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The Accuracy of Blood Pressure Measurement by a Smartwatch and a Portable Health Device

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The Accuracy of Blood Pressure Measurement by a Smartwatch and a Portable Health Device

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Introduction: Hypertension is a leading cause of mortality. Proper blood pressure (BP) control can be achieved by lifestyle modification, pharmacotherapy, and frequent measurements. With the growing popularity of cuffless blood pressure monitors, it is important to independently validate their accuracy.

Objective: We evaluated two cuffless blood pressure monitors, The Everlast TR10 fitness watch and the BodiMetrics Performance Monitor, for their accuracy and precision in BP measurements.

Methods: Using a protocol derived from the ANSI/AAMI/ISO 2013 standard for evaluating automated sphygmomanometers, we measured the blood pressures of 85 patients recruited from the Thomas Jefferson University Hospital Preadmission Testing Center with two experimental devices and a validated automated sphygmomanometer cuff. We compared the mean absolute differences in measurements between the investigational and reference devices. Comparisons were analyzed with Spearman correlation and T-test, p<0.05.

Results: The BodiMetrics Performance Monitor SBP measurements correlated well with the reference SBP measurements (ρ = 0.88, P < 0.01), whereas the Everlast TR10 fitness watch did not (SBP: ρ = -0.19, P < 0.01; DBP: ρ = -0.01, P < 0.01). The BodiMetrics performance monitor reported a hypertensive BP (≥140 mm Hg) for 80% of the hypertensive reference SBP
measurements, whereas the Everlast watch measured no hypertensive BP values for any of the hypertensive reference SBP or DBP measurements.

**Discussion:** The Everlast fitness watch and BodiMetrics Performance Monitor are not accurate enough to use for blood pressure monitoring. Use of these devices will likely result in misclassifying patients with hypertension as normotensive, which is a public health concern.