0.05$.

Results

Forty-five women completed the pre-intervention Patient Questionnaire after receiving standard of care hypertension education. Forty-five, different, women completed the post-intervention Patient Questionnaire after receiving education with the new tools. Sixteen providers completed the pre-intervention Provider Survey, and 10 Providers completed the post-intervention Provider Survey.

Patient Perceived Comprehension

After receiving standard of care patient education, the pre-intervention group rated their perceived comprehension as somewhat high, on a 6-point scale (0-5), for all three questions (Table 1).

After receiving patient education with the new education tools, the post-intervention group rated their perceived knowledge as high for all questions (Table 1). There was a slight increase (+0.3 point) perceived knowledge overall after the introduction of the new education tools.

Table 1: Patient Perceived Comprehension Ratings			
	Pre-Intervention (n=45)	Post-Intervention (n=45)	Effect of Intervention
Understanding of Condition	4.2 ±1.1	4.4± 0.9	+0.2 (ns)
Ability to Manage Condition	4.2 ±1.1	4.5± 0.8	+0.3 (ns)
Empowerment to Manage Condition	4.2 ±1.2	4.5± 0.7	+0.3 (ns)
Average Perceived Knowledge Score	4.2±1.0	4.5± 0.7	+0.3 (ns)

Objective Knowledge

The pre-intervention group had low scores on objective (actual) knowledge when prompted to list health consequences, ways to manage, and reportable symptoms for maternal hypertension. (Table 2).

After receiving patient education with the new education tools, the post-intervention group scored significantly higher on two out of three objective knowledge questions. The overall objective knowledge score showed significant improvement (+0.5 point) after use of the new education tools. (Table 2).

Table 2: Patient Objective Knowledge			
	Pre-Intervention (n=45)	Post-Intervention (n=45)	Effect of Intervention
Health Consequences of Condition	0.9 ± 0.6	0.9 ± 0.6	No change (ns)
How to Manage Condition	1.5 ± 0.7	2.6 ± 0.8	+1.1 (p<.05)
Symptoms to Report	2.6 ± 0.8	3.1 ± 0.8	+0.5 (p<.05)
Average Objective Knowledge Score	1.7 ± 1.3	2.2 ± 1.0	+0.5 (p<.05)

Provider Ratings

Prior to implementation of the new education tools, providers rated the standard of care patient education on maternal hypertension, on a 6-point scale (0-5), as low and needing improvement (Table 3). After the introduction of the educational tools, providers rated the new patient education significantly higher than the pre-intervention education.

Providers rated their perception of patient comprehension and patient confidence significantly higher than those in the pre-intervention phase. Providers reported an average of 10 minutes less time was needed to perform patient education with the new education tools than before.

Table 3: Provider Responses			
	Pre-Intervention (n=16)	Post-Intervention (n=10)	Effect of Intervention
Current Education Protocol Rating	2.6 ± 1.1	4.1 ± 0.7	+1.5 (p<.001)
Patient Comprehension Level	2.5 ± 0.6	3.5 ± 0.5	+1.0 (p<.001)
Patient Confidence Level	2.7 ± 0.6	3.6 ± 0.5	+0.9 (p<.001)
Duration of Education (minutes)	17.8 ± 8.5	7.8 ± 4.3	-10.0 minutes (p<.001)

Discussion

Overall objective knowledge scores significantly improved when providers used the new educational tools. Patients had a better understanding of how to manage their hypertensive disorder and what symptoms of preeclampsia to report. Improvement in these aspects may lead to improved short and long-term health outcomes for mother and child.

Providers also perceived improvement in patient comprehension and patient confidence after using the education tools. The quality of patient-physician interactions improved through this small intervention and can hopefully foster positive relations and open communication for all future visits.

Importantly, the new tools were not only effective but also time efficient. There was a statistically significant reduction in the time required to perform education when utilizing the tools. Time is critical in healthcare and this intervention freed up a substantial amount of visit time for providers.

Of note, patients perceived comprehension was high during both pre- and post-intervention phases, however, objective knowledge was low in both periods. This discrepancy between perceived understanding (self-reported comprehension rating) and actual understanding (objective knowledge score) is concerning. This may represent a false sense of understanding and misinformed confidence among patients which may contribute to poor medical management and decision making in this population.

This study was limited by the anonymity of the surveys and questionnaires. This limited our ability to quantify how many patients and providers participated in both pre-intervention and post-intervention phases. Another limitation was our inability to fully standardize the education provided. Both standard of care patient education (pre-intervention education) and education with the new tools (post-intervention education) allow room for provider variance during the OB visits.

In future studies, I would include patient identifiers to the Patient Questionnaire responses. This would allow us to follow the health course of each woman. We would be able to monitor short- and long-term health outcomes of the surveyed women and their babies. We could then answer the question: Are there better health outcomes for mothers who receive education with the new tools compared to those who receive standard of care education?

Conclusion

This study demonstrated that an interactive education tool designed for pregnant women who have hypertension effectively increased women's knowledge of their condition, management of their health condition, including how to manage their health condition and when to report symptoms to their provider. Both patients and providers reported higher comprehension scores for patients who received education with the new tools. Providers rated the new tools as an

improvement over the previous educational method, and reported the new method as more efficient, i.e., less time consuming.

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Appendix 2: 'Signs and Symptoms' Tear Sheet

Ask Your Doctor or Midwife

Preeclampsia

What Is It?
Preeclampsia is a serious disease related to high blood pressure. It can happen to any pregnant woman during the second half of her pregnancy.

Risks to You	Risks to Your Baby
<ul style="list-style-type: none"> • Seizures • Stroke • Organ damage • Death 	<ul style="list-style-type: none"> • Premature birth • Death

Signs of Preeclampsia

 Stomach pain	 Headaches
 Feeling nauseous; throwing up	 Seeing spots
 Swelling in your hands and face	 Gaining more than 5 pounds (2,3 kg) in a week

What Should You Do?
Call your doctor or midwife right away. Finding preeclampsia early is important for you and your baby.

For more information go to www.preeclampsia.org
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Pregúntele a su doctor o a la partera

Preeclampsia

¿Qué es?
La preeclampsia es una enfermedad grave que está relacionada con la presión alta. Es algo que puede pasarle a cualquier mujer embarazada durante la segunda mitad de su embarazo o hasta 6 semanas después de su parto.

Riesgos para usted	Riesgos para su bebé
<ul style="list-style-type: none"> • Convulsiones • Derrame o ataque cerebral • Daño a algún órgano • Muerte 	<ul style="list-style-type: none"> • Nacimiento prematuro • Muerte

Sintomas de la preeclampsia

 Dolor de estómago	 Dolores de cabeza
 Náuseas, vómitos	 Ver manchas
 Hinchazón en las manos y en la cara	 Subir más de 5 libras (2,3 kg) de peso en una semana

¿Qué se debe hacer?
Lláme de inmediato a su doctor o partera. Detectar a tiempo la preeclampsia es importante para usted y para su bebé.

Para más información, vaya a www.preeclampsia.org
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