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Lessons Learned From a Study of a Complementary Therapy for Self-Managing Hypertension and Stress in Women

Kikikipa Kretzer, PhD, FNP-BC, Andrew J. Evelo, MA, and Robert L. Durham, PhD

University of Iowa College of Nursing, Iowa City (Dr Kretzer); Beth-El College of Nursing and Health Sciences (Dr Kretzer) and Department of Psychology (Mr Evelo and Dr Durham), University of Colorado at Colorado Springs

Abstract

This report evaluates a Hawaiian-based, self-management intervention for reducing blood pressure (BP) and stress in women. It highlights lessons learned when using nonpharmacologic, complementary and alternative medicine (CAM) therapies. Specific participant characteristics and preferences should be considered for optimizing health outcomes in CAM research in nursing practice.

Keywords

hypertension; nonpharmacological or complementary therapy; stress

Hypertension (HTN) is a major risk factor in the United States for heart disease, stroke, congestive heart failure, and kidney disease.¹ Heart disease is the single leading cause of death for women.² For cardiovascular disease and stroke, yearly cost estimates associated with health care and missed work approach \$300 billion.³ Approximately 31% of the population has HTN, and 25% has pre-HTN providing a risk for developing HTN. Estimates suggest that more than 76 million US adults older than 20 years have HTN; however, fewer than 50% of those aware of having HTN can control it with medications.³ Accordingly, new methods for reducing HTN must be identified to offset associated and significant health risks, financial expenditures, and societal costs.

Stress is associated with heart disease and also contributes to HTN.^{4–7} Examples of stress associated with HTN include personal fears, worries,⁵ and activities associated with family or demanding work schedules.⁸ In addition, emotions such as anger or long-term stressors increase the risk of pre-HTN, which may progress to HTN and coronary heart disease.⁶ As diet, exercise, and lifestyle modifications are helpful recommendations for those with HTN,¹ it is possible that a nonpharmacological or complementary therapy approach might synergistically reduce stress for the individual. Synergy is explored when combining

Correspondence: Kikikipa Kretzer, PhD, FNP-BC, PO Box 536, Garrett Park, MD 20892 (Kikikipa@gmail.com).

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multiple interventions with each other, effectively integrating a bio-psycho-socio-spiritual (BPSS) approach to health.⁹

Complementary and alternative medicine (CAM) is defined as the diverse set of health practices, interventions, and products that cannot be classified as conventional medicine.¹⁰ The National Institutes of Health views mind-body therapies as a subtype of CAM therapies that capitalize on the interaction between the mind and body,¹¹ and the Institute of Medicine supports rigorous research to identify CAM therapies that improve health.¹² For persons with HTN, complementary practices (eg, mindfulness, Tai Chi, meditation, and relaxation) have been tested as alternative treatments.^{7,13,14} In addition to the direct effects of CAM, DeSimone and Crowe¹⁵ suggest CAM therapies might also have a therapeutic effect on HTN because patients feel empowered to promote self-care.

One type of CAM therapy that may be beneficial to those with increased blood pressure (BP) or chronic conditions impacted by stress, is an ancient Hawaiian problem-solving approach known as ho'oponopono. The word "ho'oponopono" means "to correct or to make right." Mornah Simeona is the developer of one form of ho'oponopono therapy. She was honored as a "Living Treasure" of Hawaii in 1983. According to Mornah, this ho'oponopono therapy provides a way to unify the mind, body, and spirit in identifying and erasing memories of problems that manifest themselves as HTN and stress. As a complementary therapy, ho'oponopono focuses on forgiveness and creating balance—physically, mentally, and spiritually—through the conscious, subconscious, and superconscious mind.^{16,17} Anyone can use the process through education and by the application of "cleaning tools" onto problems one perceives to occur throughout the day. The mental application of these tools such as meditation, short phrases, or breathing processes helps alleviate the effects of a problematic experience by releasing memories of the experience.¹⁶ Earlier research conducted by the first author (K.K.) using a ho'oponopono class instruction demonstrated statistically significant outcomes such as reduced mean BP and increased mean spirituality scores.¹⁶ For consistency, principal investigator followed a similar format using content and cleaning tools in this present study that were used in the earlier study.

PURPOSE

Building on the results of previous research, the next step was to conduct a study to test the efficacy of the Hawaiian intervention in a larger sample using a randomized design. The twofold purpose of this current article is (1) to report results of this larger study testing a Hawaiian therapy for reducing BP and stress, and assessing coping styles, and (2) to describe the lessons learned through implementing a complementary, self-management therapy for women. Lessons learned apply to both researchers and clinicians who are considering the use of nonpharmacological or CAM-like therapies for participants or patients. We hypothesized that women with pre-HTN or HTN who participated in the class intervention (group 1E) would display lower BP and would perceive less stress than those in the control group (group 2C) who received no initial intervention.

METHOD

Design

An experimental design with repeated measurements was used to evaluate the effect of a ho'oponopono class intervention. The participants were recruited using a group design with a convenience sample randomly assigned to either an experimental group with intervention (group 1E, n = 32) or control group without intervention (group 2C, n = 40). In addition, the control group was offered the intervention in a delayed paradigm model. Those who participated became a subset of group 2C and were known as the delayed experimental group (group 2DE, n = 12).

Participants

Following university institutional review board approval, local radio, flyer, and newspaper advertisements were used to recruit 72 adult female volunteers. Those interested contacted the research team by telephone, e-mail, or in-person visits. All volunteers met primary study eligibility criteria, which were (1) to be 21 years of age and older, (2) to have pre-HTN (BP 120–139/80–89 mm Hg) or HTN (BP 140/90 mm Hg), and (3) to have had no changes in antihypertensive medication for at least 2 months prior to enrollment.

Intervention

A 4-hour class instruction on the Hawaiian ho'oponopono strategy was provided at a small, southwestern local university. Participants attended one time. The class content included an introduction, description, and comprehensive illustration of the ho'oponopono process including how to use the “cleaning tools” provided during the class. Cleaning tools included meditation, breathing exercises, and positive affirmations, which were also provided for review in take-home printed booklets for participants. Step-by-step instructions, a demonstration, and a practice period were provided for each of the tools provided. Through this problem-solving approach, each participant had an opportunity to acknowledge her ability to resolve the problem of stress or other reaction when a stressful situation presented itself in her life. The individuals were responsible for selecting a tool provided in the class such as a positive affirmation (eg, participants may mentally think or say “thank you”) to use in stressful situations they encounter. By taking a moment to apply one of the tools, the individual prefers to use in any given situation, a sense of calm and peace is thought to restore balance within the individual, to halt the escalation of the stress experienced through a rebalancing of mind, body, and spirit and to enhance one's ability to self-manage each situation.

The class included sharing actual examples of instances where participants might use the process in stressful situations along with a summary review. The class was taught by the first author—a nurse practitioner and an experienced instructor. Attendance was possible in person, through video streaming, or online via password-protected video recordings. This process was taught to participants through lecture, whiteboard illustration, practice, and discussion followed by questions and answers and summarized with a review of information provided. Once learned, participants were expected to practice the process for 12 weeks using printed booklets as reminders of tools taught in class.

Procedure

Initially, a total of 72 participants were enrolled and randomized into 2 groups per a priori power analysis. After participants were randomly assigned using a computer-generated randomization chart, the first set of data was collected from the initial experimental (1E) and control groups (2C). Groups were monitored for up to 1 month before intervention and 3 months after the class intervention, using measures listed later. For those in the experimental or intervention group, participants were instructed about the ho'oponopono process and how to use the process in their daily lives. These participants also received booklets, so they could review intervention materials on their own each day following the class instruction. Participants also received daily or weekly checklists to track their practice and use of the cleaning tools. They were instructed to monitor blood pressure; stress levels; and activity, diet, or medication changes. After 3 months, group 2C participants were offered the class intervention; those who enrolled became a subset of group 2C; and this subset was subsequently monitored as group 2DE (delayed experimental group; $n = 12$).

Measures

Description of participants—*Demographics* were collected prior to the intervention and included a one-time description of health profiles. This information was developed to describe typical characteristics such as ethnicity, exercise, medication use, stress beliefs, and previous attendance at a ho'oponopono class (Table 1). The Heart Health Coping Self-Efficacy (HHCSE)—a tool developed for the purpose of this study—was used to measure participants' perceived abilities to cope with HTN preintervention. The HHCSE is a 9-item scale indicating internally reliability ($\alpha = 0.93$) and external validity with other health-related measures.

Treatment fidelity

Cleaning tools checklist: A daily checklist was used to record and quantify the number of times a day those in the experimental group used ho'oponopono techniques (termed "cleaning tools"). The checklist was used to monitor participants' use and application of those cleaning tools received during class instruction. For ease of use, participants recorded their application of the cleaning tools on the checklist as low (<5 times a day), medium (5–10 times a day), or high (>10 times a day). Participants in the experimental groups were instructed how to apply the cleaning tools when they perceived stressful problems in their daily routine throughout the duration of the study period. For instance, if they experienced a stressful interaction or incident at work, they were provided ways to decrease the stress by quickly selecting and applying a cleaning tool such as the deep breathing exercise or a positive affirmation (such as mentally saying "thank you") to reduce the effects of stress on their blood pressure. By recording participants' use of the cleaning tools, researchers could quantify how often participants used the treatment during the intervention period.

Diary of changes checklist: A checklist was used to report participants' lifestyle changes such as medication, diet, and exercise changes, if any changes were implemented. This was important to help identify any potential, confounding factors.

Blood pressures—A checklist was used to monitor BPs weekly. Each participant received her own personal Omron HEM 712C digital BP home-monitoring device to self-measure systolic and diastolic BP readings at the same time and day of each week for 3 months. This self-monitoring device was selected for the study, as it was consistent with the PI's earlier study standards of BP readings. The standard for accuracy/calibration with the current device was ± 3 mm Hg per manufacturer's specifications.¹⁸ Following the preintervention month where all participants received BP self-monitoring instructions, the actual period of monitoring BPs lasted 3 months.

Stress levels—A checklist measured self-reported stress levels daily for study duration. Levels ranged from 1 (*low*) to 5 (*high*).

Brief stress-coping survey—This 8-item scale measured baseline coping styles pre- and post-intervention and was adapted from Carver¹⁹ by taking 4 moderately reliable, relevant subscales: Active Coping ($\alpha = 0.68$), Acceptance ($\alpha = 0.57$), Positive Reframing ($\alpha = 0.64$), and Behavioral Disengagement ($\alpha = 0.65$).

RESULTS

Summary of analysis

This section contains the major results from this study including demographics, treatment use, blood pressure, and stress changes. Only a brief overview of the results is presented because many were not significant and the focus of this article is on lessons learned. Results are controlled for multiple comparisons where appropriate.

Description of participants

Demographics—Participants were all female and mostly (88%–92%) Caucasian. In sum, they physically exercised regularly, limited alcohol intake, consumed low-fat foods, and avoided tobacco. Approximately 46% had various other health issues such as diabetes, hypercholesterolemia, asthma, kidney conditions, hypothyroidism, depression, or mental health issues. Most perceived high stress levels in their daily lives. In the past, some participants had used a form of meditation, but most had never used alternative health practices or taken a class in ho'oponopono. See Table 1 for full demographic breakdown and health profile.

Heart health coping self-efficacy—Participants tended to report high heart-health self-efficacy ($M = 48.11$, $SD = 8.58$, range = 22–63) on the HHCSE preintervention. Scores were not related to systolic or diastolic BP differences and groups did not vary. A limitation of this study, 50% of participants withdrew from 1E and 2C during the course of the 3-month, postintervention period for reasons unknown. However, 100% of those participants who self-selected into group 2DE completed the study (Table 2). No demographic variables predicted attrition or the decision to continue to 2DE after controlling for multiple comparisons.

Stress levels

Groups 1E and 2C exhibited a nonsignificant decrease over time ($F_{3,84} = 1.85$, $P = .14$) (Table 3). Belonging to group 1E or 2C did not moderate this relationship ($F = 3,84 = 2.11$, $P = .07$).

Brief stress-coping survey

There were no significant findings. Neither group changed in coping styles for the study duration.

Treatment fidelity

Cleaning tools checklists—Group 1E rated low use of the cleaning tools provided in the class instruction ($M = 1.64$), whereas group 2DE reported more frequent use ($M = 2.30$), $t_{28} = -3.37$, $P = .001$, 1-tailed. Scores in groups 1E and 2DE were not related to differences in systolic BP scores ($r = -0.25$, $P = .10$) but were related to differences in diastolic BP scores ($r = -0.33$, $P = .04$). Nevertheless, these differences were the opposite of what we hypothesized; people with high cleaning tool use tended to attain smaller decreases in BP.

Diary of changes—A chi-square analysis (Fisher exact) showed no discernible difference between groups for medication usage. Some medications or doses increased, others decreased, in both groups. There were very few reports of diet or exercise changes necessitating statistical analysis.

Blood pressures

Group means (1E and 2C weekly scores were aggregated to monthly scores by taking the statistical mean) decreased in both systolic ($F_{3,102} = 6.00$, $P = .001$, $\eta^2 = 0.15$) and diastolic BPs ($F_{3,102} = 3.40$, $P = .04$, $\eta^2 = 0.09$) (Table 3). Blood pressure changes over time were not significantly moderated between groups 1E and 2C for either systolic ($F_{3,102} = 0.76$, $P = .52$) or diastolic BPs ($F_{3,102} = 0.87$, $P = .46$).

DISCUSSION

The main study finding was a decrease in mean BP measures and stress levels for all groups at almost all time points and including the control group. The exception was the 3-month mean diastolic BP in group 2DE, which rose slightly. Group differences were not statistically significant at the .05 alpha level and several factors may account for this. In this study, it is possible that power may have been reduced because attrition rates in groups 1E and 2C were higher than the anticipated 25%; although the smaller subset, group 2DE demonstrated no attrition at all (Table 2). The effect of the intervention was also less than expected with this sample compared with an earlier study in which BPs were more variable and abnormally elevated.¹⁵

Importantly, many participants at the start of this study had close to or near normal diastolic BPs. This left little room available for significant improvement (Table 3). About half of the participants were taking antihypertensive medications. Although mean systolic BP was slightly elevated, mean diastolic BP was less than 80 mm Hg compared with standard

diastolic norms of less than 80 mm Hg.¹ Possibly, some participants learned that through weekly monitoring their BP was consistently close to normal and saw no need to continue in the study and hence dropped out leading to increased attrition.

As there was no significant difference in coping styles, it seems more plausible that the universal BP and stress reductions were the result of a Hawthorne effect or were triggered simply by being involved in a self-management study. In caring for themselves through monitoring weekly BP or daily stress levels along with a high preintervention score for coping self-efficacy, participants may have recognized or become even more health conscious and self-efficacious over time. In this study, however, specific factors that might affect self-efficacy were not measured. It is important for nurses to consider all aspects of healing if we are to increase the likelihood of improving holistic health. This may be done through the application of a mind, body, social, and spiritual or BPSS model in future research to provide a comprehensive conceptual framework to guide nonpharmacologic, complementary studies and holistic healing.

This leads to our second main finding, high attrition, which we recognize as a limitation. Participants in groups 1E and 2C dropped out at a rate double the anticipated 25%. The reasons for this are unknown. Cognizant of minimizing potential participant burden, researchers provided participants both the class instruction and individual digital BP devices at no charge. No other monetary compensation was provided. Musial et al²⁰ addressed the issue of dropouts in their systematic review of mindfulness-based stress reduction studies for adults with a diagnosis of cancer. They indicated that 19 studies had reported reasons for dropout with a loss of participants over time.²⁰ Indeed, addressing ways to decrease dropout rates in future studies of this type is essential.

A significant clue in our study for reducing dropouts, however, might be found in group 2DE, the subset of 2C. This set of self-selected participants continued in the delayed paradigm phase and none dropped out. Group 2DE may have had a greater preference or sense of involvement with the study, which made them more likely to complete the study. Understanding factors that attract and/or motivate persons to use certain CAM-like therapies might help to predict use and adherence and offset attrition. Although we did not assess these factors, doing so in future studies may shed light on why participants enroll, withdraw, or maintain adherence to complementary therapies. To illustrate, Smith et al²¹ attempted to identify what individual characteristics were associated with those willing to use CAM. They found the strongest predictors to be openness to experience, spirituality, and mood attention. Using a BPSS or other holistic framework might complement CAM strategies and better serve those interested in self-management and self-care health models. A holistic, spiritual framework may offer more comprehensive insight on which nonpharmacologic strategies benefit people with similar preferences or characteristics.

Similarly, Ellison et al²² noted that persons who self-identified as spiritual only, and not religious, were 6 times more likely to use energy therapies, whereas those self-identifying as spiritual and religious were more likely to use mind-body therapies, such as prayer, meditation, and spiritual healing. Examples of energy therapies include qigong, or healing touch therapy, forms of CAM in which healing is believed to occur through manipulation of

one's energy field.¹¹ By experiencing attrition and retention of participants in our study, we had a unique position to learn from and to consider steps for improving complementary, self-management research studies. These lessons are also valuable for nurse practitioners and nurses when considering therapies to be implemented in clinical practice.

Lessons learned

Research studies—We learned that it is key to identify personal preferences and other characteristics of the sample population to help improve outcomes when using a specific intervention involving self-management strategies. Furthermore, this could enhance the ability to adequately test the efficacy of specific interventions while improving attrition and retention rates in research studies. If participants were able to identify personal characteristics thought to be a “good fit” for using specific CAM-like therapies, this might predict outcome expectancy for participant fidelity and adherence to treatment. To determine whether an intervention might be a “good fit,” participants could complete brief questionnaires geared to this identification process prior to study enrollment. To better understand why participants dropout, they could be requested to complete exit evaluations whenever exiting a CAM study. With lower attrition rates and larger studies, future studies might also analyze differences in antihypertensive pharmacologic prescriptions used by participants.

In addition, considering criteria and procedures to counter high attrition rates in intervention study designs such as in this study may also help to improve study outcomes. We learned that inclusion criteria at time of enrollment could have been added that BP for participants be elevated above normal and not close to normal. This may have improved chances of obtaining a meaningful and significant outcome. Finally, providing monetary or acceptable forms of compensation as incentives for each month participants remain in self-management studies should be considered. This could help defray travel costs, reduce potential burden, and improve adherence and retention for participants.

Clinical practice

In clinical practice, nurses and other holistic providers could offer CAM therapies to patients if providers had a process established indicating what kinds of therapies their patients prefer. This understanding along with tailoring therapies to account for personal differences, might improve adherence and health outcomes for those patients wanting to care for themselves and to self-manage their personal health. Bosworth et al²³ recommends tailoring therapies to enhance HTN prescription adherence and improve BP results.

Providers could assess, identify, and understand individual patient preferences regarding interest in and use of complementary therapies by requesting such information at each patient encounter through userfriendly surveys or questionnaires. For instance, when patients visit their health clinics for issues of high BP and stress and express interest in actively participating in self-care, those patients would be identified as candidates for CAM use. They would be given one of these types of surveys. By incorporating surveys into encounters through simple formats, win-win and personalized health programs could evolve for patients. Surveys or questionnaires could be offered to every patient who might be

interested in an educational approach for learning ho'oponopono or another CAM strategy. Patients could be instructed how to apply ho'oponopono tools in stressful daily situations unique to themselves. Following brief practice periods, patients could begin to learn how to restore peace and balance of mind, body, and spirit in self-caring complementary processes—even while adhering to their prescribed antihypertensive agents and other treatments. Nurses and providers must be knowledgeable about complementary strategies to know what may benefit their individual patients successfully.

IMPLICATIONS FOR PRACTICE

It is important for clinicians to understand the uniqueness of patients when referring patients to complementary therapies that will provide the most effective and synergistic benefit for the patient. Effective referrals depend on individual preferences, how likely a patient will adhere to the therapy, expense, and time commitment, and if it is determined to be a “good fit.” For complementary, self-management therapies for reducing BP and stress, nurses need to identify the likelihood of success for each individual patient. This research study provided insight for improving methodologies in future studies and in clinical practice when using a holistic, complementary, self-management therapy such as ho'oponopono. Lessons learned are important to disseminate for researchers when designing future studies and for clinicians in practice prior to implementation.

CONCLUSION

While this study triggered a decrease in mean BP and stress levels in the groups, high attrition rates and near normal BPs reduced statistical power in our study. Understanding factors that attract persons to specific therapies; contribute to high attrition; and allow for adherence to complementary, self-management interventions can optimize the achievement of improved outcomes. This is especially important for providers to consider. Nurses and other holistic providers could assess patients' personal characteristics and preferences for improved adherence when selecting such therapies in practice. To improve health outcomes, lessons learned from this study can be considered when designing research studies and when implementing complementary therapies for reducing BP and stress in clinical practice.

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TABLE 1

Participant Demographics and Health Profiles

	%	Frequency	1 E	2 C	2DE
Sample size, n		72	32	40	12
Ethnicity					
Black	6%	(4)	3% (1)	8% (3)	8% (1)
Hispanic	1%	(1)	3% (1)	0% (0)	0% (0)
Caucasian	89%	(64)	91% (29)	88% (35)	92% (11)
Other	3%	(2)	3% (1)	3% (1)	0% (0)
Health profile					
Never attended ho'oponopono class	96%	(69)	97% (31)	95% (38)	83% (10)
Experienced BP symptoms	42%	(30)	41% (13)	43% (17)	25% (3)
Experienced high stress	94%	(68)	97% (31)	93% (37)	92% (11)
Believes stress is related to BP	53%	(38)	59% (19)	48% (19)	33% (4)
Believes stress is related to heart health	64%	(46)	78% (25)	53% (21)	50% (6)
No use of alternative practices	63%	(45)	72% (23)	55% (22)	50% (6)
Practiced meditation	14%	(10)	16% (5)	13% (5)	17% (2)
Received massage therapy	19%	(14)	31% (10)	10% (4)	25% (3)
Exercised regularly	74%	(53)	72% (23)	75% (30)	75% (9)
Performed aerobic exercise	40%	(29)	44% (14)	38% (15)	50% (6)
Limited alcohol intake	79%	(57)	81% (26)	78% (31)	92% (11)
Consumed low fat foods	81%	(58)	72% (23)	88% (35)	83% (10)
Had other health problems	46%	(33)	41% (13)	50% (20)	50% (6)
Used antihypertensive medication	56%	(40)	47% (15)	63% (25)	58% (7)
Used other medication	53%	(38)	47% (15)	58% (23)	50% (6)
Smoked tobacco	7%	(5)	6% (2)	8% (3)	0% (0)

TABLE 2

Participant Enrollment and Attrition Rates by Group

	Enrolled Initially (%)	Attrition Over Time (%) (%)	Remaining Participants (%)
Experimental subjects (group 1E)	32 (100%)	14 (44%)	18(53%)
Control subjects (group 2C)	40(100%)	22 (55%)	18(45%)
Delayed experimental subjects(group 2DE)	12 (100%)	0 (0%)	12(100%)

TABLE 3

Mean Monthly Blood Pressure and Stress Scores^a

Group	Pretreatment, mean (SD), mm Hg	Month 1, mean (SD), mm Hg	Month 2, mean (SD), mm Hg	Month 3, mean (SD), mm Hg	Mean Diff, mm Hg
Experimental (1E)					
SBP ^b (12.45)	127.17	122.84 (14.58)	124.15 (13.31)	122.11 (11.83)	5.06
DBP ^b (8.04)	78.63	75.71 (7.93)	76.78 (9.71)	74.95 (7.65)	3.67
Stress ^c (0.76)	2.79	2.53 (0.60)	2.91 (0.73)	2.72 (0.64)	0.07
Control (2C)					
SBP ^b (12.34)	130.84	126.74 (10.75)	125.03 (10.64)	126.51 (9.97)	4.34
DBP ^b (9.24)	77.22	75.69 (7.76)	75.62 (9.16)	75.97 (9.07)	1.24
Stress ^c (0.79)	2.72	2.57 (0.70)	2.48 (0.53)	2.38 (0.60)	0.34
Delayed experimental (2DE) ^d					
SBP (13.29)	130.81	126.29 (6.43)	125.45 (9.60)	126.92 (8.66)	3.88
DBP (10.51)	76.39	75.70 (9.12)	75.75 (10.79)	76.53 (9.78)	-0.14
Stress (0.86)	2.62	2.28 (0.55)	2.35 (0.78)	2.35 (0.76)	0.25

Abbreviations: DBP, diastolic blood pressure; Mean Diff, mean difference between pretreatment scores and month 3 ($M_{pretreatment} - M_{month3} = M_{Diff}$); SBP, systolic blood pressure.

^a Means do not differ significantly between initial treatment and control groups.

^b Participants were included if they submitted at least 2 BP scores/month ($n = 18$).

^c Participants were included if they submitted at least 2 BP scores and 2 stress scores per month ($n = 15$).

^d Participants only included if they completed delay treatment paradigm ($n = 12$).