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## Application of Cold Water After Physical Activity in Pencak Silat Athletes

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### Keywords

*Physical Activity; Cold Water; Pencak Silat*

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### Abstract

Physical activity causes an increase in the use of energy or calories by the body. Cold water recovery is to reduce muscle soreness after exercise. The use of cold water for Pencak silat athletes after doing physical activity is very influential with the final result. There are changes in various ways of testing it, such as normality and correlation tests. The goal is that by applying cold water, it can make the pencak silat athletes have a steady pulse and don't get tired quickly. The methods used are experimental, pretest and posttest groups, with 11 sample. The research instrument was carried out after doing physical activity for 1 minute, calculating the pulse for 1 minute after doing physical activity, calculating the pulse was carried out using cold water with 25° C temperature. if the temperature exceeds 25° C then ice cubes are added to the soaking tub until the temperature drops to 25° C. With the normality test Absolute Value = .189 , Positive = .189, Negative = -.189, Sig. 0.200 > 0.05, then the variables are normally distributed and correlation test Correlation Test Sample PreTest = 11 , PreTest Pearson Correlation = 1 PostTest = .971 Meanwhile, PostTest Sample = 11 . PostTest Pearson Correalition = .971 PostTest =1. By applying cold water to Pencak Silat athletes after physical activity, it can be concluded that there is a change. The initial pre-test score was minimum = 162, maximum = 199, changed to post-test minimum score = 100, maximum = 135. By administering cold water, there was a change. The pulse rate which was originally 162 decreased to 100.

### INTRODUCTION

Sport is a form of planned, structured and continuous physical activity involving repetitive body movements with certain rules aimed at increasing physical fitness and achievement.(Wicaksono, 2020).(Wicaksono, 2020). Sport has also become a necessity in everyday human life, because exercise can make people healthy and strong, both physically and spiritually.(Raynadi et al., 2017)Physical activity is the movement of limbs that causes energy expenditure which is very important for maintaining physical and mental health, as well as maintaining quality of life to stay healthy and fit all day (Purnama & Suhada, 2019). Physical activity is an activit that causes an increase in the use of energy or calories by the body(Ariyanto et al., 2020). Physical activity is body movement

caused by skeletal muscles and requires energy, such as activities that are carried out when doing household chores, working and other activities World Health Organization, 2018 (Desyanti et al., 2021). Physical activity increases the number of pulses, the higher the physical activity, the higher the pulse (Samodra, Y. Touvan. June; Sudrazat, 2021). The health benefits of physical activity are well known In adults, physical activity is needed to reduce the risk of various diseases and premature death. Physical inactivity is estimated to cause 6% to 10% of non-communicable diseases, such as coronary heart disease, diabetes and breast and colon cancer(Wicaksono, 2020). The prime physical condition of an athlete includes maintaining fitness in the muscles used for strength, speed, agility, coordination, explosive power, flexibility, balance, accuracy, endurance and reaction. The mechanism for recovering lactate from the blood

and muscles is strongly influenced by activities carried out after maximal activity(Nurmawati & Sifaq, 2018).

Avoiding dehydration When Practicing Martial Arts,So it is very clear about the dangers of ice water, if you drink it in the wrong amount and at the wrong time. In order to avoid these various dangerous risks, make sure you only drink cold water, with a temperature of around 4-15 degrees Celsius. Because water with this temperature, it is very easily absorbed by the body. So quickly too, lost body fluids can be replaced. So that the body temperature that increases during exercise can be reduced effectively. Always meeting the body's need for fluids, especially after exercising is very important. Because during these activities will make the body's metabolic system increase. The body will also work harder, in order to deliver energy and oxygen throughout the body. Contractions occur in the muscles, blood vessels widen, and blood flow becomes faster. Now, The increased metabolism will produce energy and also sweat. The situation is lack of fluids will be felt by the body. So, you have to balance it too, by consuming the right and enough water. When you carry out sports activities for just one hour, the body will sweat up to 2 percent of body weight. The longer the sports activity, of course, the more fluids that will come out of the body.

With this percentage, it is enough to make your performance and concentration decrease. Especially if you get dehydrated, it can have a bad impact on the organs of the body. Therefore, fulfill the body's fluid needs, by consuming sufficient cold (room temperature) water. It is important to note that it is not safe to consume too much water. After exercising, you are usually still short of breath. So, don't drink the water right away, but wait for the breath to stabilize. Consumption should be gradual, not too much in immediate time. Give pause so that it is more easily absorbed, and good for the body's metabolism.

Pencak silat is an aspect of Indonesian culture that must be protected, nurtured and promoted. pencak silat is often considered a traditional Indonesian martial art. The fighters claim that the name "pencak-silat" has two different meanings. "Penjak is a movement of beauty steps through avoidance, which contains elements of comedy movement." Silat is part of a martial art skill that cannot be used in public, whereas pencak can be shown as a kind of

entertainment.(Hairul Rahman, Rashidah Jalil, 2022).

Pencak silat as part of Indonesian culture develops in line with the historical development of society(Moh. Nur Kholis, 2017). Pencak Silat began to be shown as an exhibition at the National Sports Week (PON) I in Solo. It was only at PON VIII in Jakarta in 1975 that Pencak Silat began to be competed officially(Lubis & Wardoyo, 2014). The basic principle of the sport of pencak silat is self-defense in which there are values of attack and defense. Attacking and defending are things that must be possessed by martial arts athletes, this will determine the quality of a martial arts athlete. Defending is like dodging, avoiding your opponent to anticipate your opponent's attack, is a key point in the concept of pencak silat matches. In addition, it is clearly emphasized that the value of attacking is something that must be possessed by pencak silat athletes.

Avoid drinking ice water after exercise stop the habit of consuming ice water after exercising or martial arts training.

Ice Water Can Cause Constriction of Blood Vessels. Ice water with temperatures below 3 degrees Celsius, allows the narrowing of blood vessels. It can even cause blood flow to stop. Actually, these harmful effects do not occur, only because of sudden changes in temperature. Shrinkage and narrowing of blood flow basically occurs when food or drink enters the body. So, that's why if you consume ice cream or drinks that are too cold, it can make your brain feel frozen. Actually, the body's response is a signal not to consume excessively cold foods and drinks. Under all conditions this habit is strictly prohibited. Especially if you do it after doing sports activities.

The attacking movement is not only for a pencak silat athlete to kick or punch, but what underlies this movement is how a pencak silat athlete can do what and when the type of punch or kick is used.(Iswana, Bayu, 2013). Aspects of self-defense, pencak silat is studied in order to defend itself from various attacks by people who intend to harm or injure. Aside from being self-defense, pencak silat can also be used as a national defense in maintaining the integrity of the Unitary State of the Republic of Indonesia. This is proven by being taught pencak silat in the police and military, which is a form of realization of pencak silat as a tool used to maintain the

integrity of the Unitary State of the Republic of Indonesia.(Saputro & Siswantoyo, 2018). In general, pencak silat can be defined as self-defense to avoid all kinds of disaster(Lubis & Wardoyo, 2014).

The psychological aspect is one of the important things in determining the success of pencak silat athletes in achieving sporting achievements. One of the factors that can affect the psychological state of athletes on the field is anxiety. Pencak silat athletes are required to have mental preparation, so they are able to overcome their anxiety. Mental toughness can play an important role in regulating and minimizing athlete anxiety in competing and important components that can determine the success of athletes in the competition arena, one of which is mental toughness which is a collection of values, attitudes, behaviors and emotions that make athletes able to survive and overcome various obstacles, hardship, or stress experienced. Anxiety is thought to be related to the mental toughness possessed by an athlete,(Raynadi et al., 2017)

#### Problem Formulation

Is There a Change When Giving Pencak Silat Athletes Cold Water?

## METHODS

This research uses quantitative methods. Quantitative research is a research method that uses a lot of numbers to collect data. Sampling is carried out as a whole from the population, data collection uses research instruments, and data analysis is quantitative(Hariyanti et al., 2019).Population is a generalization area consisting of objects/subjects that have certain qualities and characteristics, the sample is part of the total characteristics possessed by the population. This research was conducted in Kec.Lamasi Kab.Luwu, the population in this study amounted to 11 people, while the sample used in this study amounted to 11 people. The selection of this sample used saturated sampling for all populations used. The research instrument was carried out after doing physical activity for 1 minute, calculating the pulse for 1 minute after doing physical activity, calculating the pulse was carried out using cold water.

The body needs recovery to adapt from the physiological stress caused by physical exercise. Optimal recovery will help athletes maintain

their health condition and physical performance, so that they can provide an opportunity to participate in competitions with maximum performance and avoid injury. One of the recovery techniques currently popular in Indonesia is cold water immersion (RAD). RAD is cold therapy with a temperature of  $\leq 20^{\circ}$  C as a recovery method that is believed to be able to minimize fatigue and accelerate recovery after exercise.(Harun & Syafriani, 2021). Where previous research applied different treatments and assessment methods because it had two focuses so to focus this research using pretest and posttest.

Recovery using water immersion aims to reduce muscle soreness after exercise, increase blood flow, body metabolism, oxygen and reduce muscle spasms and is the main modality of post-exercise recovery. Where this research only focuses on the hamstring muscles, it is different from this assessment using pulse speed.

## RESULTS AND DISCUSSION

**Table 1.**Descriptive Results of Applying Cold Water After Physical Activity in Pencak Silat Athletes.

	N	Ra nge	Min imu m	Ma xim um	Me ans	std. Devia tion	Var ian ces
Pretest	11	37	162	199	179 .64	12,87 8	165 ,85 5
PostTes t	11	35	100	135	118 .64	12,46 8	155 ,45 5
Valid N (listwis e)	11						

Pretest Obtained Minimum Value = 162, Maximum = 199, Mean = 179.64 , Std.Deviation = 12,878, Variance = 165,855 , While PostTest Minimum Value = 100, Maximum = 135 , Mean = 118.64 Std.Deviation = 12,468, Variance = 155,455

**Table 2.**Normality Test Results of Application of Cold Water After Physical Activity in Pencak Athletes Silat.

**One-Sample Kolmogorov-Smirnov Test**

		Unstandardized Residuals
N		11
Normal Parameters, b	Means	.0000000
	std.	2.96800615
	Deviation	
Most Extreme Differences	absolute	.189
	Positive	.189
	Negative	-.189
Test Statistics		.189
asymp. Sig. (2-tailed)		.200c,d

Absolute Value = .189 , Positive = .189, Negative = -.189, Sig. 0.200 > 0.05, then the variables are normally distributed.

**Table 3.** Correlation Test Results of Application of Cold Water After Physical Activity in Pencak Silat Athletes.

**correlations**

		Pretest	PostTest
Pretest	Pearson Correlation	1	.971**
	Sig. (2-tailed)		.000
	N	11	11
PostTest	Pearson Correlation	.971**	1
	Sig. (2-tailed)	.000	
	N	11	11

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Correlation Test PreTest Sample = 11, PreTest Pearson Correlation = 1, PostTest = .971 Meanwhile, PostTest Sample = 11. PostTest Pearson Correlation = .971 PostTest = 1. If the Pearson Correlation Value > Rtable, then it is related, the Pearson Correlation value is .971 > 0.603, then it can be concluded that it is related.

**DISCUSSION**

Application of cold water after physical activity to pencak silat athletes in Lamasi District, Luwu Regency. This study used a quantitative method with the same population and sample, namely 11 pencak silat athletes. The research instrument used was counting the pulse before and after the application of cold water. The results showed that the application of cold water after physical activity can reduce the pulse rate in pencak silat athletes. This suggests that the application of cold water can aid in physical recovery after intense physical activity. In the discussion, this document also discusses the basic principles of the sport of pencak silat, namely self-defense with the values of attack and defense. Apart from that, this document also explains that pencak silat is part of Indonesian culture which must be protected. built and developed. However, this document does not provide clear information regarding previous research that has been conducted on the same topic.

Application is an act of practicing a theory, method, and other things to achieve certain goals and for an interest desired by a group or group that has been planned and arranged beforehand. cold water to reduce muscle soreness after exercise, body metabolism, oxygen, reduce muscle spasms and increase blood flow so that it can affect the smooth supply of oxygen which will convert lactic acid into a source of energy and have an impact on returning one's performance to normal(Vi et al., 2021). Cold water is an effective, easy, and inexpensive non-pharmacological method(Amalia et al., 2020). Cold temperatures will stimulate the nervous system which is near the surface of the skin to reduce blood flow and inflammation that occurs will be reduced. The cold sensation can also reduce the pain threshold so it is often used to treat injuries due to trauma from physical exercise and in Indonesia itself, the use of ice bath therapy became popular in 2013.(Kurniawan et al., 2020). The use of the cold water immersion method can have an effect on post-exercise leg muscle strength and provide a relaxing effect on the performance of muscles that have been used or stretched during exercise, especially in high-intensity exercises so that it affects the flexibility of the hamstring muscles which are the main focus of the exercise. given, so that an athlete can achieve Flexibility is one important component in a sport. Some sports require flexibility to support the sport. In its use, cold water immersion can reduce the decrease in joint performance associated with the target

body's flexibility(Harahap & Jayadi, 2019). Cold cold therapy to treat pain and reduce other symptoms of inflammation. The term cryotherapy is used for the use of very extreme cold therapy, usually using liquid nitrogen which is used as an anesthetic-analgesia to absorb calories in the local area of injury so that there is a decrease in temperature. Related to this, this type of therapy with wet ice therapy is more effective in reducing temperature than packaged ice considering that in this condition more body calories are used to melt the ice.(Hendrian, 2019)The temperature required with the effectiveness of Cold Water Immersion (CWI) temperature of 15°C and 25°C for improving endurance and perception of leg muscle pain states that CWI treatment of 15°C and 25°C can reduce pain but does not affect muscle endurance and does not there are differences in the effectiveness of the two types of treatment in reducing pain and increasing muscle endurance(Nugroho et al., 2020).

Currently there is a trend to soak in ice or cold water after exercising. The water temperature varies, usually around 10 – 15° Celsius, soaking up to the waist with a soaking time of between five and 24 minutes. Soaking in cold water is usually done 20 minutes after exercising.

You may feel the benefits of an ice bath, especially after exercising

#### 1. Relieves Muscle Pain

The first benefit of an ice bath is to help relieve muscle pain. According to Gardner, the biggest benefit of an ice bath, which is also believed by many people, is that it makes the body feel more comfortable. Especially after an intense workout, soaking in cold ice water can relieve sore and sore muscles.

#### 2. Helps the Central Nervous System

The second benefit of an ice bath is to help the central nervous system. Gardner says that ice baths can also help the central nervous system by helping you with sleep problems, and ultimately, by making you feel better because your body is less tired. These ice baths can also help improve reaction time and bursts in future workouts.

#### 3. Limits Inflammatory Response

The third benefit of an ice bath is to help limit the inflammatory response in the body. Dr. Thanu Jey, clinical director at Yorkville Sports Medicine Clinic says in theory that lowering your internal temperature after exercise will help limit the inflammatory response, reduce the amount of inflammation and help you recover more quickly.

#### 4. Reduce the Effects of Heat and Humidity

The fourth benefit of an ice bath is to help reduce the effects of heat and humidity. Ice baths are thought to reduce the effects of heat and humidity. Gardner explains that taking an ice bath before a long race in conditions where there is an increase in temperature or humidity can lower core body temperature by a few degrees, helping with increased performance.

#### 5. Trains the Vagus Nerve

The fifth benefit of an ice bath is to help train the vagus nerve. Aurimas Juodka, CSCS, CPT, a board-certified strength and conditioning specialist says that one of the main benefits of ice baths is their ability to exercise the vagus nerve. The vagus nerve is related to the parasympathetic nervous system, and exercising it can help you deal with stressful situations more easily.

#### 6. Improves Circulation

The last benefit of an ice bath is to help improve circulation. When you soak in cold water, blood flows to vital organs.

From the results of the analysis that has been carried out, it shows that there is a significant difference between the pretest and posttest in giving cold water to athletes. The difference that occurs is an increase from the results of the PreTest description data Obtained Minimum Value = 162, Maximum = 199, Mean = 179.64 , Std. Deviation = 12,878, Variance = 165,855 , While PostTest Minimum Value = 100, Maximum = 135 , Mean = 118.64 Std.Deviation = 12,468, Variance = 155,455. Also tested for Normality Absolute Value = .189, Positive = .189, Negative = -.189, Sig. 0.200 > 0.05, then the variables are normally distributed. In the correlation test, PreTest Sample = 11, PreTest Pearson Correlation = 1, PostTest = .971 Meanwhile, PostTest Sample = 11. PostTest Pearson Correlation = .971 PostTest =1. If the Pearson Correlation value > Rtable then it is related, the Pearson Correlation value.

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## CONCLUSION

Physical activity is an activity/activity that causes an increase in the use of energy or calories by the body. Pencak silat is an aspect of Indonesian culture that must be protected, nurtured and promoted. The application of cold water is to reduce muscle soreness after exercise, body metabolism, oxygen, reduce muscle spasms and increase blood flow so that it can affect the smooth flow of oxygen. With this we can see that cold water greatly affects physical activity in martial arts athletes according to some of the research that has been examined above with the normality test and correlation test it can be seen that cold water greatly affects physical activity in athletes, PreTest Obtained Minimum Value = 162, Maximum = 199, Mean = 179.64, Std.Deviation = 12.878, Variance = 165.855, While the PostTest Minimum Value = 100, Maximum = 135, Mean = 118.64 Std. Deviation = 12,468, Variance = 155,455. Absolute Value = .189, Positive = .189, Negative = -.189, Sig. 0.200 > 0.05, then the variables are normally distributed. Correlation Test PreTest Sample = 11, PreTest Pearson Correlation = 1, PostTest = .971 Meanwhile, PostTest Sample = 11. PostTest Pearson Correlation = .971 PostTest = 1. If the Pearson Correlation Value > Rtable, then it is related, the Pearson Correlation value is .971 > 0.603, then it can be concluded that it is related. PostTest Samples = 11. PostTest Pearson Correlation = .971 PostTest = 1. If the Pearson Correlation Value > Rtable, then it is related, the Pearson Correlation value is .971 > 0.603, then it can be concluded that it is related. PostTest Samples = 11. PostTest Pearson Correlation = .971 PostTest = 1. If the Pearson Correlation Value > Rtable, then it is related, the Pearson Correlation value is .971 > 0.603, then it can be concluded that it is related.

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