Exploring Implementation of m-Health Monitoring in Postpartum Women with Hypertension

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Abstract

Background: *Preeclampsia is a hypertensive disorder in pregnancy where a patients' blood pressure and warning signs of worsening disease need to be closely monitored during pregnancy and the postpartum period.*

Introduction: *No studies have examined remote patient monitoring using mobile health (m-health) technologies in obstetrical care for women with preeclampsia during the postpartum period. Remote monitoring and m-health technologies can expand healthcare coverage to the patient's home. This may be especially beneficial to patients with chronic conditions who live far from a healthcare facility.*

Materials and Methods: *The study was designed to identify and examine the potential factors that influenced use of m-health technology and adherence to monitoring symptoms related to preeclampsia in postpartum women. A sample of 50 women enrolled into the study. Two participants were excluded, leaving a total sample size of 48 women. Users were given m-health devices to monitor blood pressure, weight, pulse, and oxygen saturation over a 2-week period. Nonusers did not receive equipment. The nurse call center monitored device readings and contacted participants as needed. Both groups completed a baseline and follow-up survey.*

Results: *Women who elected to use the m-health technology on average had lower levels of perceived technology barriers, higher facilitating condition scores, and higher levels of perceived benefits of the technology compared with nonusers. Additionally, among users, there was no statistical difference between full and partial users at follow-up related to perceived ease of use, perceived satisfaction, or perceived benefits.*

Discussion: *This study provided a basis for restructuring the management of care for postpartum women with hypertensive disorders through the use of m-health technology.*

Conclusion: *Mobile health technology may be beneficial during pregnancy and the postpartum period for women with preeclampsia to closely manage and monitor their blood pressure and warning signs of worsening disease.*

Keywords: *bluetooth, hypertension, m-health, postpartum, telehealth, remote patient monitoring, telemedicine*

Introduction

The incidence of hypertensive disorders in pregnancy is increasing and currently affects 5–10% of all pregnancies.[1,2] Preeclampsia is a specific hypertensive disorder during pregnancy, complicating about 5–8% of pregnancies, and is one of the top six causes of maternal mortality in the United States (U.S.).[3] Over the past two decades, evidence has suggested that the incidence of preeclampsia is rising in the U.S.[3] Current evidence-based practices recommend that pregnancies complicated by preeclampsia are monitored in the hospital for several days following delivery since the patient may still have an elevated blood pressure, headaches, and worsening symptoms even though the preeclampsia was cured by the delivery itself.

Worsening disease can occur after delivery and the late postpartum period can occur up to 23 days after birth. Additionally, best practices suggest that when blood pressure is elevated and antihypertensive medications are started, this extra hospital time allows practitioners the ability to titrate medicine to stabilize the blood pressure before discharge.[4,5] However, if these evidence-based recommendations could be met safely and effectively through outpatient management with remote patient monitoring using mobile health (m-health) technologies, healthcare savings could be significant.[6]

More sophisticated technologies to facilitate remote patient monitoring, such as m-health, are now available and may be the innovative answer to reduce preeclampsia-related maternal and perinatal morbidity. These technologies offer

healthcare professionals the opportunity to expand their healthcare coverage to the patient's home, and the ability to improve decision-making, provide emergency care, manage chronic conditions, and ultimately save lives through strengthened care.[7] This type of healthcare delivery system has the potential to revolutionize the delivery of healthcare in developing countries to manage health conditions by providing more efficient communication and feedback from healthcare professionals. In addition, m-health can also empower patients with the education and knowledge to make better health-related decisions, adhere to a medical regimen, and ultimately have better control of their own health.[8]

Because most rural states have limited obstetrical specialty care resources compared with areas with dense populations, a tertiary care center in an urban area is critical in care management of antepartum and postpartum women with high-risk conditions. Oftentimes, these very ill women with preeclampsia are transferred to a tertiary care center before delivery and may be hours from their home.[9] Mobile health offers healthcare professionals the ability to closely monitor women after delivery without having them hospitalized. Many women may travel several hours one-way from their rural community for prenatal and postpartum visits with a specialist. The increased distance between the patient and her healthcare team may add additional financial burdens and limit adherence to their treatment regimen compared with a patient who lives closer to her healthcare team. Thus, utilizing m-health technologies to transfer blood pressure and weight readings in real time to a centralized location staffed by nurses may reduce these burdens and increase communication with the healthcare team.

A number of studies done on patient adherence agree that effective communication between health professionals and their patients is essential in maximizing adherence to treatment.[10] A study by Friedman et al.[11] on patients with hypertension found that simply adding an automated telephone call to the patient's usual medical care plan resulted in improved medication adherence and blood pressure control. Mutual collaboration and enhanced communication foster greater patient satisfaction, decrease the risk of nonadherence, improve patient outcomes,[11] and can be effective options in disease management. Even though there have been four decades of research in patient populations with chronic diseases outside of pregnancy, patient adherence to disease management continues to be an area in need of more attention with more research efforts devoted to new intervention studies. In addition, little research has been conducted on the impact of patient adherence on clinical outcomes. Intervention strategies utilizing technology may offer a better analysis of adherence behavior[12] in patients with diseases, including hypertension and preeclampsia.

To date, no studies have examined the use of remote patient monitoring using m-health technologies in obstetrical care for women with preeclampsia during the postpartum period. Thus, the purpose of this proof-of-concept study was to explore why some women with preeclampsia chose remote patient monitoring in the postpartum period and why some women declined to participate as well as to assess feasibility of remote patient monitoring and the infrastructure needed to manage these women with preeclampsia from home.

Materials and Methods

STUDY DESIGN

The primary aims of this pilot study were to (1) identify and examine the patient factors that influence a patient's decision to enroll in remote patient monitoring using the m-health user cohort or m-health nonuser cohort, (2) assess whether there were any differences between patients who chose m-health monitoring and those who did not regarding treatment adherence and health outcomes, and (3) describe the level of perceived patient experience with the technology among those who enrolled in the m-health monitoring cohort.

PARTICIPANTS

In this study, postpartum hypertensive women chose to be a user and received m-health devices to record their vital signs (blood pressure, weight, pulse, and oxygen saturation) and symptoms at home following hospital discharge, or they were a nonuser and did not receive the m-health devices. Inclusionary criteria included that the women speak English, be at least 18 years of age who delivered at the University of Arkansas for Medical Sciences during the study period, and have a pregnancy that was complicated by preeclampsia. Exclusionary criteria included having a diagnosis of a psychiatric disorder or not having telephone access. It was necessary to exclude patients without a phone in the pilot phase of the research study since it was necessary for the call center nurse and the research staff to have access to the patient through phone communication if vital signs warranted intervention.

At enrollment, all participants completed a baseline survey assessing demographic information and their perceptions about technology. Those in the user group were given m-health equipment to take home for self-monitoring for 2 weeks and were given instructions on how to use the system, while those in the nonuser group were given standard care instructions. Additionally, user and nonuser participants completed a follow-up survey 2 weeks after enrollment to evaluate their perceptions of m-health technology.

The Institutional Review Board approved this research study (No. 203360), and all participants provided informed consent before any study procedures occurred.

Given that the primary study aim was to examine the patient characteristics among those who chose to be an m-health user versus m-health nonuser, the study design was a nonrandomized controlled study. Thus, a sample of 50 women diagnosed with preeclampsia who were hospitalized and postpartum enrolled into the study. Two participants were excluded due to lack of adherence, leaving a total sample size of 48 women. For data analysis, the users were further divided into full user and partial user subgroups. The women who completed 23 or more of the 28 readings (taken twice a day) for vital signs (blood pressure, weight, pulse, and oxygen saturation) were considered full users, while women who completed 22 readings or less were considered partial users.

DEVICE AND IMPLEMENTATION

The Food and Drug Administration (FDA)-approved system used in this study included Ideal Life equipment (IDEAL LIFE, INC., Toronto, Canada) consisting of a blood pressure monitor, weight scale, and pulse oximeter. All of these devices connected through Bluetooth to a wireless gateway that transmitted results to a secure cloud-based Caregiver Portal (Verizon's Converged Health Management) where the readings and screening questions were monitored by nurses at the ANGELS Nurse Call Center (NCC). For up to 24 h before discharge from the hospital, the patient's blood pressure was monitored by her postpartum nurse in the usual manner while the patient was trained to use the m-health equipment. After discharge from the hospital, the patient monitored her blood pressure and pulse oximeter twice per day, once in the morning and once in the evening. She also monitored her weight in the morning and a series of symptom-related questions once daily. Nurses at the ANGELS NCC monitored the readings and symptom questions and called the patient if vital signs were out of range or if symptoms were indicated. While on the phone with the patient, the ANGELS NCC nurse determined if the patient needed additional care over the phone, at the clinic, or at the emergency department.

MEASURES

At baseline, we measured both groups' perception of technology using a modified set of questions extracted from the technology acceptance model (TAM).[13,14] Additionally, we modified items from Champion's publication[15] to assess benefits and barriers of the m-health system. All items were measured using a Likert response scale (1 = strongly disagree, 7 = strongly agree). For a full list of items used for each domain, see *Table 1*.

Technology anxiety. We used four items for technology anxiety, a construct that has been demonstrated to be a determinant of technology acceptance.[13] A composite sum score was derived with higher scores indicating a higher level of technology anxiety.

Facilitating conditions. We measured facilitating conditions based on a composite sum score of three items from the Venkatesh et al.[14] TAM model (higher scores indicating better facilitating conditions). Facilitating conditions represent organizational support that facilitates the use of informational technology[16] such as m-health.

Perceived benefits and barriers to the use of technology. A total of eight items were used to address both perceived benefits and barriers for the baseline survey. A composite sum score of four items for each domain was obtained.[15] For both domains, higher scores indicated increases in both benefits and barriers.

During the follow-up assessment period, all participants completed questionnaires regarding treatment adherence and health outcomes (*Table 1*). Additionally, among only the users, participants were asked about their perceived ease of the use of m-health technology, satisfaction, and benefits.

Treatment adherence. The assessment of treatment adherence at the 2-week follow-up period was based on the Morisky et al.[17] self-reported measure of medication adherence. A composite sum score of three Likert items (1 = never, 7 = always) was used (lower score indicated greater level of treatment adherence).

Ease of use. The perceived ease of usage of the m-health technology was based on the composite sum score from the Davis[18] scale for acceptance of information technology.

Perceived satisfaction. We modified items from Bhattacherjee and Premkumar[19] and used four items to obtain a composite sum score, with higher scores indicating higher levels of perceived satisfaction.

Perceived benefits during the follow-up period. We included three additional questions and took two of the original questions used from the baseline survey to measure this domain during the follow-up period (higher scores indicated greater level of perceived benefits).[15]

Table 1. Baseline and Follow-Up Survey Items

	CRONBACH'S ALPHA
Baseline survey	
Technology anxiety[a,10]	
Using technology makes me nervous	0.73
Using technology makes me uncomfortable	
Using technology does not scare me at all	
Using technology makes me feel uneasy	
Facilitating conditions[a,11]	
I have the resources at home necessary to use the m-health system	0.82
I have the knowledge necessary to use the m-health system at home	
There is a specific person or people available at home to assist me if I have difficulties with the m-health system	
Benefits[a,12]	
Using the m-health system would help me monitor my risk for preeclampsia complications	0.67
Using the m-health system will decrease my chances of experiencing complications from preeclampsia	
Using the m-health system is the best way for me to monitor my risk for preeclampsia complications	
Using the m-health system will help me find out if I am at risk for preeclampsia early	
Barriers[a,12]	
Using the m-health system would take too much time	0.56
I don't know how to go about using the m-health system	
Using the m-health system would compromise my health privacy	
Using the m-health system daily would be hard for me to do	
Follow-up survey	
Treatment adherence[b,13]	
How often did you forget to monitor yourself for these warning signs and symptoms?	0.79
How frequently do you feel you were careless about monitoring yourself for these warning signs and symptoms?	
When you felt better, how often did you stop monitoring yourself for these warning signs and symptoms?	
Questions for full or partial m-health users	
Ease of use[c,14]	
Learning to operate the m-health system was easy for me	0.88
I found it easy to get the m-health system to do what I wanted it to do	
My interaction with the m-health system was clear and understandable	
I found the m-health system to be flexible to interact with	
It was easy for me to be skillful at using the m-health system	
I found the m-health system easy to use	

continued →

Table 1. Baseline and Follow-Up Survey Items *continued*

	CRONBACH'S ALPHA
Perceived satisfaction[c,15]	
I feel extremely satisfied with using the m-health system to monitor my health	0.84
My choice to use the m-health system to monitor my health at home was a wise one	
I think that I did the right thing when I used the m-health system to monitor my health at home	
The m-health system is exactly what is needed for home-based postpartum health monitoring	
Perceived benefits[c,12]	
Using the m-health system was the best way for me to monitor my health at home	0.88
Using the m-health system decreased my chances of experiencing complications related to postpartum preeclampsia	
Using the m-health system increased my chances of early detection of warning signs and symptoms related to postpartum preeclampsia	
I felt greater peace of mind about my health and well-being due to using the m-health system	
By using the m-health system, I worried less about my risk of having complications related to postpartum preeclampsia	

[a]Likert scale: 1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = neutral; 5 = somewhat agree; 6 = agree; 7 = strongly agree.

[b]Likert scale: 1 = never; 2 = rarely, ~10% of time; 3 = occasionally, ~30% of time; 4 = sometimes, ~50% of time; 5 = frequently, ~70% of time; 6 = usually, ~90% of time; 7 = always.

[c]Likert scale: same scale as [a], but 4 = neutral/don't know.

STATISTICAL ANALYSES

To address the first aim of this pilot study, we compared the profile of women in the users group and nonusers group based on demographic information and baseline perception of technology. Given the sample size, this assessment was performed based on only univariate analyses. More specifically, these comparisons were made through the use of a chi-squared test, Fisher's exact test, and a two-sample independent *t* test, as appropriate. For the second aim, a two-sample *t* test was used to compare the mean composite adherence scores of users and nonusers. Additionally, Fisher's exact test was used to determine any difference in health outcomes based on whether or not a participant who had been discharged from the hospital returned to a medical facility due to complications related to preeclampsia. Finally, a two-sample independent *t* test was used to compare full users and partial users with respect to a composite sum score of responses for each of the following: perceived ease of use, perceived satisfaction, and perceived benefits.

Results

Of the 48 eligible participants, 25 women chose to enter the user cohort, while 23 elected for the nonuser group. Of the 25 users, only 21 opted to complete the follow-up survey and qualitative interview, with 15/21 classified as full users for fulfilling the minimum requirement of m-health usage for the duration of the project and 6/21 designated as partial users for not meeting this threshold. Of the 23 nonusers, 16 completed the postphase of the study.

Cronbach's alpha was calculated for all measures (*Table 1*). Demographic information and technology perception for users and nonusers are summarized in *Table 2*. There was no statistically significant difference between these two groups in terms of race (white/black), age, marital status, education, income, work hours per week, rural/urban, delivery complications (1 vs. >1), C-section, length of hospital stay before delivery or after delivery, gestational age, or history of a blood pressure problem during a prior pregnancy. With respect to technology measures at baseline, there was a statistically significant difference between users and nonusers in terms of facilitating conditions, perceived benefits, and perceived barriers. More specifically, users on average had higher facilitating condition scores, higher levels of perceived benefits, and lower levels of perceived barriers compared with nonusers. There was no statistical difference between the two groups in terms of technology anxiety.

For treatment adherence, the mean composite score for users was 5.5 (standard deviation [SD] = 3.14), and for nonusers, it was 8.2 (SD = 4.90). However, no statistical difference between the two groups was indicated ($p = 0.0521$). With respect to health outcomes, there was a significant difference between users and nonusers ($p = 0.0046$), where 42.9% ($n = 9$)

Table 2. Demographic Characteristics and Technology Measures Based on Baseline Survey

	USERS (*N* = 25)	NONUSERS (*N* = 23)	*p*
Maternal measures			
Caucasian, *N* (%)	12 (48.0)	12 (52.2)	0.7726
Age, mean ± SD	26.8 ± 5.2	27.9 ± 5.0	0.4394
Married, *N* (%)	13 (52.0)	12 (52.2)	0.9904
>High school, *N* (%)	14 (56.0)	15 (65.2)	0.5142
Income (>$30,000 per year), *N* (%)	7 (28.0)	11 (47.8)	0.1564
Work (≥11 h per week), *N* (%)	11 (44.0)	11 (47.8)	0.7904
Rural, *N* (%)	11 (44.0)	7 (30.4)	0.3321
Delivery complications >1, *N* (%)	4 (16.0)	5 (21.7)	0.7195
Hospital days prior to delivery, mean ± SD	1.8 ± 2.0	2.2 ± 2.4	0.5969
C-section, *N* (%)	21 (84.0)	18 (78.3)	0.7195
LOS after delivery, mean ± SD	3.7 ± 2.1	3.9 ± 1.7	0.7360
History of blood pressure problem during a prior pregnancy, *N* (%)	9 (36.0)	8 (34.8)	0.9298
Gestational age, mean ± SD	33.1 ± 3.3	33.7 ± 3.7	0.5968
Technology measures			
Technology anxiety, mean ± SD	7.7 ± 3.0	8.7 ± 5.1	0.4302
Facilitating conditions, mean ± SD	19.9 ± 1.3	18.5 ± 1.6	0.0024
Benefits, mean ± SD	25.2 ± 2.5	23.1 ± 2.8	0.0072
Barriers, mean ± SD	6.9 ± 2.5	10.2 ± 4.7	0.0055

SD, standard deviation; LOS, length of stay.

of the users returned to a medical facility, while none of the nonusers returned to a medical facility.

After comparing full users and partial users regarding perceptions of m-health monitoring, there was no indication of a statistically significant difference between the two groups in terms of perceived ease of use, perceived satisfaction, or perceived benefits (*Table 3*).

Discussion

A recently published study[20] evaluated the functionality and acceptability of wireless vital sign monitors to capture heart rate, respiratory rate, and temperature in hospitalized pregnant women. They discovered that most women found the devices comfortable, likeable, and useful. The authors also emphasized the importance of monitoring blood pressure in obstetrical populations using wireless technologies.[20] However, no studies have examined the challenges of introducing m-health technologies into obstetrical care for women with hypertensive disorders, including preeclampsia during the postpartum period. Our study attempted to fill this gap in the literature by providing pilot data using m-health technologies to manage treatment using an outpatient model of care for postpartum women with hypertension. If a patient's blood pressure remains elevated and antihypertensive medication is started while they are an inpatient postdelivery, it often takes days to titrate the medicine to stabilize the blood pressure before discharge. Therefore, if preeclamptic women could be safely managed during the postpartum period as outpatients rather than inpatients, healthcare savings and patient burdens could possibly be reduced. Management for hypertensive disorders in both the pregnancy and the postpartum period has not changed empirically in over a decade.[21] This study may give some basis of restructuring the management of care for these women.

Although our pilot study focused on postpartum women, the impact could potentially be even greater if the m-health monitoring started during pregnancy with continued follow-up during the postpartum period. We recruited postpartum women with preeclampsia because traditionally these women are monitored as inpatients for additional days

Table 3. Follow-Up Survey Evaluation Between Full Users and Partial Users

	FULL USERS (*N* = 15)	PARTIAL USERS (*N* = 6)	p
Postsurvey measures			
Perceived ease of use, mean ± SD	38.3 ± 4.3	35.8 ± 4.8	0.2592
Perceived satisfaction, mean ± SD	25.8 ± 2.4	25.8 ± 2.1	0.9765
Perceived benefits, mean ± SD	31.9 ± 4.0	30.5 ± 3.6	0.4742

following delivery and, once discharged, they do not typically receive follow-up care until 1–2 weeks later. Selecting this population provided the opportunity to test the feasibility of the project in women who were hospitalized following delivery. Additionally, it allowed sufficient time to train the users on the m-health technology and to problem-solve any issues before their discharge.

MANAGEMENT IN THE POSTPARTUM PERIOD

Case management, especially for those with high-risk conditions requiring additional education and monitoring of their health status, can be an invaluable tool and resource. Current evaluations of postpartum hypertension should utilize a multidisciplinary approach that takes into account pregnancy risk factors, time of onset related to delivery, disease symptoms, laboratory findings, and how a patient responds to initial therapy.[22] Recent studies have shown that case management utilizing m-health technology has a positive impact on maternal and infant outcomes, behavior change, and adherence to treatment. A 2013 study assessed the effects of telephone support in women during pregnancy and 6 weeks postpartum on maternal and infant outcomes and found an increase in women's overall satisfaction with care when compared with routine care.[22] Additionally, Vodopivec-Jamsek et al.[23] found in their analysis of various mobile phone messaging interventions for preventative healthcare and desirable behavior outcomes that there was increased adherence to treatment regimen, increased confidence level, and decreased anxiety level. Furthermore, a study on telephone nursing case management of high-risk mothers and infants in a large managed care organization found an enormous impact on health outcomes of mothers and babies, resulting in fewer babies hospitalized in a neonatal intensive care unit (NICU) and fewer mothers with high-risk conditions.[24]

Current recommendations suggest that postpartum care should include management of hypertension, especially since these symptoms can develop for those with and without a history of hypertension or preeclampsia in the antepartum period.[21] In addition, during the postpartum period, these women are more prone to develop premature cardiovascular disease[25] and are at increased risk for ischemic heart disease.[21] They may also be at risk for edema due to excess fluid and seizures related to the risk of eclampsia.[26] Due to the many risks associated with postpartum preeclampsia, early detection and proper management of the symptoms are necessary to reduce further complications. When a postpartum woman with elevated blood pressure is monitored as an inpatient, she must remain away from her family sometimes in a hospital that is far from her home for more additional days postdelivery compared with women without high-risk conditions. Sometimes the woman has to be hospitalized because she is far from a hospital or clinic that could provide emergency triage and care, whereas a woman who lives closer to the hospital could be managed on an outpatient basis. The hospitalization causes separation of the woman from her family and support system, which may include her other children, significant other, extended family, and friends, as well as her community, and can prove to be a difficult situation. Especially in a state with a large rural population, this can be an additional financial strain on the woman.

INCREASING THE ACCEPTANCE OF M-HEALTH TECHNOLOGY

Based on our findings, women who chose not to use the m-health technology (i.e., nonusers) reported greater perceived barriers and lower facilitating conditions and benefits compared with the users. In the future, it would be important to identify how to work best with nonusers to improve these limitations and in turn make them users. One possible solution to help overcome these challenges is to introduce the technology to patients during their pregnancy itself. This would allow women ample time to get comfortable with the technology and overcome some level of anxiety, thus providing them a motivation for continued use in the postpartum period. Although we narrowed our recruitment to the postpartum period to provide a good control setting, this may have contributed to higher anxiety, resulting in a higher percent of nonusers. After going through the stress of labor and delivery as well as adapting to the new role as a mother, these women may not be as motivated to adapt to new technology.

Lessons learned related to using m-health technology in the field were also an important finding in this pilot study. Many of the women in the study, when enrolled, stated they had a personal phone. However, several of these women had a limited number of minutes on their cellular phones and preferred texting as their mode of communication with the NCC. Our solution to facilitate texting communication was to provide a centralized cell phone to the NCC for the nurses to communicate with the women being monitored. The second issue found that connecting to the wireless gateway for one of the users who lived in a rural setting was a problem. Even though the m-health equipment was equipped with cellular service, this woman's readings would not get transmitted. To get the data transmitted, the woman had to take the equipment to a different location to upload the data. The third issue was collecting the equipment once the monitoring was completed. Women were instructed to bring the equipment back during

their follow-up visits. However, if that was not possible, each equipment box included prepaid postage for it to be mailed back to the study team. Even with these two methods of equipment return, for one woman, the research team had to travel to her home to retrieve the equipment. For other women, multiple requests were made before the equipment was finally returned to the clinic or mailed back. Even with these issues, this pilot study allowed for corrections to be made and resolved before expansion in a larger patient population.

Even though remote patient monitoring using m-health is a reasonable intervention, it requires significant infrastructure and funds to facilitate the implementation. Remote patient monitoring software typically alerts a nurse or provider when vital sign readings are outside of the norm. The vital sign readings must be addressed and triaged to determine if additional care is needed. In addition to infrastructure for triaging women with vital sign alerts, there also is a need to coordinate care of the hypertensive patient in the outpatient setting and inpatient setting. To facilitate enrollment in the remote patient monitoring program, to instruct women how to use the m-health equipment, to determine infrastructure needed to provide remote patient monitoring, and to test feasibility, the postpartum period was chosen to pilot remote patient monitoring in preeclamptic women. However, one main challenge observed during enrollment was getting the m-health blood pressure device to calibrate with the hospital blood pressure machines on some patients. The m-health blood pressure device was equipped with only one blood pressure cuff size, and as a result, patients of differing size upper arm circumferences could not always be enrolled. A limitation of our pilot program and research study is that ideally observation and monitoring of women with preeclampsia would occur before delivery. However, due to a small research budget and a limited number of m-health devices, the healthcare team chose to conduct this proof-of-concept feasibility study in a convenient population, which consisted of women in a postpartum unit with preeclampsia. This resulted in a small sample size, which limits our ability to draw conclusive results. In addition, introduction of remote patient monitoring in the postpartum period was theoretically safer since there would be only the woman to monitor and not the woman and fetus. During pregnancy, assessment and evaluation of the fetus would need to be integrated into the remote care.

Despite the limitations of the number of participants in the study, we believe that this study provided valuable data. The study provided findings on implementation of m-health technology in managing hypertension in the postpartum period. This technology may be beneficial during pregnancy and the postpartum period in underserved areas where the lack of or under management of the condition could significantly impact both the mother and the fetus.

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