

# THE COMPARISON OF EFFECTIVENESS AND MECHANISMS OF DRY CUPPING THERAPY AND WET CUPPING THERAPY IN REDUCING NECK PAIN SYMPTOM IN HYPERTENSION

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## Abstract

*Hypertension is a risk factor for stroke, Myocardial infarction, and vascular dementia. Symptoms that often appear in hypertensive patients include neck pain, dizziness, and physical weakness. Some of the non-pharmacological therapies that can be used to reduce pain are dry cupping therapy (DCT) or wet cupping therapy (WCT). The purpose of this study is to compare the effects and mechanisms of WCT and DCT in reducing neck pain in hypertensive patients. This is pre-experimental research with a pre-post test approach involving 32 participants without a control group. The instrument used in this study is The Numeric Rating Scale questionnaire. The Numeric Rating Scale questionnaire is used as an instrument in this study. Data are analyzed with Shapiro-Wilk Normality Test, Parametric Paired T-test, and independent t-test. The result shows that there is a significant reduction of pain scale in participants within the DCT group with a p-value of 0.000, and also within participants in the WCT group with a p-value of 0.000. It can be concluded that both DCT and WCT methods have a similar effect on decreasing the scale of neck pain.*

**Keywords:** Dry Cupping Therapy; Wet Cupping Therapy; Neck Pain

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## 1. Background

Hypertension, known as the silent killer, is a condition where there is an increase in systolic blood pressure >140 and diastole >90 (Organization, 2013). Hypertension is one of the risk factors for stroke, myocardial infarction, and vascular dementia (Meschia et al., 2014; Sierra et al., 2011). In addition, hypertension appears to be a predisposing factor for early cognitive impairment, which develops into dementia and stroke (Sierra, 2020). Currently hypertension is also one of the most frequent comorbidities in covid 19 patients (Zhou et al., 2020).

Symptoms that often appear in hypertensive patients include such as neck pain, dizziness and physical weakness. This situation if it lasts for a long time These symptoms when lasts for periods of time, will cause psychological problem such as anxiety (Setyawan and Hasnah, 2020). In addition, neck pain, if not treated properly will interfere with patient's activities. Pain management consists of pharmacological and non-pharmacological therapies. One of the non-pharmacological therapies that can be used to reduce pain is a complementary therapeutic approach such as cupping.

Scientifically, cupping can be used as a preventive, curative and rehabilitative effort. Cupping is proven to be effective in reducing the risk of cardiovascular disease, treating various diseases such

as hypertension, neck pain, migraine, carpal tunnel syndrome and helping in stroke rehabilitation (Hasan et al., 2014; Hanan & Eman, 2013; Refaat et al., 2014; Lee et al., 2010; Benli & Sunay, 2017). Cupping therapy is increasingly accepted because it is proven to have no side effects in the treatment of hypertension. In addition to reducing blood pressure, cupping is also effective in reducing symptoms associated with hypertension such as pain (Zarei et al., 2012; Jia et al., 2015; Aleyeidi et al., 2015; Al-Tabakha et al., 2018).

The type of cupping therapy can be classified into six main categories, namely technical category, strength, method, added ingredients in the cup, the area being cupped, and other cupping methods. The technical categories include dry cupping, wet cupping, massage cupping and glide cupping (Al-Bedah et al., 2016).

Dry cupping is one of the cupping techniques by suction only without scarification. Dry cupping has been shown to be effective in improving blood circulation and also for relieving neck pain (Lauche et al., 2011). Meanwhile, wet cupping is a cupping technique by suctioning the skin in certain parts to remove toxins and oxidants that accumulate in the body through thin incisions that hit the capillaries in the epidermis (Sina, 2007; Ridho, 2015). Wet cupping is effective in the treatment of chronic muscle pain

through nociceptive stimuli, that triggers diffuse noxious inhibitory control (DNIC) (Kim *et al.*, 2011), and through the expression of hsp70 and  $\beta$ -endorphin (Subadi *et al.*, 2017). Based on the those backgrounds, both dry and wet cupping can reduce pain, but it is not clear yet whether they have similar or the different mechanism. The author is interested in examining the to have a better understanding of the neck ain reducing mechanism of dry and wet cupping hypertensive patients.

## 2. Method

This research is a pre-experimental study with a pre-post test approach without control group design. The population of the study are patients diagnosed Hypertension in Posbindu PTM Wijaya Kusuma Dusun Taskombang, Palbapang Village, Bantul District, Bantul Regency, Special Region of Yogyakarta. The sample in this study are patients who meet inclusion criteria: Systolic blood pressure  $\leq 160$  mmHg and and diastolic pressure  $\leq 100$  mmHg batas bawahnya harus dicantumkan, misal systolic  $>120$  -

$<160$ , age 20-50 years, experiencing neck pain and willing to be respondents. While exclusion criteria: patients with contraindication for cupping atau who contraindicated to cupping and not experiencing atau without neck pain.

The number of sample is 32 and patients assigned randomly in 2 groups (intervention group WCT 16 and group DCT 16). The sampling technique is simple random sampling performed by taking random numbers in covered/ closed/ sealed paper in the presence of patients.

This study used the Numeric Rating Scale (NRS) questionnaire for pain measurement. Researcher measured the neck pain scale 5 - 10 minutes prior to cupping therapy (pre test). The Intervention then performed and the post test carried out 15-20 minutes after all steps of the cupping procedures completed. Data is collected only once for each respondent. Data then analysed using parametric paired t test and independent t test. This research has passed ethical committee review No.1395 / KEP-UNISA / I / 2020.

## 3. Results and Discussion

Tabel 1. Data distribution of Age, Gender, drug consumption, and smoking habits (n = 32)

	Characteristics	Frequency (f)	Percent (%)
1.	<b>Age (Year)</b>		
	26 – 35 Tahun	3	9.4
	36 - 45 Tahun	5	15.6
	46 – 55 Tahun	15	46.9
	56 – 65 Tahun	9	28.1
		<b>32</b>	<b>100.0</b>
2.	<b>Sex</b>		
	Female	20	62.5
	Male	12	37.5
		<b>32</b>	<b>100.0</b>
3.	<b>Antihypertensive Drugs</b>		
	Yes	23	71.9
	No	9	28.1
		<b>32</b>	<b>100.0</b>
4.	<b>Smoking habits</b>		
	Yes	6	18.8
	No	26	81.3
		<b>32</b>	<b>100.0</b>

Table 1 shows that the average age of the respondents is 46-55 years old, female, does not routinely take antihypertensive drugs and do not have a smoking habit.

Table 2 Normality test using Shapiro Wilk test obtained p value  $> 0.05$  (as presented in table 2), means that data in this study are normally distributed, so that statistical test will be done using a parametric test.

Table 2. Normality Test Results Using the Shapiro-Wilk Test (n = 32)

Group		Shapiro Wilk	
		Df	Sig.
WCT	Pre Test	16	.122
	Post Test	16	.073
DCT	Pre Test	16	.029
	Post Test	16	.071

Table 3. Paired t test for WCT and DCT groups (n = 32)

Group	N	Pre-Test	Post-Test	P value
		Mean	Mean	
WCT	16	4.50	1.56	0,000
DCT	16	4.19	2.44	0,000

Table 3 shows that there is a significant difference in the mean value of pretest and posttest in the DCT group. In this study, DCT was proven to be effective in reducing neck pain scale in hypertensive patients. This is consistent with previous studies that DCT has been shown to be effective in improving blood circulation and also for relieving neck pain (Lauche *et al.*, 2011).

The reduction in the scale of neck pain using the DCT method in this study may occur due to changes in the biomechanical properties of the skin, which may be explained by the diffuse noxious inhibitory control (DNICs) theory, Pain Gate Theory and reflex zone theory. Stimulus on the skin during DCT will cause the phenomenon of pain inhibits pain. In addition, the first suction on the skin will stimulate the nerves in the skin. This stimulation will be continued to the cornu posterior of the spinal cord

through the nerves a delta and C, as well as towards the thalamus via spinothalamic tract which will release  $\beta$  endorphin. On the other hand, other mechanism, the negative pressure during the first suction will stimulate keratinocyte cells in the skin to increase the expression of HSP 70 (Heat Shock Protein) and  $\beta$  endorphin. (Subadi *et al.*, 2017). Increasing endorphins will also improve mood and increase feelings of comfort, but also acts as analgesic (Petersen, 2019). Negative pressure during the first suction drives away nociceptor mediator such as Substance P from pain receptors and pain sensitive structures producing analgesic effect (El Sayed, Mahmoud and Nabo, 2013).

Likewise, in the WCT group there was a significant difference in the value of pretest and posttest neck pain. The WCT method in this study was proven effective in reducing neck pain in hypertensive patients. This is in accordance with previous studies which stated that WCT was effective in the treatment of chronic muscle pain, Low Back Pain (LBP) (Tarique, Ansari and Zulkifle, 2016) through nociceptive stimulation, that triggers diffuse noxious inhibitory control (DNICs) (Kim *et al.*, 2011), and could be mediated by the expression of HSP70 and  $\beta$ -endorphin (Subadi *et al.*, 2017).

Similar to the DCT method, decreasing the neck pain scale by the WCT method may also be explained by the diffuse noxious inhibitory control (DNICs) theory mechanism, Pain Gate Theory and reflex zone theory. In the DCT method the  $\beta$  endorphin expression was generated from the negative pressure exerted during the first cupping, but in the WCT method the  $\beta$  endorphin expression was not only generated from negative pressure but also from the puncture process in the skin area. Puncture of the skin allows the release of endogenous opioids such as endorphins, enkephalins and dynorphins which reduce pain and intensify the analgesic effect.

The reduction in neck pain by the WCT method may also be explained through blood detoxification theory. The WCT method is carried out through three phases known as CPC, namely Cupping Puncture and Cupping, each of which has benefits for the health of the body. Blood that is removed during the cupping process contains Causative Pathological Substance (CPS), interstitial fluids, damaged erythrocytes, hydrophilic and hydrophobic materials in the form of lipoproteins, described in taibah theory as metabolic waste (El-Sayed, Mahmoud and Nabo, 2013). Cupping has been shown to be effective in removing CPS including pain-causing substances such as substance P (El Sayed, Al-quliti, *et al.*, 2014). Negative pressure during the first suction drives away nociceptor mediator such as Substance P from pain receptors and pain sensitive structures producing analgesic effect (El Sayed, Mahmoud and Nabo, 2013).

In addition, WCT has also been proven effective in reducing lactic acid levels (Ningsih, 2016). The

increase in lactic acid that results from tissue consequences when oxygen deprivation is one of the causes of pain. Lactic acid is produced when tissue experiencing oxygen deprivation and consequently cause pain. In hypertensive patients there is vasoconstriction of blood vessels and also increased blood viscosity, this condition will reduce oxygen in the tissues, resulting in anaerobic metabolism. Hypertensive patients experience vasoconstriction and increased blood viscosity, resulted in reduced oxygen level, lead to anaerobic metabolism that produce lactic acid. One of the effects of WCT is reducing lactic acid buildup, so that pain can be reduced.

Table 4. Independent t test for WCT and DCT groups (n = 32)

Group	N	$\Delta$ Mean	SD	P value
WCT Pre-post	16	2.81	834	0,000
DCT Pre-post	16	1.75	683	

Table 4 shows that the pretest delta value of WCT is higher than the DCT. This explains that although both groups had a significant effect on decreasing the neck pain scale, the WCT group showed a higher decrease than the DCT. The table above also explains that there is a significant difference between the delta values for pretest WCT and pretest DCT.

In this study, WCT and DCT are equally effective in reducing neck pain scale. This is consistent with previous studies that DCT and WCT are effective in the treatment of pain (Lauche *et al.*, 2011; Kim *et al.*, 2011; Subadi *et al.*, 2017; Tarique, Ansari and Zulkifle, 2016; El Sayed, Mahmoud and Nabo, 2013).

Although both (DCT & WCT) have an effect in reducing pain, in terms of general benefits, WCT is more beneficial than other cupping methods (El Sayed, Al-quliti, *et al.*, 2014). WCT is an effective method for reducing low density lipoprotein cholesterol in men (Preventive effect against atherosclerosis) (Niasari *et al.*, 2010), Effective in the treatment of shingles (Cao, Zhu and Liu, 2010), medicine for cellulitis (due to honey bee stings) (Ahmed *et al.*, 2011), adjuvant treatment for iron overload in treating thalassemia, hemochromatosis, and sideroblastic anemia (El Sayed, Abou-Taleb, *et al.*, 2014).

Punctures on the skin during the WCT process will cause mast cell damage which will release several substances such as serotonin, histamine, bradykinin, slow reacting substance which will then result in the release of Nitric Oxide (NO) (Lauche *et al.*, 2012; Al-Bedah *et al.*, 2019). NO has an important role in the activities of cell proliferation, differentiation, angiogenesis, apoptosis and remodeling (Frank *et al.*, 2002; Rahmadi, 2019). In addition, skin injuries will also stimulate the release of inflammatory mediators such as neutrophils and

macrophages that play a role in increasing the body's immune system. (Asmalinda and Sapada, 2018).

#### 4. Conclusions and suggestions

DCT and WCT had the same effect on decreasing the neck pain scale. The DCT method in reducing neck pain scale may be explained by the mechanism of diffuse noxious inhibitory control (DNICs) theory, Pain Gate Theory and reflex zone theory. Likewise, the WCT method in reducing neck pain scale may also be explained by the diffuse noxious inhibitory control (DNICs) theory mechanism, Pain Gate Theory and reflex zone theory. Apart from being able to be explained through pain reduction effects, the reduction in neck pain with the WCT method may also be explained through blood detoxification theory, this is what distinguishes WCT and DCT. Although DCT & WCT have the same effect in reducing pain, WCT more beneficial than DCT, and presumably from other cupping method without blood releasing/ skin incision procedure

However, this study still needs improvement through further research with a larger sample size and not just pain in hypertensive patients.

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