



Achieving Normal Blood Pressure with Cloud-Based Monitoring and Management

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INTRODUCTION

We assessed the feasibility and impact of remote monitoring and medication management on hypertension control in a nursing home.

HYPOTHESIS

Uncontrolled hypertension is an increasing epidemic and is a causal factor for cardiovascular disease. However, with many available treatments, hypertension represents an important opportunity to improve population health. Moreover, skilled nursing centers do not have continuous clinical oversight despite taking care of at-risk patients. We hypothesized that increased sensitivity to elevated blood pressure (BP) readings via remote monitoring and targeted medication management alerts would lead to higher rates of controlled hypertension.

METHODS

48 long-term nursing home patients (average age=68.4) were followed over a 10-week period, of whom 21 were identified as uncontrolled hypertension with a reading >140/90 mmHg. BP readings were taken 3 times a week as compared to a norm of 1 measurement per 3 weeks. Blood pressure data was stored in a cloud and analyzed via algorithms. The physician was given a summary of data identifying those patients who met criteria for elevated BP with averaged per week mean systolic and diastolic blood pressure. Furthermore, patients were further stratified via an algorithm where systolic BP over 140 mmHg was reported as a fraction of the week with uncontrolled hypertension. Together these 3 variables guided the physician in making a determination of a decision to escalate pharmacologic therapy.

RESULTS

After monitoring and interventions there were significant decreases in patients' average systolic BP (130.6 mmHg vs. 135.6 mmHg, p=0.027). Neurological (headache, vision changes) and cardiac symptoms (chest pain) were resolved or improved in 83% of patients (5 of 6). By end of the pilot 4.2% (2 of 48) remained hypertensive as compared to the initial 43.8% (21 of 48) found to be hypertensive within 2 weeks at start of pilot; 95.8% (46 of 48) remained controlled by end of study. Furthermore, when compared with a similar cohort of patients, all-cause hospital admissions were 80% (2 versus 10) fewer in the study population.

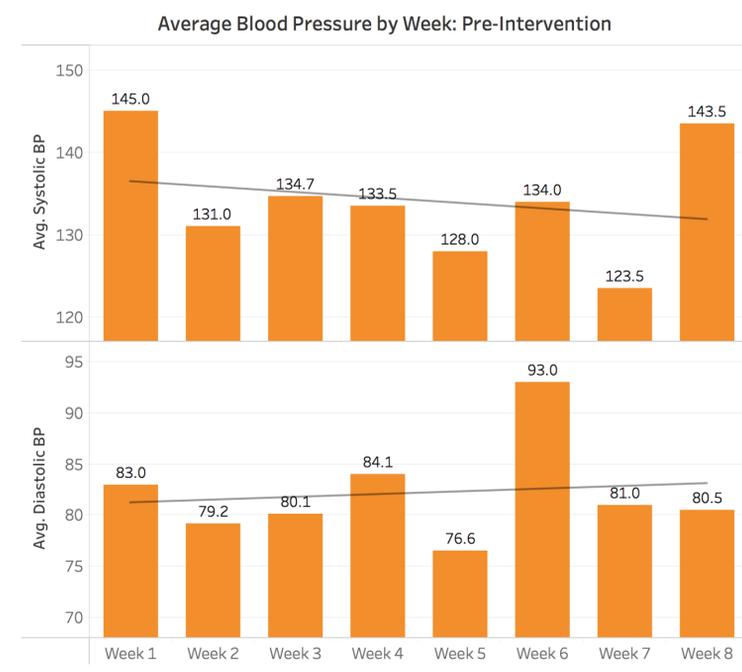


Figure 1: BP trend during remote monitoring

CONCLUSIONS

In agreement with our hypothesis, more frequent BP measurements and medication adjustments led to increased rates of hypertension control. We believe that normotension is achievable using cloud-based monitoring, reporting, and treatment. In conclusion, this new method requires serious consideration versus the current standard of care and could help provide improvements in skilled nursing facilities and other care settings.

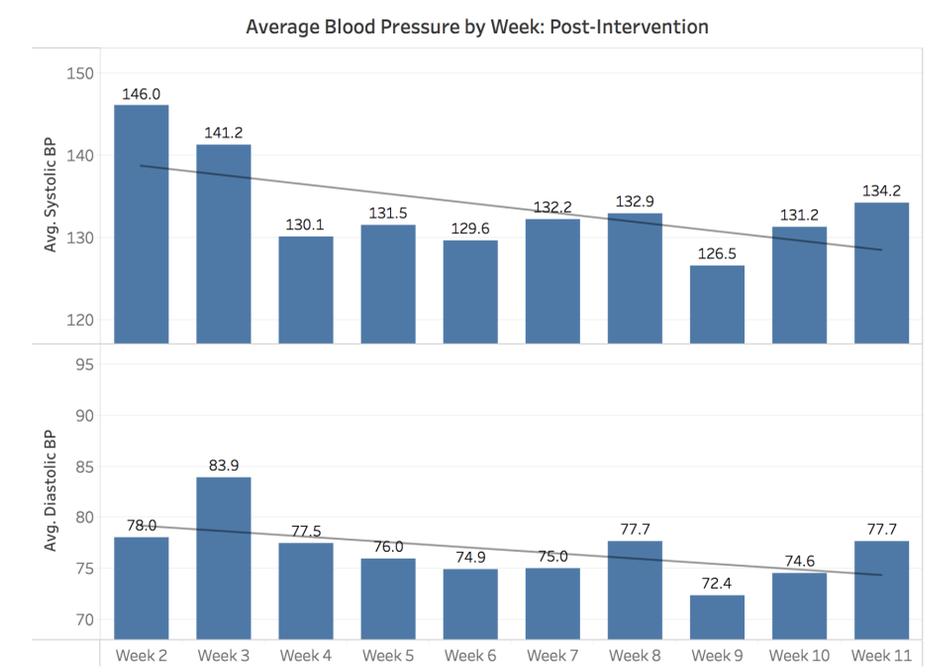


Figure 2: BP trend after remote monitoring

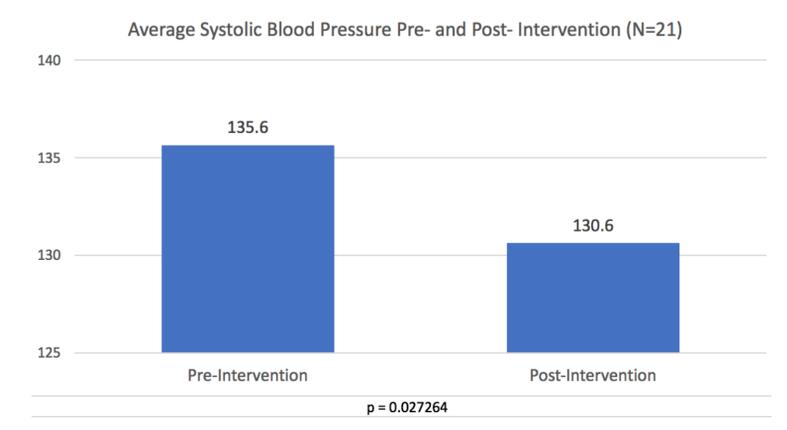


Figure 3: Average pre- and post-intervention Systolic Blood Pressure