Impact of a Digital Innovation to Grow Quality Care through Interprofessional Teamwork (DIG IT): A Multicenter Case-Control Study on High-risk Underserved Patients with Uncontrolled Blood Pressure

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INTRODUCTION

Underserved populations are 40% more likely to have hypertension and three times more likely to die from heart diseases due to uncontrolled blood pressure (BP).

Digital health technologies such as self-monitoring devices and phone apps are becoming increasingly important as tools to promote healthy habits and patient empowerment. The clinical effectiveness of digital health technologies on the BP of underserved patients, however, is unknown.

OBJECTIVES

- The primary objective was to compare the mean change of BP of underserved patients with or without the use of smart BP monitoring devices remotely guided by an interprofessional care team.
- The secondary objective was to compare the mean change of 10-year Atherosclerotic Cardiovascular Disease (ASCVD) risk scores between the two arms.

METHODS

Study Design and Sites:
This was a case-control observational study conducted in two UCI Health affiliated Federally Qualified Health Center (FQHC) sites, namely Santa Ana and Anaheim, in Orange County, California. This study was approved UCI IRB #1558.

Subject Selection Criteria:
- Inclusion: >40 years of age, uncontrolled BP (>140/90 mm Hg), used smart BP devices* for > 3 months, data from August to December 2021; and received remote guidance from an interprofessional care team*
  (* Intervention arm only)

METHODS (Cont.)

Subject selections (cont.):

- Exclusion: Missing data at baseline or at 3 months

Study Procedures and Analysis:
Matched control (1:1, based on age, ethnicity, and baseline BP measurements) without the use of any guided health technology for BP management were identified from the UCI Health Enterprise Data Warehouse during the same time period between August and December 2021.

Statistical analysis was performed using the IBM SPSS Statistics 22 (IBM SPSS, Turkey) program, with descriptive statistical methods (means, standard deviations), Chi-square and Fisher's exact test. Multiple linear regression was performed to adjust for potential confounding factors associated with the primary and secondary outcomes.

RESULTS

A total of 140 patients (70 control (C), 70 intervention (I)) were included in the study.

Table 1: Baseline Sociodemographics and Risk Factors

N = 140	Intervention (n=70)	Control (n=70)	P-value
Age (years ± SD)	62.6 ± 10.7	63.0 ± 8.5	0.848
Gender (%)			
Female	21 (30.0)	34 (48.6)	0.01
Male	49 (70.0)	36 (51.4)	
Ethnicity (%)			
Hispanics	55 (78.6)	56 (80.0)	0.757
Asians	6 (8.6)	4 (5.7)	
Black	3 (4.3)	4 (5.7)	
White	2 (2.8)	4 (5.7)	
Other	4 (5.7)	2 (2.9)	
Smoking Status (%)			
Yes	3 (4.3)	1 (1.4)	0.620
No	67 (95.7)	69 (98.6)	
Alcohol Consumption (%)			
Yes	13 (18.6)	33 (47.1)	<0.001
No	57 (81.4)	37 (52.9)	
Diabetes Status (%)			
Yes	35 (50)	40 (57.1)	0.397
No	35 (50)	30 (42.9)	

RESULTS (Cont.)

The sociodemographic between the two arms were similar with an average age of 62.8± 9.7 years, dominated by Latinx (79.3%) with similar self-reported smoking status (2.9%), and prevalence of diabetes (53.6%) (Table 1).

- Intervention arm had more males with higher total cholesterol level and fewer self-reported alcohol consumption.

Baseline mean BP (163/81 mmHg) and baseline mean 10-year ASCVD risk score (23.9%) were comparable (all p>0.05). The mean change in BP from baseline to 3 months was significantly greater in the intervention arm (I: 163/82 to 132/71 mmHg, C: 163/80 to 148/75 mmHg; p<0.001) (Figures 1 and 2).

Figure 1: Changes in Systolic Blood Pressure

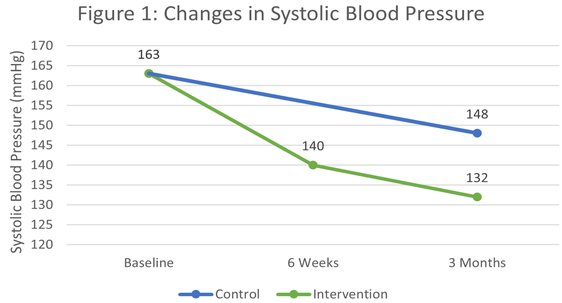
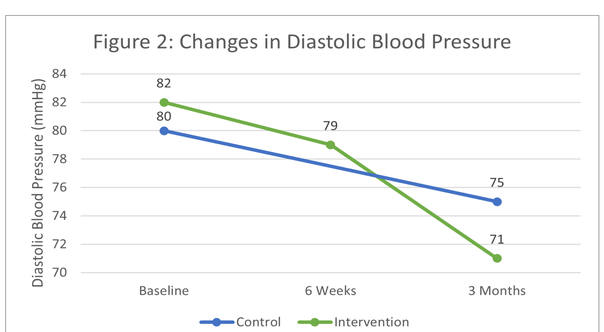


Figure 2: Changes in Diastolic Blood Pressure



RESULTS (Cont.)

There was a greater mean 10-year ASCVD risk score reduction in the intervention arm compared to the control arm (I: -6.4±7.4, C: -3.1±5.1; p=0.003).

Difference in the mean change of BP and 10-year ASCVD risk score reduction remained statistically significant after adjustment of confounding variables including gender, total cholesterol and self-reported alcohol consumption.

DISCUSSION

- Studies have shown that remote monitoring of BP among patients with hypertension is ineffective without proper guidance and follow-up.
- The promising improvement observed in our study was likely due to patient empowerment instilled by an interprofessional team consisting of providers, technical support team, and clinical pharmacists who can guide the patients regularly and timely on their BP control.

CONCLUSION

The use of digital health technology coupled with remote guidance from an interprofessional care team was more effective than the usual care in achieving BP improvements. In addition, the cardiovascular risk reduction was also twice that of the usual care.

SELECTED REFERENCES

1. Aggarwal R, et al. *Hypertension*. 2021 Dec;78(6):1719-1726. 2. Lee M, et al. *Int J Environ Res Public Health*. 2018;15(12):2838. 3. Alessa T, et al. *JMIR Mhealth Uhealth*. 2018 Jul 23;6(7):e10723. 4. Lee JYC et al. *J Am Coll Pharm.* 2022; 5, Sun-62 (abstract): 1424-1425.