



## EXPLORING THE IMPACT OF DRY CUPPING AND WET CUPPING THERAPY ON HAEMOGLOBIN LEVELS DURING MENSTRUATION AMONG ADOLESCENT FEMALES: A PRELIMINARY COMPARATIVE STUDY

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### ABSTRACT

Adolescence is a critical phase of transition from childhood to adulthood, characterized by various reproductive health challenges. Anaemia is a prevalent problem, with approximately 10% of women experiencing significant haemoglobin loss through menstrual bleeding. Non-pharmacological approaches, including cupping therapy, have shown promise in managing anaemia and menstrual issues. This study aimed to compare and evaluate the effectiveness of dry cupping therapy and wet cupping therapy in improving haemoglobin levels during menstruation among late adolescents. A quasi-experiment with a pre-post test without control group design was conducted. The sample consisted of 70 respondents, with 35 participants in the dry cupping group and 35 participants in the cpc-wct cupping group, selected using purposive sampling. The data were analyzed using the paired t-test and independent t-test. Both the dry cupping group ( $t=-4.896$ ,  $p<0.001$ ) and the cpc-wct group ( $t=-12.727$ ,  $p<0.001$ ) experienced a significant increase in haemoglobin level after the implementation of cupping therapy. However, there was no statistical significant difference in haemoglobin levels between groups after the intervention ( $t= 0.425$ ,  $p=0.534$ ). This suggests that the outcomes or measured variables did not significantly differ between the two cupping groups following the intervention. Cupping therapy, whether applied through cpc-wct or dry techniques, has the potential to enhance haemoglobin levels in adolescents during menstruation. Cpc-wct cupping, in particular, is perceived as a more effective method compared to dry cupping. Consequently, both cpc-wct and dry cupping can be considered as viable alternative interventions for raising haemoglobin levels in adolescents during menstruation.

Keywords: adolescents; cupping therapy; haemoglobin enhancement; menstruation

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## INTRODUCTION

Adolescence signifies a phase of change from childhood to adulthood. It encompasses the age bracket of 13 to 20 years and is a critical time when individuals are susceptible to reproductive health challenges (Liang et al., 2019). In Indonesia, there was an observed increase in anaemia, reaching 48.9% based on The Indonesian Basic Health Research Survey (*Riset Kesehatan Dasar* [Riskesmas]) report. In 2018, the prevalence of anaemia in the 15-24 age group was 18.4%, with a higher proportion observed in girls (27.2%) compared to boys (20.3%). Within the same age group, the prevalence of anaemia was 32% (Ministry of Health Indonesia, 2018).

The total blood loss during menstruation typically ranges from 30 to 180 ml, with an average of 80 ml per menstrual period (Hallberg et al., 1966). Studies have shown that a blood loss of 40 ml during menstruation. Continuous blood loss exceeding 60 ml per menstrual period can deplete the body's haemoglobin stores, while a loss exceeding 80 ml may indicate clinical anaemia. It is worth noting that anaemia affects around 20% to 25% of the global population, primarily children and women. Women of reproductive age are more susceptible to anaemia due to menstrual blood loss (Ofojekwu et al., 2013).

Non-pharmacological approaches can be employed to manage anaemia (Maharani et al., 2022). Grown evidence showed that cupping therapy particularly beneficial for conditions such as menstrual problem and irregular or suppressed menstrual cycles (Hani & Saleem, 2019). Cupping therapy, also known as hijama, is an alternative form of medicine that utilizes cups, hence its name, to provide therapeutic benefits. In the initial classification of cupping therapy, it was broadly divided into two types: dry cupping and wet cupping. Dry cupping involves pulling the skin into the cup without making any cuts, whereas wet cupping involves making small incisions on the skin, allowing blood to be drawn into the cup (Lauche et al., 2012).

Wet cupping therapy, which has been employed as an alternative treatment method, is widely utilized in the Middle East, as well as in other regions of Asia and Europe (AlBedah et al., 2013). The precise mechanism underlying the effectiveness of wet cupping therapy is not yet fully understood. The procedure involves extracting congested blood from the skin, which promotes improved circulation of both blood and lymphatic fluid, alleviates muscle spasms, and yields the desired therapeutic effects. Wet cupping may stimulate the release of endogenous nitric oxide, known for its vasodilatory, antineoplastic, and antimicrobial properties, or it may facilitate the removal of oxidants, thereby reducing oxidative stress. Moreover, the skin laceration caused by wet cupping could activate diffuse noxious inhibitory control, ultimately serving as a nociceptive stimulus (Cao et al., 2012; Huang, 2008; Manz & Piotrowski-Manz, 2020).

Considering the substantial prevalence of adolescent females facing this particular issue both in Indonesia and globally, along with the limited existing research on the application of cupping therapy for this concern, there is a compelling need to investigate the potential benefits of cupping therapy. This urgency arises from the historical and cultural significance of cupping therapy, as well as its perceived therapeutic advantages. Rigorous research is required to comprehensively explore its strengths, encompassing its mechanisms of action, safety considerations, and potential integration into evidence-based healthcare practices. Conducting scientific investigations into cupping therapy can yield valuable insights that may contribute to the development of innovative treatment approaches, enhance the quality of patient care, and foster a comprehensive understanding of its role within holistic healthcare. Therefore, the objective of this study was to compare and evaluate the effectiveness of dry cupping therapy and wet cupping therapy in enhancing haemoglobin levels during menstruation among late adolescents.

## **METHOD**

The study was a quantitative quasi-experiment with a pre-post test without control group design. The study included all female nursing students enrolled as the study population. The sample size was determined using the formula for the difference between two proportions (Lemeshow et al., 1990), which was resulted in minimum sample of 70 respondents, including 35 respondents in the dry cupping therapy and 35 respondents in the cupping-

puncturing-cupping wet cupping therapy group using purposive sampling techniques. The inclusion criteria for this study involved female nursing students aged 18-22 years who met the following conditions: regular menstrual cycles ranging from 21 to 35 days and low to moderate anaemia status with haemoglobin levels of  $\geq 8$  g/dL. On the other hand, the exclusion criteria encompassed female students aged 18-22 years who had a medical history of severe conditions that could impact haemoglobin levels, such as kidney failure, lung disease, lymphatic disorders, cancer, and malaria as well as those who experienced menstrual disorders including metrorrhagia, hypermenorrhea, polimenorrhea, oligomenorrhea, and amenorrhea.

Two instruments were used to collect the data, namely demographic sheet and haemoglobin measurement device. An Indonesian demographic datasheet was developed by the researchers, including age, Fe supplement consumption, history of anaemia in the last 3 months, and haemoglobin level prior to intervention. Following the completion of the informed consent process, capillary blood samples were obtained from each participant for analysis. The HemoCue® system, capable of measuring haemoglobin levels in both venous and capillary blood, was used for this purpose. Capillary blood samples were collected by performing a finger prick on the middle finger of the left hand, preceded by cleaning and massaging the finger to enhance blood flow. The device underwent daily checks using control cuvettes and a standard of known concentration. Daily three-set control tests were conducted to ensure the functionality of the device.

## **Intervention**

### *Dry cupping*

The dry cupping technique involves the application of sterilized suction cups to specific anatomical points on the body, without the need for incisions or blood extraction. Initially, the lower back skin is prepared by applying olive oil, followed by the implementation of moving cupping along the lumbar area. Subsequently, four cups are positioned and suction is created within the cups while the patient assumes a prone lying position. The amount of suction applied is adjusted based on the patient's individual tolerance, typically utilizing one to three hand pumps. The cups are left in place for a duration of 8 minutes, allowing them to exert a pulling force on the underlying tissue, potentially resulting in vasodilation and the possible rupture of capillaries. Following the allotted time, the cups are carefully removed, and the low back area is wiped with olive oil (Conrad, 2016).

### *Cupping-puncturing-cupping wet cupping therapy (CPC-WCT)*

The CPC-WCT intervention was performed following a six-step standardized procedure proposed by Setyawan (2022), including preparation, cup placement, incision, cupping, removal and dressing, and aftercare. This procedure was conducted by trained professionals in a controlled and sterile environment to ensure safety and minimize the risk of complications. Cupping-puncturing-cupping wet cupping therapy (CPC-WCT), is a specific technique used in wet cupping therapy, also known as hijama. The procedure involves several key steps to ensure a safe and effective treatment. The description of the steps involved in CPC-WCT showed in Table 1.

Table 1.  
CPC-WCT Technique

Step	Activity
Preparation	The first step is to prepare the treatment area and the patient. The area to be cupped is cleaned and sterilized to maintain a hygienic environment. The patient's medical history and any contraindications are reviewed to ensure their suitability for the treatment.
Cup placement	Cups with a vacuum-sealing mechanism are selected for wet cupping. The cups are applied to the marked points on the skin and gently pressed down to create a vacuum seal. The cups are left in place for 5 minutes to allow the skin to rise into the cups.
Incision	After the cups are removed, the therapist makes small, shallow incisions on the surface of the skin using a sterile lancet. The incisions are made at a controlled depth and angle to ensure minimal discomfort and bleeding.
Cupping	Cups are then reapplied to the incised areas, and a vacuum is created to draw out a controlled amount of blood or other fluids. The therapist adjusts the suction pressure based on the patient's tolerance and the desired therapeutic outcome. The cups are left in place for a predetermined time, typically ranging from a few minutes to up to 7 minutes.
Removal and dressing	Once the cupping duration is complete, the therapist carefully removes the cups and applies sterile dressings or antiseptic ointments to the incised areas to prevent infection. The patient's comfort and safety are ensured throughout this process.
Aftercare	The patient is given instructions on post-treatment care, including proper wound care, hygiene, and any specific recommendations to follow. They may be advised to avoid certain activities or substances temporarily to optimize the healing process.

### Cupping point

According to Setyawan (Setyawan, 2022), dry and wet cupping therapy are applied to two distinct areas of the body. The first area is the upper back region, specifically between the seventh cervical vertebra (C7) and the first thoracic vertebra (T1). The second area is the sacrum region, which lies between the lower vertebrae known as the lumbar vertebrae (L1-L3). During cupping therapy, the application of suction aims to create negative pressure on the skin, generating localized hypoxic conditions. This hypoxia triggers an adaptive response in the body by activating the Hypoxia Inducible Factor (HIF) gene, which interacts with enzymes and other transcription factors to regulate vascularization and tissue growth. As the hypoxic condition persists, the HIF signals prompt an adaptive reaction aimed at reducing oxygen demand and increasing oxygen supply to establish a new equilibrium. The activation of HIF-1alpha stimulates the release of Erythropoietin (Epo) from the kidneys. Additionally, HIF-2alpha, alongside HIF-1alpha, stimulates erythropoiesis, which is the process of generating red blood cells and hemoglobin. This process occurs within the kidneys and spinal cord, resulting in an elevation of hemoglobin levels (Rahmadi, 2018). The cupping point for this study was presented in Figure 1.

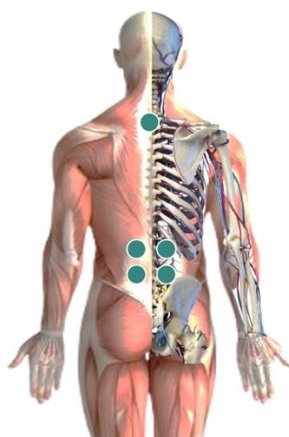


Figure 1. Cupping point location

*Data collection*

The sampling technique employed in this study was purposive sampling method from April to August 2022. This method involved selecting samples based on chance encounters with the researcher, meaning that anyone who happened to come across the researcher and met the inclusion and exclusion criteria could be included as a sample. The selection of individuals as data sources was based on the researcher's judgment of their suitability according to the specified inclusion and exclusion criteria. The data collected from the study were then analyzed to determine the effectiveness of the cupping intervention.

The statistical analysis of the data was performed using IBM SPSS Statistics (IBM Corp., Armonk, N.Y., USA). To describe the respondents' characteristics, univariate analysis was utilized including frequency, percentage, mean and standard deviation (SD). The normality test utilized in this study was the Kolmogorov-smirnov test, considering the sample size of more than 50 respondents. Based on the results of the normality test, it was found that the pre-test and post-test data for both wet cupping therapy and dry cupping therapy yielded a *p*-value of >0.05, indicating a normal distribution of the data. Furthermore, paired t-test was employed to examine the similarities and differences in both groups before and after the study. To determine the differences between groups after the study, the independent t-test was utilized. The level of significance was set at *p*<0.05. The informed consent was obtained writtenly from all human adult participants and the parents or legal guardians. The Ethics Review Board approved the research at the health research ethics committee number 4.21/KEPK/SSG/III/2022 on March 2022.

**RESULTS**

*Characteristics of the Participants*

The characteristics of the participants, as presented in Table 2, demonstrate that the average age of individuals in the dry cupping group was 21.19 years, while in the cpc-wct cupping group, it was 20.90 years. The age range of the participants spanned from 18 to 22 years. Prior to the intervention, the haemoglobin levels in both groups showed similar results, with mean values of 11.76 gr/dL and 12.38 gr/dL, respectively. All of the participants (100%) did not receive iron supplementation and had no history of clinical anaemia in the last three months. There were no significant differences observed in the characteristics of the participants between the two groups (*p*>0.05).

Table 2.  
Participants characteristics

Variable	Dry cupping group (n=35)		Wet cupping group (n=35)	
	f	%	f	%
Fe supplement consumption				
Yes	0	0	0	0
No	35	100	35	100
History of anaemia in the last 3 month				
Yes	0	0	0	0
No	35	100	35	100
Haemoglobin level prior to intervention (Mean ± SD)	11.76 ± 1.35		12.30 ± 1.38	
Age (Mean ± SD)	21.19 ± 1.13		20.90 ± 0.96	

*The Effects of Dry Cupping and CPC-WCT Intervention on Haemoglobin Level*

Table 3 shows the statistical analysis using paired t-test demonstrated a highly significant effect of cupping therapy in both the cpc-wct cupping group (*t*=-12.727, *p*<0.001) and the dry

cupping group ( $t=-4.896$ ,  $p<0.001$ ). This indicates that cupping therapy had a substantial impact on the participants' outcomes in terms of the measured variable.

Table 3.  
Pre- and post-test mean comparison of haemoglobin level among wet and dry cupping group (n=70)

Variable	Group	Pre-Test	Post-Test	T	df	P value <sup>§</sup>
		Mean ± SD	Mean ± SD			
Haemoglobin level (g/dL)	Wet cupping	12.30 ± 1.38	13,18 ± 1.32	-12.727	14	<0,001 *
	Dry cupping	11.76 ± 1.35	13,43 ± 1.81	-4.896	14	<0,001 *

Note: Paired t-test was performed, \*Significant at  $p<0.05$ .

*Dry Cupping and CPC-WCT Group Comparison on Haemoglobin Level*

According to the statistical analysis presented in Table 4, there was no statistically significant difference observed between the cpc-wct cupping group and the dry cupping group after the intervention ( $t= 0.425$ ,  $p = 0,534$ ). This suggests that the outcomes or measured variables did not significantly differ between the two cupping groups following the intervention.

Table 4.  
Post-test mean comparison of haemoglobin level between wet and dry cupping group (n=70)

Variable	Group	Post-Test	Mean difference	t	P value <sup>§</sup>
		Mean ± SD			
Haemoglobin level (g/dL)	Wet cupping	13,18 ± 1.32	0.24	0.425	0.534
	Dry cupping	13,43 ± 1.81			

Note: <sup>§</sup>Independent t-test was performed

**DISCUSSION**

The objective of this research was to investigate the impact of cupping therapy on the haemoglobin levels in women during menstruation. The findings demonstrated a significant influence of both dry cupping and cpc-wct cupping techniques on the haemoglobin levels, indicating the effectiveness of cupping therapy as a treatment option for women during menstruation. Anaemia is a prevalent condition characterized by various underlying factors. Among women, anaemia is particularly common during the reproductive years due to physiological factors such as menstrual blood loss and pregnancy. In other instances, which can affect men and postmenopausal women, anaemia is typically associated with hidden gastrointestinal bleeding (Auerbach et al., 2021).

Upon comparing the outcomes of our study with the aforementioned research, it is evident that our findings align with the previous study. In contrast, the case reports mentioned previously outlined contrasting observations, as they documented instances where patients underwent frequent wet or dry cupping sessions for prolonged durations, resulting in the development of anaemia. Therefore, it is plausible to attribute the occurrence of anaemia in those cases to the atypical and excessive cupping interventions detailed in those reports. It is important to note that our study followed the standard wet-cupping procedure, and contrary to claims made by some hijama practitioners regarding its efficacy in treating anaemia, our results clearly indicate no improvement in haemoglobin (HB) levels among individuals who

initially presented with anaemia (Jimenez et al., 2015; Koran & Irban, 2021; Shawaf et al., 2018).

Menstrual patterns can vary among women, with some experiencing regular periods with minimal bleeding while others have prolonged and heavy bleeding. Prolonged heavy bleeding can lead to blood deficiency or anaemia over time. Excessive bleeding increases the risk of haemoglobin deficiency. Haemoglobin subsequently reduces the supply of red blood cells, resulting in decreased oxygen delivery to the body's organs. Adolescent girls, who typically have menstrual periods lasting 2-7 days, may also experience anaemia due to these menstrual conditions (Mirawati, 2020). The results of the study conducted on the dry and wet cupping intervention groups revealed a positive effect of cupping therapy on increasing haemoglobin levels. These findings are consistent with the previous study by Rahmadi (2018), which indicated that wet cupping therapy does not lead to a decrease in haemoglobin levels but rather increases them. The t-test conducted for both wet and dry cupping groups further supported the significant difference in haemoglobin levels before and after the cupping therapy intervention. These findings are in line with the study conducted by Syaifullah (Syaifullah et al., 2021).

The initial suction process of cupping aims to create negative pressure on the skin, inducing localized partial hypoxia. In the presence of hypoxia, the body initiates adaptive responses by activating Hypoxia Inducible Factor (HIF) genes. These genes interact with enzymes and other transcription factors to regulate vascularization and tissue growth. As hypoxia persists, HIF signaling triggers adaptive mechanisms to reduce oxygen demand and increase oxygen supply, aiming to establish a new equilibrium (Li et al., 2017). Activation of HIF-1alpha stimulates the secretion of Erythropoietin in the kidneys. Additionally, HIF-2alpha stimulates erythropoiesis, the process of red blood cell and haemoglobin formation, through the kidneys and bone marrow, leading to increased haemoglobin levels (Setyawan, 2022).

#### *Study Limitations*

There are several limitations to consider in this study. Firstly, the study did not utilize a true experimental design, which introduces the possibility of selection bias among the participants. Therefore, further research employing a randomized control trial is necessary. Secondly, the scope of this study focused solely on Indonesian participants as the target population, suggesting that the effectiveness of the findings may be limited to Indonesians.

#### *Implication*

The research findings on cupping therapy's impact on haemoglobin levels in women during menstruation have implications for nursing practice. Nurses can consider using cupping therapy as a complementary treatment for blood deficiency or anaemia related to heavy menstrual bleeding. Individualized care should be provided, considering the variations in menstrual patterns and the risk of anaemia. Further research is needed, and nurses should be culturally sensitive when applying these findings. Understanding the physiological mechanisms behind cupping therapy can enhance patient education and care.

#### **CONCLUSION**

In conclusion, the research findings suggest that cupping therapy has a notable influence on increasing haemoglobin levels in women during menstruation. Both dry cupping and cpc-wct cupping techniques have shown positive effects. This indicates that cupping therapy can be considered as an effective treatment option for women experiencing blood deficiency or anaemia due to prolonged and heavy menstrual bleeding. However, further research with

randomized control trials is necessary to gather more robust evidence. Nurses should also be mindful of individualized care, cultural considerations, and the physiological mechanisms underlying cupping therapy. By incorporating these findings into practice, nurses can provide comprehensive and tailored care for women with menstrual-related blood disorders.

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