

## The Influence of Dry Cupping toward Heart Rate Variability (HRV) in Male Obesity adolescence

### *Pengaruh Bekam Kering terhadap Heart Rate Variability (HRV) pada Remaja Laki-laki Obesitas*

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#### Abstract

Cardiovascular disease defines as a disease related to heart and blood vessel. One of high risk in the disease of cardiovascular is its on people with obesity. Heart Rate Variability (HRV) indicator is an important sign to identify cardiovascular risk and provide early information related to change of heart autonomy controlling. This indicator was influenced by several factors such as cupping therapy. Study found that HRV increased after cupping therapy by wet cupping treatment in healthy people. The aims of this research is to investigate the influence of dry cupping toward increased HRV in male obesity adolescence. The study was experimental with pre-post test design by using consecutive sampling of 30 male adolescence aged 18-24 years old with BMI  $\geq 25$  kg/m<sup>2</sup>. They were divided into 2 groups, control and intervention group with cupping therapy. Data result used in SDNN and RMSSD level. Analysis Data were used paired and independent t test. The result showed SDNN and RMSSD level before intervention were 73,95 ms dan 67,11 ms. Whereas SDNN and RMSSD level after intervention were 69,66 ms dan 61,95 ms. In paired ( $p=0,52$  and  $p=0,38$ ) and independent t test ( $p=0,30$  and  $p=0,56$ ) showed that there were no significant difference between SDNN and RMSSD in intervention group and control group ( $p>0,05$ ). The conclusion of this study is dry cupping had no effects toward increased HRV level in male obesity adolescence.

Keywords: dry cupping, sympathetic nervous system, heart rate variability, obesity

#### Abstrak

Penyakit kardiovaskular adalah penyakit yang terkait dengan jantung dan pembuluh darah. Salah satu faktor risiko yang cukup tinggi pada penyakit kardiovaskular adalah obesitas. Indikator Heart Rate Variability (HRV) adalah tanda yang penting untuk mengetahui risiko penyakit kardiovaskular yang menyediakan informasi awal tentang perubahan pada kontrol otonom jantung. Indikator ini dipengaruhi oleh beberapa faktor salah satunya adalah perlakuan bekam. Tujuan penelitian ini adalah untuk mengetahui pengaruh perlakuan bekam kering terhadap peningkatan HRV pada remaja laki-laki obesitas. Metode penelitian yang digunakan berupa eksperimental dengan rancangan pre-post test design. Subyek penelitian adalah 30 mahasiswa berusia 18-24 tahun, yang dibagi menjadi 2 kelompok yaitu kelompok kontrol dan kelompok intervensi. Kelompok kontrol adalah remaja laki-laki tidak obesitas sedangkan kelompok intervensi adalah remaja laki-laki obesitas dengan perlakuan bekam. Sampel dipilih melalui teknik consecutive sampling. Hasil menunjukkan tidak adanya pengaruh secara signifikan bekam kering terhadap nilai SDNN dan RMSSD pada kelompok intervensi ( $p>0,05$ ). Uji statistik independent t test menunjukkan tidak adanya perbedaan secara signifikan SDNN dan RMSSD pada kelompok kontrol dan intervensi, sehingga bekam kering tidak memberikan pengaruh terhadap peningkatan HRV pada remaja laki-laki obesitas. Jenis penelitian yang digunakan adalah eksperimen dengan desain pre-post test design. Subyek penelitian sebanyak 30 orang dengan kriteria inklusi laki-laki usia 18-24 tahun dengan IMT  $\geq 25$  kg/m<sup>2</sup>. Subyek dipilih melalui teknik consecutive sampling. Subyek dibagi menjadi 2 kelompok yaitu kelompok kontrol dan kelompok intervensi dengan perlakuan bekam. Data yang dihasilkan adalah nilai SDNN dan

*RMSSD. Analisis data yang digunakan adalah paired dan independent t test. Hasil penelitian menunjukkan nilai SDNN dan RMSSD sebelum intervensi adalah 73,95 ms dan 67,11 ms. Sedangkan nilai SDNN dan RMSSD setelah intervensi adalah 69,66 ms dan 61,95 ms. Uji statistik paired ( $p=0,52$  dan  $p=0,38$ ) dan independent t test ( $p=0,$ ) menunjukkan tidak adanya perbedaan secara signifikan SDNN dan RMSSD pada kelompok kontrol dan intervensi. Kesimpulan dari penelitian ini bahwa bekam kering tidak memberikan pengaruh terhadap peningkatan HRV pada remaja laki-laki obesitas.*

Kata kunci: bekam kering, saraf simpatis, *heart rate variability*, obesitas

## INTRODUCTION

Cardiovascular disease defines as disease that related to heart and blood vessel.<sup>1</sup> One of condition associated to cardiovascular is imbalances of autonomic nervous system.<sup>2</sup> Imbalance of autonomic nervous system could cause increasing of morbidity and mortality rate including in term of cardiovascular disease.<sup>2</sup>

One of high risk factor in cardiovascular disease is obesity. Several studies show there was increasing sympathetic activity and decreasing vagal system control in changing of HRV and non-adrenaline.<sup>3</sup> Domination of sympathetic nervous caused decreasing of Heart Rate Variability (HRV).<sup>4</sup>

HRV indicator is an important sign for investigating the risk of cardiovascular disease and could provide early information about autonomic control changes on the heart.<sup>5</sup> There are 2 important parameter of HRV and used in many research, they are Standard Deviation of the Normal to Normal intervals (SDNN) and Root Mean Square of Successive Differences (RMSSD). SDNN show the role of sympathetic and parasympathetic. RMSSD in further demonstrate the role of the parasympathetic. These indicator could be influenced by several factors such as cupping therapy.

Cupping therapy, wet and dry are assumed that can release liquid and toxic in human body, diffuse

the condition of adhesion, strengthen the connective tissue, accelerate blood circulation to skin and muscle and also stimulate peripheral nervous system.<sup>6</sup> Dry cupping could increase blood flow and stimulate autonomic nervous system. Dry cupping provides potential benefits of simple administration, low costs, and safety. Study found that there was increasing HRV rate after cupping therapy in group of healthy people.<sup>7</sup>

The study aimed to investigate the influence of dry cupping therapy toward increased HRV in male obesity adolescence.

## MATERIAL AND METHODS

This was an experimental study with pre-post test design. The variables in this study are dry cupping as independent variable and HRV in male obesity adolescence as dependent variable. This study took place at Universitas Muhammadiyah Yogyakarta (UMY) in November 2016.

The subject in this study was 30 people. The inclusion criteria are male adolescence, aged 18-24 years old and  $BMI \geq 25 \text{ kg/m}^2$ . Exclusion criteria are smoker, alcoholic, cardiovascular disease history and nervous drugs consumers. They were divided into two different group control and intervention. Each group had 15 students. Intervention group was male students with obesity and received dry cupping

therapy, and control group was who without obesity and did not receive the therapy. The samples took trough consecutive sampling.

This study began with subject screening. After that the subject asked to fulfill the Informed Consent, before that they were understood the rules and procedure as intervention or control group. The researcher measured the HRV with the condition of subject in last two hours were not in actively act, have big portion meal, not consume any caffeine drink. The condition of room was calm and comfort. The measuring by Electro Cardiogram (ECG) took time 5 minutes in supine position. This study was approved by ethics committee of Medical and Health Sciences Faculty, Universitas Gadjah Mada (KE/FK/0086/EC/2017).

Pretest and posttest were took 5 minute before and after therapy by used ECG machine. The dry cupping had been done by therapies certified by Asosiasi Bekam Indonesia (ABI). Treatment took time 15 minutes in 5 points on the back of neck/posterior (1 point), bilateral perispinal area (2 points) dan thoracic spine (2 points). Data result were used HRV parameter. They are SDNN and RMSSD level in millisecond (ms). SDNN show the role of sympa-

thetic and parasympathetic. RMSSD in further demonstrate the role of the parasympathetic. Analysis Data were used paired and independent t test.

## RESULTS

Researcher analyzed the data with descriptive analysis with standard error of mean (SEM). The differences HRV between before and after dry cupping examine in paired t test and examine differences between each group used independent t test.

Measurement of HRV with parameter SDNN and RMSSD show that there is variation changes in both group control and intervention, it can be seen in Table 2. The SDNN in control group was  $77,30 \pm 4,09$  ms then decreased to  $75,03 \pm 3,11$  ms. In intervention group got SDNN  $73,95 \pm 5,38$  decreased to  $69,66 \pm 4,24$  ms. RMSSD in control group  $59,40 \pm 2,33$  ms and got the increasing  $64,72 \pm 3,05$  ms. RMSSD in the beginning of intervention group  $67,11 \pm 5,86$  ms decreased to  $61,95 \pm 3,58$  ms.

Table 1. Respondents Characteristic

Characteristic	Control group	Intervention group
Amount	15	15
Age (year)	$21,00 \pm 0,36$	$20,86 \pm 0,36$
BMI ( $\text{kg}/\text{m}^2$ )	$21,04 \pm 0,28$	$31,39 \pm 1,50$

Mean  $\pm$  SEM

Table 2. Measurement Result of HRV in Control and Intervention Group

Parameter	Control			Intervention		
	Pre	Post	p level	Pre	Post	p level
SDNN	$77,30 \pm 4,09$	$75,03 \pm 3,11$	0,66	$73,95 \pm 5,38$	$69,66 \pm 4,24$	0,52
RMSSD	$5,40 \pm 2,33$	$64,72 \pm 3,05$	0,14	$67,11 \pm 5,86$	$61,95 \pm 3,58$	0,38
HR	$70,93 \pm 2,73$	$67,60 \pm 2,27$	0,19	$68,00 \pm 3,74$	$65,80 \pm 2,24$	0,50

SEM: Standard Error of Mean, HR: Heart rate, SDNN: Standard deviation of the normal to normal intervals (ms), RMSSD: Square root of the mean squared differences of successive NN interval (ms)

## DISCUSSION

The result show SDNN and RMSSD in group intervention were decreased. In statistical paired t test had no significantly with p level ( $p > 0.05$ ).  $p = 0,52$  and  $p = 0,38$ . HRV in parameter SDNN show the role of sympathetic and parasympathetic. This suggests that the increase in the sympathetic nervous system. Parameter RMSSD in further demonstrate the role of the parasympathetic. This shows a decrease in the parasympathetic nerve activity. The results of this study contrast with a research which showed a significant increase in HRV parameters and RMSSD SDDN after treatment given by wet cupping.<sup>7</sup> In this study showed a decrease in HRV in the intervention group. This indicates dry cupping does not provide adequate effect to the nucleus ambiguus.

SDNN level and RMSSD before being given the treatment showed no statistically significant difference ( $p > 0.05$ ) ( $p = 0,62$  and  $p = 0,24$ ). It has similarities with the research Farah et al. showing that BMI did not correlate significantly with all parameters of HRV.<sup>5</sup> Significant relationships indicated by waist circumference and is characterized by a decrease in RMSSD parameter. This result is inversely proportional to the results of research Chethan et al. (2012),<sup>3</sup> which showed a significant difference in HRV between obese and normal group with an age range 20-24 years.

SDNN level and RMSSD after being given the treatment showed no statistically significant ( $p > 0.05$ ) difference ( $p = 0,30$  and  $p = 0,56$ ). These results differ from the results of Kim et al. (2014),<sup>8</sup> which showed a significant influence of wet cupping therapy to increase HRV. This could be due to the effect of dry cupping has not been able to increase HRV compared with wet cupping. Based Vaskilampi &

Hanninen that cupping treatment resulted in blood loss during conditions of vasodilatation thus increasing parasympathetic activity to provide a relaxing effect on the muscles. Cupping treatment is meant to refer to wet cupping.<sup>9</sup>

The results showed a decrease in SDNN and RMSSD indicating the dominance of the sympathetic nervous system. This could be due to environmental influences that cause stress and anxiety. Activation of the sympathetic nervous system stimulates the stress response is divided into two types which include: (1) The stress response type I which involves the sympathetic nervous system and the adrenal medulla to let go of catecholamines such as adrenaline and noradrenaline; (2) The stress response type II involving the release cortisol of HPA Hypothalamic-pituitary-adrenal (HPA) axis.<sup>10</sup> Work environment influence on the psychological state of the workers represented by the scaling HRV.<sup>2</sup>

The average percentage increase in SDNN and RMSSD the intervention group is greater than the decline. This percentage indicates the activity of the parasympathetic nervous system is dominant over the sympathetic in some samples. It predicted for their beliefs or a strong perception on relevant samples cupping therapy. That perception was that the bruise is part of the Sunnah of the Prophet Muhammad (PBUH) and good for health. This perception of the samples obtained through questions asked by investigators.

Dry cupping is one kind of cupping to put the saucer bruise on the skin and then given a negative pressure in order for the blood and fluid from the point of inflammation migrate to the skin surface.<sup>11</sup> The effect of dry cupping therapy toward HRV level in this study was not significant. It might caused by

the duration and frequency of therapy. Dry cupping treatment in this study was given for 15 minutes and only one treatment. Dry Cupping against spinal pain in women postpartum indicates that dry cupping can reduce pain significantly with intervention for 20 minutes a day for four consecutive days.<sup>12</sup> This indicates dry cupping performed in this study requires the duration and frequency longer to obtain significant results.

## CONCLUSION

Dry cupping had no effect toward increased HRV level in male obesity adolescence. Duration of treatment of this study was in 15 minutes.

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