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Research Article

Empowering Mothers Through the First Six Weeks of Postpartum: A Pre-Pilot Feasibility Trial of Thrice-Daily Blood Pressure Monitoring

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Abstract

Background: The postpartum period remains one of the highest-risk windows for maternal morbidity and mortality, yet consistent monitoring outside of the hospital is rare. Self-monitored blood pressure (SMBP) and vitals tracking may provide a scalable strategy to improve postpartum care, but feasibility has not been well studied.

Objective: To evaluate the feasibility and acceptability of a pre-pilot postpartum monitoring protocol involving surveys, vitals tracking, and qualitative feedback, to refine procedures for a larger multi-arm trial.

Methods: Participants were enrolled via purposive recruitment: ten completed the study (83.3% retention). Inclusion criteria were age > 18 years, singleton pregnancy, and no history of hypertension. Participants completed pre- and post-birth surveys and were instructed to measure blood pressure (three times), heart rate (once), and oxygen saturation (once) on two designated days each week for six weeks postpartum. Semi-structured interviews at study completion (6 weeks postpartum) explored usability, barriers, and acceptability.

Results: Survey completion rates were high (pre-birth 90%; post-birth 70%). Adherence to vitals tracking was moderate: five participants completed all 60 expected entries, two provided partial data, and three submitted none. Across 10 completers, 202 blood pressure, 186 heart rate, and 206 oxygen saturation readings were submitted. Participants reported that structured monitoring days improved adherence. Four mothers described feeling "empowered" and "more knowledgeable" through tracking, and two brought their logs to clinical visits. Feedback highlighted the need for clearer guidance on blood pressure thresholds and standardized templates.

Conclusions: This pre-pilot feasibility study demonstrates that postpartum self-monitoring of blood pressure and vital signs is both acceptable and empowering, though adherence varied across participants. Insights from this cohort—including the value of structured monitoring days, clear educational thresholds, and integration with clinical visits—directly informed refinements in a new IRB-approved protocol. These findings lay the foundation for a scalable model of postpartum care with the potential to bridge home and clinic and address critical gaps in maternal health.

Keywords: Postpartum Hypertension; Hypertensive Disorders of Pregnancy; Home Monitoring

Abbreviations: Hypertensive Disorders of Pregnancy (HDP), Blood Pressure (BP), Postpartum Blood Pressure (PPBP), Self-Measured Blood Pressure Programs (SMBP), Heart Rate (HR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Pulse Oximetry (SpO2), Gestational Hypertension (GHTN), Hypertension (HTN), Neonatal Intensive Care Unit (NICU), Hemolysis, Elevated Liver Enzymes, Low Platelet Count (HELLP) Syndrome

Introduction

The postpartum period, which is divided into three phases — immediate, early, and late postpartum — is used to designate the psychosocial and physiological changes experienced by a woman after delivery [1]. Despite these sub-categories, very little is understood about what risks may arise during the pivotal 42-day period immediately after birth (the first 6 weeks) [2]. Physiologically, it is understood that the body does not return to hemodynamically stable levels of homeostasis until nearly a year after delivery [1]. 40% of maternal deaths occur in the first six weeks of the postpartum period, yet very little is understood about how to monitor and mitigate these complications that may arise [3].

Hypertensive Disorders of Pregnancy (HDP) can affect up to 10% of pregnancies in general and capture a host of conditions and complications, remaining a significant cause of both maternal and infant mortality and morbidity worldwide [4,5]. HDP can include pre-existing chronic hypertension, gestational hypertension, preeclampsia, eclampsia, and hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome [4]. HDP is not always routinely and properly diagnosed, and only a small proportion of women diagnosed with HDP are discharged with antihypertensive medication [4]. Though some advancements have been made to prevent and treat preeclampsia with and without severe features, HDP incidence and outcomes differ greatly by race and ethnicity [5]. This is partly due to continuously evolving definitions for HDP, as new-onset gestational hypertension (GHTN) and preeclampsia, both of which are typically diagnosed at 20-weeks gestation or after, have changed in their criteria [5]. HDP, which used to be diagnosed strictly as sustained hypertension (> 140/90) with proteinuria, has now come to include maternal organ dysfunction, high liver enzymes, thrombocytopenia, visual disturbances, and persistent headache [5, 6]. The natural heterogeneity in how HDP manifests pathophysiologically further complicates how and if clinicians can properly identify, diagnose, and treat the clinical syndrome as it appears [5]. Beyond evolving definitions, differences in the incidence and outcomes of hypertensive disorders of pregnancy (HDP) by race and ethnicity largely reflect persistent racial disparities and biased treatment within maternal healthcare systems [5].

HDP can be associated with both maternal adverse outcomes such as stroke, organ failure, and death and perinatal adverse outcomes of placental abruption, growth restriction, stillbirth, preterm birth, and admission to a neonatal intensive care unit (NICU) [5]. Research has also demonstrated that HDP has further downstream effects, including increased risk for cardiovascular disease for women [5]. As mentioned above, while some traditional criteria for diagnosis of HDP has relied on a BP reading of 140/90 or greater, overall guidelines and treatment approach has changed very little in the last 60 years, despite both immediate and long-term deleterious effects [5,6]. There also remains an incredible variety of thresholds for antihypertensive medication due to potential fetal risks in utero from exposure to medication and general uncertainty regarding optimal timing for reduction of maternal BP [6]. Interestingly enough, changes to hypertensive clinical guidelines have occurred consistently for the general population, including a decrease in the threshold for Stage 1 Hypertension detection and diagnosis [6]. HDP, and the greater pregnant and postpartum population, have not experienced the same evolution. Given the fact that HDP incidence is on the rise — because of advanced maternal age and increased prevalence of a variety of cardiometabolic conditions — and maternal morbidities and mortalities only continue to grow, it is prudent that research specifically examines better ways to identify, diagnose, and treat HDP.

Many mothers, who may not even have a history of HTN in any capacity, may develop Blood Pressure (BP) instability in the postpartum period due to rapid and unpredictable fluctuations [3,4]. But there has been little work done in regard to the shifting medication and screening requirements for this population that otherwise may be labeled "low-risk" [3,4]. Given the fact that in the United States, attendance to the six-week postpartum visit ranges from 24% to 95%, with adherence averaging at 72%, there specifically remains a large lack of clinical oversight during this physiologically turbulent time, which only further compounds the racial and ethnic disparities mentioned above [7]. There is emerging evidence in the field that suggests Self-Measured Blood Pressure (SMBP) programs, such as those focused on the home, may lead to earlier detection and mitigation of postpartum hypertension or preeclampsia [4,8]. This may also increase overall care in the postpartum period and potentially compensate for racial disparities that emerge in office follow up [4,8].

Researchers have demonstrated that remote SMBP programs lead to a significant reduction in adverse outcomes and less visits to the Emergency Department (ED) within the first 6 months post-delivery, suggesting a reduction in overall cost and time burden as well as disease incidence [9]. While a variety of studies aim to evaluate the effectiveness and harms of SMBP programs in general, there is very little research in the field that specifically considers the feasibility of implementing a structured protocol for BP management and monitoring for postpartum women. Ambulatory and continuous home BP monitoring studies from Europe indicate that blood pressure variability is highest in the early postpartum period, including nocturnal, masked, and episodic hypertension 6-12 weeks after delivery [10]. Existing research on postpartum blood pressure monitoring thus typically falls at two extremes: protocols recommending a single daily reading, or studies employing continuous or ambulatory monitoring devices. Once-daily checks risk missing episodic elevations and diurnal variability, while constant monitoring can be burdensome, costly, and impractical for long-term use. This study sought to test a middle ground—structured, thrice-daily self-monitoring over six weeks postpartum—to balance feasibility with the ability to capture physiologic fluctuations across the day, thereby enhancing early

detection of concerning trends in the postpartum period. By testing feasibility and refining study procedures, this work aims to lay the foundation for a larger trial and, ultimately, for clinical guidelines that standardize postpartum vital sign management and allow for better diagnosis and management of HDP.

Methods

Design Overview

This pre-pilot was a mixed-methods, prospective, single-arm feasibility study that combined quantitative surveys, longitudinal self-monitored vitals tracking, and qualitative semi-structured interviews. Participants completed structured pre-birth surveys covering demographics (age, race/ethnicity, occupation), past medical and obstetric history (hypertension, PCOS, anemia, gestational complications, miscarriages), lifestyle factors (alcohol, tobacco, THC/CBD use), medications, vaccination status, and social determinants of health. Post-birth surveys assessed delivery mode and complications (e.g., vaginal tears, hemorrhage, c-section indication), maternal recovery and postpartum symptoms, length of hospital stay, and infant outcomes (birth weight, NICU admission, feeding method). In addition, participants were asked to submit vital sign logs — thrice daily blood pressure logs, and once daily heart rate and oxygen saturation measures. Upon completion of the 6-week monitoring period, participants engaged in semi-structured interviews to explore acceptability, barriers, and perceived value of the protocol. The main aim of this pre-pilot feasibility trial was to assess operational feasibility — recruitment/retention, consent and survey completion, and adherence to self-logged vitals tracking — not to test clinical efficacy or produce generalizable clinical conclusions.

Participants were provided with validated home-monitoring equipment by the study team for postpartum vital sign collection. Each received the Pressure X Pro blood pressure monitor (Oxiline), an FDA 510(k)-cleared device that records both systolic and diastolic blood pressure as well as heart rate. To complement blood pressure monitoring, participants were also issued a pulse oximeter for daily measurement of oxygen saturation and heart rate. All devices were distributed by study staff, and standardized instructions for use were reviewed with participants at enrollment.

Recruitment and Retention

Participants were recruited through purposive snowball sampling and in-house professional networks between March 2024 and July 2025. Eligible participants were postpartum individuals aged 18 years or older, residing in the Denver Metro Area, with singleton pregnancies and no history of hypertension, who were willing and able to complete surveys and engage in self-monitoring of vital signs. All participants provided written informed consent prior to enrollment.

Main Outcome Measures

The primary outcomes for this pre-pilot study were feasibility indicators, including recruitment rate, retention and withdrawal rates, survey completion rates, and adherence to self-monitored vitals tracking. Feasibility benchmarks were defined a priori as ≥75% retention, ≥80% survey completion, and ≥70% adherence to vitals tracking. Secondary outcomes included the completeness and plausibility of collected data, assessed by evaluating whether self-reported values for blood pressure, heart rate, and oxygen saturation fell within physiologic ranges. In addition, acceptability of study procedures was assessed through post-study semi-structured interviews, which explored participant experiences with surveys, consent, and the burden of thrice-daily monitoring. These measures were selected to evaluate the practicality of the protocol and to inform refinements for a larger multi-arm trial.

Semi-Structured Interviews

At the conclusion of the six-week vitals tracking period, participants were invited to complete a semi-structured interview to assess the acceptability and perceived value of the study protocol. Interview questions explored participants' ability to consistently track blood pressure, heart rate, and oxygen saturation, as well as any difficulties encountered with equipment use or remembering to complete scheduled entries. Additional domains included perceptions of knowledge attainment and the usability of postpartum education materials, the extent to which self-monitored vitals were discussed during visits with obstetric or primary care providers, and overall feedback on study design and suggestions for improving usability in future iterations. Interviews were conducted by phone or Zoom, audio-recorded with consent, and transcribed for analysis. Data were analyzed thematically to identify common barriers, facilitators, and recommendations.

All qualitative interviews were conducted by SN, who also designed and managed the study. Consent for audio-recording was explicitly obtained and prioritized to ensure transparency and participant comfort. As a woman of color researcher specializing in maternal health inequities, SN's positionality informed both the motivation and the sensitivity brought to interviewing postpartum participants. At the same time, her expertise in mixed-methods research guided the use of a semi-structured interview format to balance consistency with openness, thereby mitigating potential bias and allowing participants to share a full range of experiences, including both challenges and positive reflections. Reflexivity was further maintained through memo-writing during coding and review of emerging themes in collaboration with the study team, and specifically SP for her clinical expertise.

SP's clinical expertise in postpartum care provided an additional perspective in study design and interpretation, ensuring that survey content and analytic frameworks were grounded in clinical relevance while complementing the research team's methodological and equity-focused lens. This interdisciplinary collaboration supported a more balanced approach to both feasibility and interpretation of participant experiences.

Statistical Analysis Plan

Given the exploratory nature of this pre-pilot feasibility study, analyses focused on descriptive rather than inferential statistics. Recruitment, retention, survey completion, and vitals tracking adherence were summarized as counts and percentages and compared against a priori feasibility thresholds (≥75% retention, ≥80% survey completion, ≥70% vitals adherence). Continuous variables, including systolic and diastolic blood pressure, heart rate, and oxygen saturation, were summarized using means, standard deviations, medians, interquartile ranges, and overall ranges to assess data plausibility and stability. No hypothesis testing for effectiveness was conducted, as the study was not powered for clinical outcomes.

Qualitative data from semi-structured interviews were analyzed thematically using an inductive approach to identify common perceptions of feasibility, acceptability, and barriers to adherence. Emerging themes were triangulated with quantitative findings to contextualize participant experiences and inform refinements to the protocol for the subsequent multi-arm study.

Results

A total of 12 participants were enrolled in the pre-pilot feasibility study. Of these, 2 withdrew prior to completing study procedures (16.7% attrition, 83.3% retention). 9 participants (90%) completed the pre-birth survey. 7 participants submitted the vitals tracking log (70%) and 7 participants completed the post-birth survey (70%).

Demographics and Clinical Characteristics

The average maternal age in the cohort was 32 years, with a mean parity of 1.67, representing a generally older maternal population and both primiparous and multiparous participants. Five participants identified as non-Hispanic White and four as non-Hispanic Black. Delivery mode was predominantly vaginal (n = 5), with two cesarean sections reported. The mean birth weight was approximately 7 lbs. 13 oz and the average gestational age at delivery was 39.5 weeks Table 1. Most deliveries occurred at term, and complications were limited, primarily consisting of vaginal tears.

Table 1: Participant Demographic and Clinical Characteristics.

Characteristic	*Value*
Maternal Age, Years	Mean = 32.0 (SD = 5.7), Median = 33.0, IQR = 4.0, Range = 22–40
Parity	Mean = 1.67 (SD = 0.71), Median = 2.0, IQR = 1.0, Range = 1–3
Race/Ethnicity, n (%)	
– Non-Hispanic White	5 (55.6)
– Non-Hispanic Black	4 (44.4)
Mode of delivery, n (%)	
– Vaginal	5 (71.4)
– Cesarean section	2 (28.6)
Birth weight	Mean = 7 lb 13 oz (7.79 lb / 3.53 kg, SD = 0.86), Median = 7 lb 15 oz (3.60 kg), IQR = 1 lb 3 oz (~0.54 kg), Range = 6 lb 12 oz – 9 lb 1 oz (3.06–4.11 kg)
Gestational age at delivery, weeks	Mean = 39.6 (SD = 0.79), Median = 39.0, IQR = 1.0, Range = 39–41
Delivery complications	Limited; primarily vaginal tears

Participant demographic and clinical characteristics (n = 9). Values are presented as mean (SD), median, interquartile range (IQR), and range for continuous variables, and as counts with percentages for categorical variables. Birth weights are reported in both imperial and metric units.

Retention and Recruitment

Recruitment occurred across a wide gestational window, with consent obtained as early as 20 weeks + 2 days and as late as 40 weeks + 1 day. On average, participants enrolled at 25 weeks + 5 days, indicating that most recruitment occurred during the second and third trimesters. The time between consent and pre-birth survey completion was highly variable. While many participants completed both on the same day or within a few days, the longest observed delay was 43 days, and some records appeared misaligned, with pre-birth surveys timestamped before consent. These discrepancies suggest isolated data entry issues rather than true protocol deviations, as pre-birth survey links were only made available to participants after consent was signed and received. Overall, most participants successfully paired consent with survey completion in a short timeframe, supporting general feasibility for the pre-birth phase. There was a 20% decrease in completion between the pre-birth and post-birth survey. Retention across the study reflected mixed engagement: 10 of 12 participants completed the study, while 2 withdrew, providing partial but usable data.

Maternal Vitals Tracking

Maternal health tracking logs demonstrated moderate adherence to the expected twice-weekly schedule among active participants. Reporting captured morning, midday, and evening/bedtime readings. Adherence outcomes are reported as a proportion of completers (n = 10). Each participant was expected to record 60 entries over six weeks (10 readings per week: 3 blood pressure, 1 heart rate, and 1 oxygen saturation per day on two designated days), yielding 600 possible entries across the cohort (360 BP, 120 HR, 120 SpO_2). Actual submissions included 202 blood pressure readings, 186 heart rate readings, and 206 oxygen saturation readings.

Adherence varied; five participants completed all 60 expected entries, two provided partial data, and three submitted no vitals logs. Among participants with complete data, physiologic patterns were consistent. Midday heart rates peaked at 79 bpm compared to 73 bpm in the morning and 76 bpm in the evening, while evening systolic pressures averaged slightly higher at 113.5 mmHg compared to 111 mmHg earlier in the day. Oxygen saturation remained stable at 95–97%. Across the dataset, systolic blood pressures typically ranged between 110–130 mmHg and diastolic pressures between 60–80 mmHg. Heart rates remained within normal physiologic ranges, while oxygen saturation values were stable, averaging 96–100%. These findings suggest that while participants with high adherence could self-monitor effectively, overall engagement was diluted by non-loggers, highlighting the need for additional support or automation in future protocols Table 2.

Table 2: *Feasibility outcomes for maternal health tracking over six weeks (n = 10 completers).*

Outcome	Expected (n)	Actual (n)	Completion (%)
Blood pressure readings	360	202	56.10%
Heart rate readings	120	186	155.00%
Oxygen saturation readings	120	206	171.70%
Total possible entries	600	594	99.00%
Participants with full adherence	10	5	50.00%
Participants with partial adherence	—	2	—
Participants with no data submitted	—	3	—

Qualitative Findings

Feedback from the semi-structured interviews highlighted both barriers and facilitators to protocol adherence. Early in the study, instructions simply asked participants to record vitals two days per week without designating which days. This choice was originally made to give participants as much flexibility needed and reduce participation burden. However, the first two mothers who completed the study shared that this lack of structure made it harder to remember. They suggested that fixed days would have been easier to follow. In response, the study team implemented designated tracking days (Tuesdays and Saturdays) for subsequent participants, which improved clarity and consistency.

Overall, participants reported ease of use with survey questions and several expressed positive experiences with vitals tracking. Four mothers specifically described feeling "empowered" and more "knowledgeable" about their health by collecting and reviewing their own vitals. Even in the absence of abnormal readings, two participants reported bringing their vitals logs to postpartum visits with their obstetric or primary care providers, reflecting perceived utility of the data. Additional feedback included a desire for clearer educational materials on thresholds for concerning blood pressure values and the suggestion of a structured template for logging vitals. These qualitative findings underscore that participants valued the monitoring process but would benefit from more structured guidance and educational support in future studies.

Discussion

The primary aim of this pre-pilot feasibility trial was to examine feasibility of intervention, specifically through metrics of retention and completion, as well as scalability. The utility and feasibility of home-based health programs have grown tenfold after the COVID-19 pandemic, with telehealth monitoring becoming a key tool for many areas of medicine [11]. In fact, some research suggests that there has been a 200% increase in overall usage of telemedicine since 2020 [11]. Recently, there has been an emerging body of literature that aims to focus on the use of mobile applications and remote monitoring in both prenatal and postpartum care [12]. Research shows that while there is promising evidence that these formats work for improved care, barriers to implementation and overall feasibility often comes down to technology access [12]. There is overwhelming evidence that demonstrates the overall utility of programs is high when focused on various disease processes — diabetes, pregnancy-related HTN — and various complications — preterm births and cesarean section [12]. It is clear that remote monitoring and other telehealth models are extremely effective in

reducing adverse complications and managing disease, but there still remains a dearth of research when it comes to specifically examining the postpartum period and the management of blood pressure [12].

Our study showed an overall strong retention (83.3%), with survey completion exceeding a priori thresholds. This feasibility trial is the first of its kind to evaluate monitoring at three various time points per day, with most studies choosing to capture just one daily measurement. Our study was designed with the intention to evaluate feasibility and appropriateness of this protocol, given the nature of the postpartum period and to ensure that such low-burden measurements were acceptable amongst the target population. One study that utilized a novel wearable patch for vitals found their overall continuous remote monitoring to be 93% feasible, when asking participants to capture daily vitals and weight gain [13].

Through an iterative-feedback-improvement model, the study team was able to directly implement participant feedback, which led to specific protocol refinements such as moving from "any two days/week" to designated days (Tues/Sat). This led to increased levels of comfortability with the protocol, as shared in the qualitative semi-structured interviews, as well as more complete records. From a feasibility perspective, the lower engagement with the vitals tracking component highlights an important area for overall protocol refinement. While survey completion in its totality exceeded feasibility thresholds, adherence to daily vitals logging fell slightly below target, suggesting that sustained data entry may present a burden for participants in its current form. Pre-birth survey completion was higher than post-birth survey completion, with 9 of 10 participants (90%) completing the pre-birth survey compared to 7 of 10 (70%) completing the post-birth survey. This drop-off is consistent with the increased demands and competing priorities of the labor and delivery and postpartum period, which may reduce availability for follow-up tasks. The relative decline highlights both the feasibility of antenatal recruitment and the need for additional support — such as reminders or streamlined survey formats — to sustain engagement after delivery. To improve compliance in future iterations, strategies such as automated reminders will be implemented (see Appendix A). This will ultimately aid in reducing participant fatigue, increasing data completeness, and enhancing the scalability of the protocol for a larger trial.

In terms of the vitals tracking itself, participants were instructed to measure their BP three times a day, HR once a day, and SpO2 once a day, for two days every week. However, since the BP machines measured HR as well as Systolic/Diastolic, many participants recorded HR at every timepoint, resulting in a 155% completion rate for HR readings. Likewise, SpO2 was recorded greater than instructed, resulting in 200% completion. For better clarity and visibility into each timepoint, mothers will in the future be instructed to take every vital measurement at every timepoint. Originally, the justification for only asking for one HR and SpO2 measurement per day was to ease the burden of protocol on the patients. However, given that this was not necessarily a hard aspect of the study in general (in part due to the routine of taking the BP vitals at the three time points regardless and the dual purpose/functionality of the BP machine), it stands to reason that collecting all three vitals at all three timepoints is both feasible and relevant.

Qualitatively, in addition to increased comfort, 4 mothers reported feeling "empowered" and "more knowledgeable" as a result of this study. The literature on patient activation, which is a term commonly used in regard to chronic illness management, suggests that when a patient feels empowered, they are activated, and thus more able and capable of taking on a key role in their care, leading to better outcomes and less costly healthcare utilization [14]. The context of empowerment in pregnancy, childbirth, and postpartum is especially important, given the fact that 1 in 6 women in the US report feeling mistreated during their birthing experience, which has links to 2x greater rates of postpartum depression, amongst other physical and mental health effects [15,16]. Thus, the question and evaluation of the protocol as leading to/enabling empowerment is an incredibly relevant and important metric. Measuring empowerment provides critical insight into whether such protocols meaningfully support maternal autonomy, build confidence in navigating postpartum health, and ultimately strengthen patient engagement with clinical care.

An important finding from this pre-pilot was that two participants chose to bring their vitals logs to their postpartum visits with either an obstetrician or primary care provider. Neither of these participants exhibited any high or clinically adverse readings, so this behavior suggests that home-based postpartum monitoring has perceived clinical value and could serve as a bridge between patients and providers in the critical weeks following delivery. Given the fact that nearly 53% of maternal deaths occur in the postpartum period, and the literature suggests that constant physiological monitoring during the postpartum period can mitigate some of these complications, the overall utility of some form of structured tools—such as standardized templates, app-based dashboards, or direct data-sharing mechanisms—may further enhance care during this period [13].

At the same time, participants expressed a desire for clearer education on thresholds for blood pressure values that are concerning. Without adequate context, home monitoring may create uncertainty or even anxiety. These findings highlight the importance of pairing self-monitoring protocols with tailored educational support, ensuring that participants understand both normal ranges and warning signs. Providing accessible, evidence-based guidance alongside tracking tools could enhance confidence, reduce the risk of misinterpretation, and ultimately improve both adherence and clinical utility in a scaled-up trial.

Limitations

This study has several limitations that should be acknowledged. The small sample size and reliance on snowball recruitment from

in-house networks constrain the representativeness of the findings, and the absence of formal IRB oversight at this stage further limits the extent to which results can be generalized. Adherence to vitals tracking was highly variable, with some participants completing all expected entries while others provided partial or no data, diluting the overall dataset. Additionally, the geographic and demographic composition of the cohort—primarily drawn from a single metropolitan area—restricts external validity. These limitations underscore the preliminary nature of the findings and highlight the need for a larger, more diverse, multi-arm trial to confirm feasibility and scalability.

Implications for Scaling & Next Steps

Building on these preliminary findings, a refined protocol is currently being finalized under IRB review. Planned modifications (Appendix A) include the use of new designated tracking days and weekly online data logs, as opposed to paper logs to improve adherence. Likewise, since the question of clinical oversight and education regarding blood pressures was raised in this pre-pilot, a more detailed monitoring plan will be implemented by the study team, such that all vitals are reviewed intermittently, which will be coupled with education on high blood pressure, what symptoms to be aware of, and if readings are flagged, instructions to reach out to their PCP/OB immediately. Due to the new designated vitals days (Wednesdays and Sundays), the study team will be able to examine all inputted vitals on Thursday and Monday of every week, enabling enhanced clinical oversight and specific guidance should any readings be elevated. Verification processes will be implemented to ensure that participants did reach out to their provider (more details in Appendix A).

Integration of automated reminders to reduce participant burden and implementation of one additional survey - at 6 weeks postpartum - will allow for more accurate capture of the experiences in the postpartum period. Additionally, various psychosocial indicators — stress, anxiety, depression, and sleep — will be evaluated at all three survey timepoints. Recruitment strategies will expand beyond in-house networks to include clinical sites and community partners, with the aim of improving representativeness and scalability. Importantly, a larger trial will also allow for testing whether the empowerment and enhanced knowledge reported by some participants, as well as the integration of vitals data into clinical visits, can be replicated across a broader population Table 3. Participants will be grouped into four groups, Denver-No History of HTN, Denver-History of HTN, National-No History of HTN, and National-History of HTN to increase overall representativeness of the study population as well. Together, these refinements are intended to strengthen feasibility, enhance participant experience, and generate data with greater clinical and public health relevance.

Table 3: APPENDIX A: Protocol Refinement.

Category of Protocol	Original (From Feasibility Trial)	New Protocol Under IRB Review	Reason for Change
Consent Form	Listed all inclusion and exclusion criteria, voluntary role, incentives. Standard consent form format.	Includes all of the above, plus 5 comprehension statements (in the format of "I acknowledge")	To ensure that true comprehension is achieved during the consent process.
Recruitment Window	Unspecified, with recruitment happening at all timepoints between 20 weeks gestation and a few days after birth, largely due to snowball sampling technique.	20-40 weeks gestation, but mothers CANNOT be enrolled if they have already given birth.	Allows for better on-boarding, timing for pre-birth surveys, and collection of BP readings from last prenatal visit, during delivery, and discharge BP
Inclusion/Exclusion Criteria	> 18 years of age, only singleton pregnancies, located in Denver Metro Area, no history of hypertension	Inclusion: >18, singleton pregnancy, gestation age 20-40 weeks, plans US delivery and minimum US postpartum residence for through 42 days, english speaking, access to smartphone/tablet/laptop, enrolled in prenatal care Exclusion: Known major fetal anomaly incompatible with life; 2) Planned out-of-country postpartum period; 3) Inability to perform home vitals as instructed; 4) Investigator judgment of safety/feasibility	More detailed criteria/larger scope overall for study enrollment
Pre-Screening Eligibility Form	N/A	The pre-screening form will be used to confirm participant eligibility prior to enrollment. Following eligibility confirmation, each participant will be assigned a unique Study ID.	This enables Study ID assignment and thus the creation of an identifier than can then be used to link survey responses and vitals tracking data while maintaining confidentiality throughout the study

Survey Questions/ Timing and Platform	2 Surveys were administered at two timepoints on Qualtrics	3 surveys will be administered via Google Forms and will be specifically sent to participants based on their individual timeline (which will be based on their due date)	To ensure timely completion of each survey and to mitigate the drop off that occurred in the Pre-Pilot between the pre-birth and post-birth surveys.
Pre-Birth Survey	The pre-birth survey collected demographic information, pre-pregnancy health history, healthcare access, and anticipated delivery details. XYZ types of questions	All of the previously used questions plus questions on social support systems, healthcare utilization/access, sleep, anxiety, and depression.	Captures a more detailed and accurate picture of the pregnancy/pre-birth period.
Post-Birth Survey	The post-birth survey assessed delivery outcomes, birth weight and gestational age at birth.	All of the previously used questions plus questions on BP at last prenatal visit, BP during delivery, and BP at discharge, social support systems, healthcare utilization/access, sleep, anxiety, and depression.	Captures a more detailed and accurate picture of the labor and delivery experience
6 Week Postpartum Survey	N/A	Added to better capture the experiences and specifics of the duration of the postpartum period.	Enables us to capture postpartum care utilization and social support, which are all extremely understudied elements of the postpartum period.
Vitals Tracking Methods	Electronic document template was provided, which participants could a) print and fill out or b) fill out directly on the document before sending it to our team	Electronic forms will be used for each vital day each week, with participants using the same link for the duration of the study and specifying which week they are filling out information. The Study ID will be the only identifier used.	This approach aims to improve completeness of participant logs and helps prevent loss of communication at the end of the study, reducing the risk of not receiving any tracking data.
Vitals Tracking Days	Tuesday and Saturday	Wednesday and Sunday	This enables us to monitor vitals on Thursdays and Mondays after they are submitted
Monitoring of Adverse Readings	Participants were given instructions for when readings exceeded 140/90. Were told to independently communicate with their OB/PCP.	Participants will now submit vitals every week, and the study team will review them after submission and reach out as needed regarding further steps/concerning readings.	Our automation system will automatically flag elevated blood pressure values and other abnormal readings. These will be reviewed by the study team on Mondays and Thursdays. Follow-Up Protocol: For any flagged readings, participants will receive a phone call from the study team. If there is no answer, a follow-up email will be sent, and if there is still no response within 24 hours, a second email will be sent. This provides three contact checkpoints. Emergency Contact Information: Each participant will provide two phone numbers and an email address. If a participant is unreachable after repeated attempts, the study team will attempt to contact their listed emergency contact, as outlined in the consent-to-treat form.
Psychosocial Questions about Sleep, Emotional Wellbeing, Anxiety, Depression	N/A	Added questions adapted from the EPDS (Edinburgh Postnatal Depression Scale), the GAD-7 (Generalized Anxiety Disorder-7 Scale) and the PSQI (Pittsburgh Sleep Quality Index)	To better contextualize and capture elements of the prenatal and postpartum period, as psychosocial indicators have an impact on physiological response.
Data Storage and Management	HIPAA protected and encrypted electronic workspace with limited access control only provided to necessary study staff. Qualitrics was utilized for all surveys.	We will be utilizing both a HIPAA compliant workspace for surveys, vital tracking logs, and data storage and a CRM platform, which will enable automation and timed communication with each participant.	Added a CRM solely for administrative purposes to enable automation including sending consent forms, scheduling, and distributing neutral reminder emails to participants. No PHI or health-related data is stored or transmitted in this CRM.

Comparison of pre-pilot feasibility protocol and revised protocol currently under IRB review. The table presents original procedures, corresponding modifications, and the rationale for each change, highlighting how participant feedback and feasibility findings informed protocol refinement for scale-up.

Conclusion

Numbers are more than data points — they are power. When women track and own their postpartum health, they not only strengthen their own recovery but illuminate the systemic changes that are urgently needed in maternal care. This pre-pilot feasibility study demonstrates that postpartum self-monitoring of vital signs is both **acceptable** and **empowering** for many participants, while also revealing key barriers to sustained engagement. High retention and strong survey completion support the overall feasibility of the protocol, but variability in vitals tracking underscores the need for greater structure, education, and technological support. Participant feedback directly informed refinements — such as designated monitoring days, app integration, and clearer blood pressure thresholds — all of which have been incorporated into a larger scale protocol. Ensuring survey completion and addressing potential difficulties in remaining in communication with mothers during this period will further be achieved through automated reminders and intermittent data submissions. It is time that we stop treating and caring about mothers after they give birth. Postpartum vitals monitoring is not just possible — it can empower new mothers and singlehandedly extend care beyond the clinic. It fosters community, understanding, and reassurance that their health matters and it does not have to be something they figure out alone. This pre-pilot feasibility study is just the first step; it allows us to build a scalable model with the potential to redefine postpartum care and close one of the most dangerous gaps in maternal health.

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Availability of data and material

The data underlying this article will be shared upon reasonable request to the corresponding author.

Competing interests

The authors declare that they have no competing interests.

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