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THE EFFECTS OF WET CUTANEOUS CUPPING STIMULATION TOWARD MEAN ARTERIAL PRESSURE AMONG HYPERTENSIVE PATIENTS

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ABSTRACT

Introduction: Hypertension (HT) is identified as main risk factors of heart disease incidence. Cupping (Bekam) is a simple and affordable complementary therapy modality in various diseases with different causes and pathogenesis, including HT and increased MAP. **Aim:** This study aimed to identify the effect of wet cutaneous cupping stimulation to the Mean Arterial Pressure reduction among hypertensive patients. **Methods:** This research was a quasi-experimental study with pretest-posttest control group design. The study population were all hypertensive patients in Canden District, Bantul Regency. 27 patients for the control group and 29 patients for the intervention group recruited through random sampling technique. A univariate analysis presented in a form of frequency distribution table while bivariate statistical analysis Wilcoxon signed Rank test. **Results:** Wet cupping treatments above 4, 5, 6, 7 and 8 body points, twice a week within 3 days interval and 30 minutes intervention, provide different effects toward diastolic & systolic blood pressure and MAP between pretest and posttest for both interventions. Mean Systolic differences in the first intervention was 18.33 mmHg (p value of 0.000). The mean Systolic difference in the second intervention16.11 mmHg with p value 0.000. Mean diastolic pressure in the first intervention 6.11 mmHg (p=0.003) while mean diastolic differences in the second intervention was 6.3 mmHg (p=0.000). The study results present mean MAP differences in the first account for 10.23 mmHg with p value=0.000. In the second intervention, mean MAP difference was 9.56 (p=0.000). **Conclusion:** The study confirms that wet cutaneous cupping stimulation effective to reduce MAP among hypertensive patients.

Keywords: Hypertension; MAP; Wet Cupping

INTRODUCTION

World Health Organization (WHO) estimated that deaths due to cardiovascular diseases will increase to 20 million people and continue to rising to the next decades (Kishore *et al.*, 2018). In 2030, 23.6 million people estimated to be diagnosed with cardiovascular diseases (Rini, Karim & Novayelinda, 2014). The main risk factors for heart disease incidence are hypertension (HT), increased cholesterol levels, and smoking behavior (Bild *et al.*, 2014). HT contributes to nearly 55% deaths from heart disease worldwide (Zou *et al.*, 2015). Indonesia Baseline Health Research in 201 reported the prevalence of HT in the country reached 26.5% on age group above 18 years old. The prevalence of HT increased from 7.6% in 2007 to 9.5% in 2013. Among this prevalence, 63.2% of HT cases in the community were undiagnosed. The prevalence of HT at age above 18 in Yogyakarta Special Region reaches 25.7% (Kementerian Kesehatan Republik Indonesia, 2013).

The population in Suren Wetan were 895 inhabitants, while in Kralas occupied by 963 people. Most of the population occupation are farmers and labors. Health volunteers in the surrounding area requested to present actual data. More than half of the late adults (pre-elderly and elderly) suffer from HT as they demanded to change

the lifestyle. Hypertension management implemented both pharmacological and non-pharmacological. Pharmacological management involve diuretic, sympathetic inhibitors, beta blockers, vasodilators agent, angiotens in conversion enzyme inhibitors, angiotens in calcium, and angiotens in II receptor blockers (Black & Hawks, 2014; Wahdah, 2011). Long-term administration of pharmacological agents causing various side effects, posing risk to drug resistance which affects the treatment effectiveness (Wang, Xiong & Liu, 2013).

Non-pharmacological therapy modalities development occurred and frequently administered in treating chronic diseases including HT (Kretchy Owusu-Daaku & Danquah, 2014). Among various modalities, wet cupping is widely implemented (Aleyeidi, Aseri & Kawthar, 2014). Cupping is a simple and cost-effective therapy to manage several diseases with different causes and pathogenesis, such as HT and increased MAP (El Sayed, Mahmoud & Nabo, 2013).

Wet cupping is an independent procedure that can be performed by certified nurse. The therapy effectiveness evaluated from mean arterial pressure differences prior and post intervention.

METHODOLOGY

This was a quasi-experimental research with pretest-posttest control group design. Population in this study were all patients who diagnosed with hypertension and eligible to the inclusion criteria. 27 patients were participating for the intervention group from Suren Village while 29 study samples recruited for the control group from Kralas Village. The intervention group administered wet cutaneous cupping therapy at 4, 5, 6, 7 and 8 accu-points for 30 minutes period in 3 days-interval. Cupping performed by registered nurse with cupping therapy certification. Wet cupping therapy protocol was standardized and reviewed by ethical committee. This study was ethically approved by Respati University Ethical Committee. The control group scheduled for a health education session. Study participants' characteristics were identified by univariate analysis, resulting gender, age and occupational profile. Bivariate analysis of this study performed by Wilcoxon signed Rank between intervention and control. Retrieved data in the two groups of this study were interval scale and not normally distributed. Statistical significance considered at p-value <0.05.

RESULTS

Table 1: Respondent Characteristics Based on Gender, Age and Occupation in Suren Wetan and Kralas

Sex	Groups				Total n=56	
	Study n=27		Control n=29			
	f	%	f	%	n	%
Male	11	40.74	4	13.79	15	26.79
Female	16	59.26	25	86.21	41	73.21
Total	27	100	29	100	56	100
Age						
Mean ± SD						
Middle Age (45-59)	4	14.81	7	24.14	11	19.64
Elderly (60-74)	6	22.22	15	51.72	21	37.50
Old (75-90)	17	62.96	7	24.14	24	42.86
Total	27	100	29	100	56	100
Job						
Unemployed	9	33.33	12	41.38	21	37.50
Farmer	7	25.93	0	0	7	12.50
Labor	7	25.93	11	37.93	18	32.14
employed	3	11.11	0	0	3	5.36
Others	1	3.70	6	20.69	7	12.50
Total	27	100	29	100	56	100

Source: Primary Data

Table 1 indicated that the female gender was dominant with 41 respondents (73.21%) compared to 15 male respondents (26.79%). Participants of this study dominated by 75-90 years age group with 24 respondents (42.86%), while 21 respondents of this research (37.50%) were unemployed.

Table 2: Systolic, Diastolic Blood Pressure and MAP in the First and Second Intervention Groups for Hypertensive Patients in Canden Village (n = 27)

Data	Mean	SD	Min	Max	*p* value
Spre1	160.18	22.80	135	240	0.000
Spos1	141.85	24.18	100	220	
Dpre1	86.48	14.79	70	140	0.003
Dpos1	80.37	16.35	60	150	
Spre2	144.81	20.26	110	200	0.000
Spos2	128.70	18.22	100	190	
Dpre2	83.33	10.74	70	100	0.000
Dpos2	77.03	9.53	60	100	
MAPPre1	111.00	16.53	93	173	0.000
MAPPos1	100.77	18.02	73	173	
MAPPre2	103.81	12.61	83	133	0.000
MAPPos2	94.25	11.53	73	130	

Note: S: Systolic; D: Diastolic; MAP: Mean Arterial Pressure; Pretest: Before the Cupping intervention; Posttest: After Cupping Intervention; 1 and 2: First intervention and second intervention. Source: Primary Data

Table 2 presented bivariate analysis. The table describes significant difference in the systolic blood pressure before and after the first and second wet cupping at 4, 5, 6, 7 and 8 accu-points for 30 minutes

within 3 days interval. For both, the p value was 0.000. Similar findings were identified from diastolic blood pressure. Before and after first and second intervention of the DBP, the *p* value was 0.003 and 0.000. The intervention affects mean arterial pressure significantly. The p value significance before and after for both first and second intervention were 0.000.

There was a significant difference in the MAP values before and after the first and second intervention with a p value of 0.000 for both.

Table 3: Systolic, Diastolic Blood Pressure and MAP in the Control Group in Hypertensive Patients in Canden Village (N = 29)

	Mean	SD	Min	Max	*p value*
SPre	162.41	16.62	130	190	0.027
SPos	157.59	16.40	130	180	
DPre	93.79	11.77	70	120	0.001
DPos	89.31	12.52	70	120	
MAPPre	116.66	12.83	90	143	0.000
MAPPos	112.03	13.13	90	140	

Note: S: Systolic; D: Diastolic; MAP: Mean Arterial Pressure; Pre: Before Health Education; Post: After Health Education Source: Primary Data

Table 3 specify paired *t* test results. The table illustrates differences between two means of the measured samples. Systolic blood pressure among the control group were differ for 4.82 mmHg, while the diastolic blood pressure 4.48 mmHg. Particular to mean arterial pressure, this research group has 4.63 mmHg difference. Significant differences were identified from systolic, diastolic and MAP before and after the health education session in the control group with *p* value= 0.027, 0.001 and 0.000.

DISCUSSION

The prevalence of hypertension was higher in female group compared to male respondents. The study finding relevant with Florea & Cohn (2014), which indicated that female was more vulnerable to male in responding stressors. At the stress induction, either coming from inner individual or external factors, the stressor becomes a stimulus that will be transmitted to the brain. Once the human brain receives stimuli, the sympathetic nervous system activated to release CRH. CRH triggers ACTH secretion which flow in the blood circulation and eventually reach the adrenal cortex. The adrenal cortex induced and stimulated to release adrenaline, later affects the body homeostasis. The body organs response in various mechanism, including structures that regulate cardiovascular hemo-dynamics. The heart pump faster, increasing heartbeat, resulting higher flow of blood circulation and mean arterial pressure.

At the onset of organ function changes, female tend to be more passive and less exploratory. Women prefer to withdraw and silence. Fight-or-flight response among female is lower compared to male individuals. The phenomenon decreases energy conservations which results to the declining reserved brainpower. Lower brainpower affects readiness to receive stressors. Female develop to be more sensitive and subtle against stressor. Higher sensitivity related to frequent anxiety episodes. Compared to men, woman stimulate more adrenaline in a stressful event. Elevated adrenaline concentration in the blood flow presents direct effects to the cardiovascular system, resulting higher hypertension incidence among female population.

The elderly age group (75-90 years) occupied higher sample proportion in this study by 24 participants (42.86%). Moyo *et al.*, (2016) discovered that cognitive and behavioral changes occurred in the aging process. As individuals get older, the cognitive, physiological abilities and behavior tend to change. This study reported a 0.73 correlation that changes occur due to the degeneration process in the human body cells. Brain, kidney, lung and cardiovascular system cells were experiencing deterioration. Ageing phenomenon among respondents which affects the anxiety level originated from the Gamma-Amino Butyric Acid (GABA) system function changes. The anxiety further increases blood pressure, resulting hypertension. Lower GABA receptor affinity linear to the age maturity.

Decreasing GABA affinity receptor system correlated to the termination of chloride ion channel, inhibiting chloride ions flow into the cell. Lower chloride ions in the cell causes declining cell polarization. Persistent anxiety episodes pose individual to be more at risk of hypertension. Anxiety incidence among elderly group also associated with insulin. Decreased insulin hormone concentration affects body ability to carry glucose into the cells as a source of energy. Lower blood glucose in the brain disturb energy consumption for body defense. Individual experiencing hypoglycemia prone to anxiety and directly proportional to the occurrence of hypertension. Ningsih, Indriani & Rosida (2017) confirmed that hypertension diagnoses in United Arab Emirates are more common in women

(54%) than men (47%), meanwhile in Yogyakarta 226 respondents (70.6%) of hypertension patients were women. The study suggests that obesity correlated with diabetes mellitus.

This study reported that 21 respondents (37.50%) as the largest group of hypertensive patients were unemployed, 18 respondents (32.14%) work as a labor. Hardati & Ahmad (2017) presented similar findings, unemployed individuals are 8.95 times at risk for hypertension compared to employed population. People with less physical activity characterized by Metabolic Equivalent Task (MET) lower than 600 per week were 1.25 times at greater risk of experiencing hypertension compared to individuals with physical activity more than 600 MET per week. Less physical activity correlated with the hypertension incidence. Physical activity reduces the risk of hypertension by reducing vascular resistance, inhibiting sympathetic nervous system activities and renin-angiotensin system. Less active people tend to have higher heart rate, causing heavy burden of myocardial function during the heart contraction and stronger pressure against the artery walls.

The Difference in the Pretest-Posttest MAP Scores in the First and Second Intervention Groups

Wet cupping in the intervention group presented different mean pretest and posttest score in the first and second interventions. This finding is parallel with Fatonah, Rihiantoro & Astuti (2017) which confirmed that significant difference discovered on MAP among hypertensive patients before and after therapy (p=0.007 where p value significant <0.05). Wet cupping decreased the systolic and diastolic blood pressure thus decline the mean MAP. It is considerable that MAP obtained from the blood pressure which consists of systolic and diastolic. Changes in the blood pressure, whether systolic or diastolic resulting MAP adjustment. Al-Bedah, *et al.*, (2018) & Larasati & Wicaksono (2016) strengthen the study findings. Both of the studies discovered that several mechanisms occurred due to wet cupping intervention provide effect to reduce MAP.

First, cupping intervention causing inflammatory reactions (rubor, tumor, dolor, heat, functional loss). Inflamed tissue indicates mast and cells damage, releasing several substances such as serotonin, histamine, bradykinin, slow reacting substance (SRS), as well as other unknown substances. These substances enhance capillary and arterioles dilatation in the clamped area, stimulating production of Nitric Oxide (NO) endothelial derivative relaxation factor. The factors relaxing smooth muscle of blood vessels. During the cupping intervention, aforementioned factors and substances promote relaxation and vasodilation of blood vessels, decreasing pressure in the walls and suppress MAP.

Second, after the therapy, all study participants reported relaxing and calm sensation. Wet cupping stimulates nerves in the skin. This stimuli received by posterior horn of the spinal cord through the A delta and C nerves, and the spino thalamic tract towards the thalamus which produce endorphins. Endorphins recognized as small peptides, released into the hypothalamus, improving mood and increasing calm feelings. Happy and calm mood automatically turns the body into relaxed condition thus decrease the heart rate. Declining heart rate resulting lower cardiac output which impact to lower MAP.

Third, the excretion occurred during wet cupping therapy characterized by high-viscosity-blood. The blood may contain cholesterol that exceeds normal levels. This indicates accumulation of cholesterol in the damaged blood cells which extracted during the therapy. High cholesterol level causes cell damage, due to damaged cells physiology. Elimination of cholesterol in the body through wet cupping therapy improves blood flow in the blood vessels. Besides affected by cardiac output, the blood pressure also correlated by the blood viscosity. Thus, in patients receiving wet cupping, decreased blood viscosity identified in the body resulting lower blood pressure and MAP.

Difference of the Two Mean MAP Values in the Control Group

This research discovered various significant results. Systolic, diastolic blood pressure and MAP before and after health education were significantly differ with p value respectively 0.027; 0.001 and 0.000. These results indicate that provision of health education session to the control group promoting lower blood pressure. The respondents were following health education provided by researcher for about 45 minutes continued by questions and answers session. Prior to the education, participant's blood pressure evaluated during 5-10 minutes rest period after arrival. The session generally affects respondent hemodynamics. Sitting in a relaxed state enhance blood vessels elasticity, depreciating

blood pressure. Results of this study also influenced by participants anxiety level. The health education session in the control group comfort participants as the endorphin stimulated and decrease the anxiety level, directly benefit blood pressure. Endorphins are similar chemicals to morphine, produced naturally and take role to reduce pain as well as creating positive state of mind. Relaxation stimulates the production of endorphins. These findings are relevant to Yuwono, Ridwan & Hanafi (2017) which evaluates the effect of health education toward anxiety levels among hypertensive patients in Kwancen, Bandongan Village, Magelang Regency. Decreased anxiety level among patients with hypertension after receiving health education reduce blood pressure. Hypertension is a disease without symptoms but prone to cause sudden death. This situation addressed by patients as a stressor causing rapid increase of blood pressure without realizing the symptoms. Fear, anxiety, and worry were perceived feelings due to lack of knowledge regarding the disease and management.

One individual diagnosed with hypertension, anxiety occurred perceived the disease as a health burden. Before education sessions implemented, study participants were thinking various subjects, especially depressive experience which arises anxiety as a result illiteracy. The health education about hypertension delivered comprehensive knowledge. Hypertension definition, pathogenesis, factors influencing, prevention and HT management were discussed in the education sessions. A dynamic interactions were made during the session. Participants raised questions related to anxiety feelings and received explanation afterwards. After the session, participants reported nothing to worry about their condition as long as diet, balanced activity and rest program implemented. Once individual feels relaxed, adrenaline production decreased. This condition affects blood pressure and blood vessels resistance, which eventually causing lower blood pressure and MAP.

RECOMMENDATION

Confounding factors correlated with decreased MAP among hypertensive patient were not established. Future study with randomize controlled trial in larger population sample are required.

CONCLUSION

This study confirmed that wet coetaneous cupping therapy effective to reduce MAP among hypertensive patients.

Conflict of Interest

The authors declare that they have no conflict of interest.

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