MOBILE INTERVENTION IN COLLEGE STUDENTS WITH ELEVATED BLOOD PRESSURE: A PILOT STUDY

MW CTR-IN Pilot Grant

Dieu-My T. Tran, PhD, RN, CNE
Associate Professor
University of Nevada, Las Vegas
School of Nursing

DISCLOSURE

Conflict of Interest

- Dieu-My Tran (Content expert and speaker) reports no conflict of interest.

OBJECTIVES

1. The learner will understand the **MOBI**LE intervention and how it was implemented.

2. The learner will be able to identify if there are significant reduction with blood pressure along with sodium intake in college students involved in the **MOBI**LE Intervention.

BACKGROUND

- Cardiovascular disease (CVD) is the leading cause of death in both men and women and hypertension a major risk factor for CVD.
- The prevalence of high blood pressure has increased steadily since 1990
- Since 2015 there is a growing pattern of hypertension among young adults and starting as early as childhood
- The age-adjusted prevalence of hypertension among U.S. adults 20 years of age and older was estimated to be 46.0% by the NHANES from 2013-2016
- While it is often a risk factor recognized in middle-aged and older adults, it is overlooked in young adults.

PURPOSE

The purpose of this study was to (1) implement a mHealth intervention, the **O**ptimize **B**lood Pressure **I**mprovement (**MOBI**LE) intervention, in college students, aged 18 to 29 years, with elevated blood pressure (BP); and (2) test its feasibility and impact on BP reduction (primary outcome) along with sodium intake and hypertension knowledge improvement (secondary outcomes) after 28 days.

The long-term goal is to develop tailored interventions to increase awareness of elevated blood pressure in college students in a larger study.

METHODS

Research Design. Randomized controlled trial, two-arm intervention pilot study

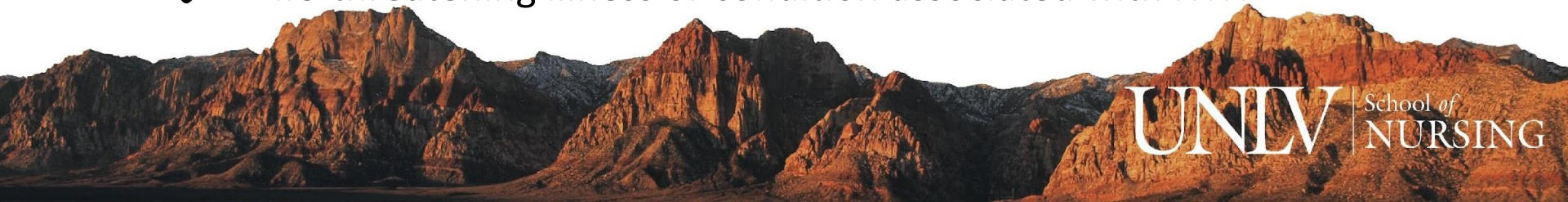
Settings and Recruitment. A large urban university

Inclusion Criteria:

- ✔ Full-time college students at the recruited university
- ✔ Ages 18 to 29 years old
- ✔ SBP 120 - 139 mm Hg and DBP 80 - 89 mm Hg
- ✔ Have regular access to a mobile smartphone with unlimited text messaging

Exclusion criteria:

- ✔ Antihypertensive medications
- ✔ Pregnant, lactating, or plans to become pregnant
- ✔ Life-threatening illness or condition associated with HTN



METHODS

Formative Phase

- ✔ Conducted prior to the intervention implementation
- ✔ Assessed text messages acceptability, engagement, and feasibility
- ✔ 10 full-time students (ages of 18 and 29) , 2 groups of 5 students each
- ✔ Participated in a Zoom meeting (30 minutes) and was asked to rate 83 tasks (i.e., daily text message interventions) on a scale of 1 to 5 and X (poorly written or discard)
- ✔ Appropriate considerations were made following the formative phase

Measurements

- ✔ BP levels
- ✔ Self-reported anthropometric measurements, sociodemographic information, health history (family history, smoking status…)
- ✔ HK-LS Questionnaire and ASA-24 Dietary Assessment Tool

INTERVENTION GROUP

- ✔ Educational session and baseline measurements
- ✔ Each participant take their own BP for 28 days
  - A Withings Wireless BP cuff was provided (FDA approved)
- ✔ Then send the BP value to RA daily with motivation level (1 = low, 3 = moderate, 5 = high)
- ✔ Random number generator to select and send a daily message intervention task based on the subject's reported motivation level.
- ✔ Encouraged participants to record their BP reading, motivation level, assigned task, and whether they completed the task daily in a journal
- ✔ After 28 days, post-assessment

CONTROL GROUP

- ✔ Completed the same processes as the intervention group except for the 28-day intervention
- ✔ Attended the educational session
- ✔ Complete baseline measurements: height, weight, and sociodemographic questionnaire; BP assessment; ASA-24; and pre-test HK-LS
- ✔ 28 days later, scheduled for an exit meeting to complete the post assessment (i.e., height, weight, BP, ASA24, and post-test knowledge).

SAMPLE

Table 1: Comparison of Baseline Characteristics for Intervention and Control Groups[a]

Characteristics	Intervention Group *n* = 15 (%)	Control Group *n* = 14 (%)	*P* value
Sex			.715
Males	6 (40.0)	7 (50.0)	
Females	9 (60.0)	7 (50.0)	
Race			.490
White	8 (53.3)	6 (42.9)	
Asian	3 (20.0)	5 (35.7)	
Black	0	1 (7.1)	
Other/Mix	4 (26.7)	2 (14.3)	
Ethnicity			1.000
Hispanic/Latino/Spanish	6 (40.0)	6 (42.9)	
Marital status			.546
Single	11 (73.3)	12 (85.7)	
Married or living together	3 (20.0)	2(14.2)	
Divorced/Separated	1 (6.7)	0	
Education			.001*
Undergraduate	6 (40.0)	14 (100.0)	
Graduate	9 (60.0)	0	
Insurance coverage			1.000
Yes	12 (80.0)	12 (100.0)	
Family history of heart disease			.139
Yes	4 (26.7)	8 (57.1)	

[a] Categorical comparisons between groups using a 2-sided Fisher's Exact Test or Chi-square when appropriate.

* $P < .05$

RESULTS

Table 2. Comparison of Pre- and Post-Clinical Data for Intervention and Control Groups[a]

	Intervention Group $n = 15$			Control Group $n = 14$		
Variables	**Pre**	**Post**	***P* value[b]**	**Pre**	**Post**	***P* value[b]**
Continuous Measures						
BMI	28.7 (7.53)	28.8 (7.19)	.859	29.0 (6.04)	29.0 (6.09)	.774
Systolic Blood Pressure, mmHg	131.2 (11.30)	118.7 (11.32)	.001**	125.5 (12.04)	124.0 (12.31)	.638
Diastolic Blood Pressure, mmHg	80.6 (8.70)	73.7 (7.60)	.001**	80.9 (9.01)	77.9 (7.90)	.188
Caloric Intake, cal	2446.5 (1425.86)	1977.7 (1053.72)	.128	1874.2 (752.16)	1631.7 (631.13)	.305
Sodium Intake, mg	3955.4 (2530.53)	3799.39 (2540.81)	.539	3765.5 (1953.08)	3046.2 (1095.85)	.273
HK-LS Score	17.9 (3.07)	19.3 (1.35)	.066	17.1 (2.48)	19.1 (1.54)	.001**
Categorical Measures						
BMI, kg/m^2 [c]			1.000			.995
Underweight	0 (0)	0 (0)		1 (7.1)	1 (7.1)	
Normal or Healthy Weight	4 (26.7)	4 (26.7)		3 (21.4)	4 (28.6)	
Overweight	7 (46.7)	7 (46.7)		4 (28.6)	2 (14.3)	
Obese	4 (26.7)	4 (26.7)		6 (42.9)	7 (50.0)	
Blood Pressure‡			.016			.197
Normal	0 (0)	10 (66.7)		0 (0)	4 (28.6)	
Elevated	6 (40.0)	1 (6.7)		4 (28.6)	2 (14.3)	
HTN Stage I	6 (40.0)	3 (20.0)		6 (42.9)	7 (50.0)	
HTN Stage II	3 (20.0)	1 (6.7)		4 (28.6)	1 (7.1)	

[a] Data shown as N (%) or mean (SD).
[b] *P* values represent pre-to-post comparisons within groups using either a 2-sided paired t-test or McNemar's test.
[c] Refer to the methods section for the BMI and blood pressure categories.
** Correlation is significant at the .01 level (2-tailed).

LIMITATIONS

- ✔ Only collected ASA24 data pre and post study, which may not be sufficient to examine changes and eating patterns
- ✔ Did not monitor the participants' physical activity (it may be the factor that affected the BP reduction in the intervention group)
- ✔ The intervention was short in duration and the sample size small
- ✔ Did not examine sustainability

CONCLUSIONS

- ✔ The **MOBI**LE intervention is the first randomized controlled trial to evaluate the feasibility of reducing BP in college students.
- ✔ This pilot study draws attention to the importance of engaging college students with elevated BP and the impact we can potentially accomplish with the **MOBI**LE intervention.
- ✔ These results provided preliminary data on BP reduction approaches in both groups, which significantly affected the intervention group and warrant further examination of this intervention and its long-term effects.

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