Monitoring Postpartum Hypertension Outcomes Using Ecological Momentary Assessment (MOMitor™)

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Abstract

Background

The postpartum period represents a critical opportunity for maternal health monitoring, yet it remains a time when many individuals have limited interaction with the healthcare system despite ongoing risks of pregnancy-related complications. Digital health interventions, such as remote blood pressure monitoring, present an opportunity to detect hypertension early, intervene efficiently, and reduce adverse maternal outcomes.

Objective

The primary objective is to evaluate within- and between-person changes in positive postpartum hypertension screening status during the first six weeks after delivery with data collected via a smartphone-based ecological momentary assessment (EMA) technique. The secondary objectives are to characterize longitudinal trajectories of hypertension indicators throughout the six-week postpartum period.

Method

The study utilized a time series design, with data prospectively collected from participants who were enrolled from a quaternary hospital starting November 2021 to June 2025. EMA technique was used to collect blood pressure data from patients in real time during the first six weeks of postpartum period. All participants responded to two questions (1) “Is your blood pressure (BP) greater than 140/90?”, and (2) “Do you feel dizzy or lightheaded, short of breath, or have a terrible headache?”. A subset of participants also recorded their numeric blood pressure reading in the app. We examined within- and between-person changes in hypertension status using generalized linear mixed models, controlling for race, age, education, marital status, mode of delivery, insurance type, diabetic mellitus and total number of pregnancies.

Results

Among 767 enrolled participants, the number of participants with a positive hypertension screen decreased from 181 in week 1, to 12 in week 6. Each additional day during postpartum was associated with a 10% reduction in the odds of a positive hypertension screen (Odds Ratio [OR]=0.90, 95% Confidence Interval [CI]:0.92–0.96). Similarly, each subsequent day from delivery was associated with a 6% reduction in the odds of a positive hypertension symptom screen (OR=0.94, 95% CI:0.92–0.96). In our main analysis, identifying as Black and having Medicaid insurance were both associated with higher odds of a positive hypertension screen. The average discordance between the ‘yes/no’ BP screening responses and numerical BP readings was about 5%, highlighting the importance of prioritizing numerical BP measurements.

Conclusions

Our findings provide evidence to support the scalability of this digital health surveillance approach to improve postpartum outcomes and maternal health.

Keywords: hypertension, postpartum, maternal health, digital health, pregnancy.