JMIR mHealth and uHealth | Remote Automated Blood Pressure Monitoring With Wearable Tech

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Tagged accuracy, biosensor, blood pressure, continuous non-invasive blood pressure monitoring, continuous vital signs monitor, mHealth, monitoring, usability, validation, validation study, vital sign, wearable

Edit This

JMIR Publications recently published *"Continuous Noninvasive Remote Automated Blood Pressure Monitoring With Novel Wearable Technology: A Preliminary Validation Study"* in JMIR mHealth and uHealth which reported that the aim of the study was to validate the accuracy of Cloud DX Vitaliti continuous vital signs monitor (CVSM) continuous noninvasive blood pressure (cNIBP) measurements in postsurgical patients.

In static and supine positions, 3 cNIBP measurements, each 30 seconds, were taken for each patient with the Vitaliti CVSM and an invasive arterial catheter.

At the conclusion of each test session, captured cNIBP measurements were extracted using MediCollector BEDSIDE data extraction software, and Vitaliti CVSM measurements were extracted to a secure laptop through a cable connection.

The average times from calibration to first measurement in the static position and to first measurement in the supine position were 133.85 seconds and 535.15 seconds, respectively.

The JMIR mHealth and uHealth authors found that the Cloud DX's Vitaliti CVSM demonstrated cNIBP measurement in compliance with ISO 81060-2:2018 standards in the context of evaluation that commenced within 2 minutes of device calibration; this device was also well-received by patients in a postsurgical intensive care unit (ICU) setting. Future studies will examine the accuracy of the Vitaliti CVSM in ambulatory contexts, with attention to assessment over a longer duration and the impact of excessive patient motion on data artifacts and signal quality.

Dr. P J Devereaux from The Population Health Research Institute as well as McMaster University said, *"Intraoperatively, continuous hemodynamic monitoring is the standard of care for patients undergoing surgery."*

Continuous monitoring of patients' vital signs in the operating room facilitates immediate recognition of hemodynamic instability and patient deterioration.

Hospital policies typically dictate that nursing staff assess patients' vital signs every 4 hours to 12 hours on surgical wards.

Major developments in the field over the last decade include the evolution of remote automated monitoring (RAM) systems capacity for semi-automatic discrete measurement of vital signs to fully automatic continuous measurement of vital signs; the development of ultra-lightweight, unobtrusive sensors that facilitate unencumbered patient ambulation; and the incorporation of more powerful microprocessors that enable higher sampling frequencies and, ultimately, higher fidelity signal inputs for increased precision of early adverse event detection.

Such methods include the use of a sphygmomanometer with manual measurements by auscultation of Korotkoff sounds or palpatory methods and the derivation of automatic measurements through oscillometry.

A challenge with systems that feature intermittent, pneumatic cuffs for the measurement of noninvasive blood pressure is that they can be uncomfortable for patients and infeasible for longer-term patient monitoring.

The Devereaux Research Team concluded in their JMIR Publications Research Output that wearable RAM technologies that enable continuous acquisition of physiologic data from biosensors have the potential to transform postoperative care.

This study found that one such wearable technology, Cloud DX's Vitaliti CVSM, demonstrated cNIBP measurement in compliance with ISO 81060-2:2018 standards in the context of evaluation that commenced within 2 minutes of device calibration; this device was also well-received by patients in a postsurgical ICU setting. Future studies will examine the accuracy of the Vitaliti CVSM in ambulatory contexts for both cardiac and noncardiac surgery patients, with attention to assessment of the impact of excessive patient motion on data artifacts and signal quality.

The Vitaliti CVSM will also be evaluated longitudinally as part of a postoperative remote patient monitoring solution both in hospital and while patients are recovering at home for up to 30 days following surgery.

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