

Wearable Automated SPT for Prediction of Preeclampsia

A portable wearable biometric device integrates blood pressure measurement and position sensing to predict and manage preeclampsia from home, reducing healthcare costs and premature births.

Preeclampsia (or pregnancy related hypertension) is the most common complication to occur during pregnancy. It accounts for over \$2.18 billion of U.S. health care expenditures in the first 12 months after birth. Of the 131 million pregnancies per year (4 million in the United States), approximately 10 percent are complicated by hypertension, leading to 3 million premature births. New insights suggest compromised blood flow through the kidneys plays a fundamental role in the development of preeclampsia. Researchers at Purdue University are refining a wearable biometric intended to screen for compromised kidney blood flow in 100 percent of pregnant women with the goal of predicting and preventing preeclampsia.

Symptoms of preeclampsia can include high blood pressure, protein in the urine, swelling, and seizures. After the 20th week of pregnancy, the mass of the pregnant abdomen is well known to affect kidney blood flow, especially when a woman lies on her back. In women with a vulnerable anatomy, this compromised blood flow leads to high blood pressure. Previously published work has shown that an acute elevation in blood pressure associated with a pregnant woman shifting from her side to her back predicts approximately 90% of preeclampsia. The procedure is known as the supine pressure test (SPT). Furthermore, when detected early, rest in a therapeutic position, on one's side for example, has been shown to prevent preeclampsia.

Purdue University researchers have developed a wearable biometric intended to both predict preeclampsia and better manage those women identified to be at risk. The technology couples a blood pressure measuring device with a body position sensor to ensure meticulous execution of the SPT. The device transmits via smartphone the changes in blood pressure and calculated predictive risk to a remote medical location. Sequential testing is intended to optimize test sensitivity. For those women identified to be at risk, the wearable device is also programmed to monitor a pregnant

Technology ID
2018-GOER-68042

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woman's resting position and communicate with her as needed to optimize position. The goal is to better predict and prevent preeclampsia and to allow expecting mothers to monitor their own health without frequent travel to a clinic.

Advantages:

- Predicts, manages, or prevents preeclampsia
- Testing performed in the comfort of home
- Results transmit to remote medical professionals
- Affordable
- Portable

Potential Applications:

- Early detection and prevention of preeclampsia
- Reduce the number of premature births resulting from preeclampsia
- Allow expecting mothers to monitor their own blood pressure without traveling to a clinic for frequent monitoring
- Similar application available for those with obesity-related hypertension, since physiology has been shown to be similar. U.S. hypertensive population is 76 million.

TRL: 3

Intellectual Property:

Provisional-Patent, 2017-09-05, United States | PCT-Patent, 2018-08-29, WO
| NATL-Patent, 2020-01-21, Europe | NATL-Patent, 2020-02-13, United States

Keywords: Preeclampsia prediction, wearable biometric, pregnancy hypertension, compromised kidney blood flow screening, supine pressure test, SPT, maternal health monitoring, remote patient monitoring, premature birth prevention, therapeutic positioning, blood pressure sensor