

Effectiveness of yoga practice to increase flexibility and anaerobic endurance in pencak silat athletes

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ABSTRACT

This study aimed to analyse the effectiveness of yoga practice model in increasing flexibility and anaerobic endurance of pencak silat athletes. A quantitative approach was used to find this effectiveness with a pre-experimental research design in the form of one group pretest-posttest design. The number of subjects in this study was 65 athletes. The instrument used in this study was a yoga movement assessment questionnaire. In addition to the yoga movement test instrument data, the research data was obtained based on a split test to determine the athlete's flexibility. The results showed that there are differences in the flexibility of fighters before and after the application of the yoga training model ($t = 4.528$, $r = 0.00$, <0.05). The results of the effectiveness test showed that there are differences in the anaerobic endurance of fighters before and after the application of the yoga training model (t value = -2.463 , $r = 0.017$, <0.05). This means that there is a significant difference in anaerobic endurance before and after the yoga training model applied to fighters at BN Banyuning.

KEYWORDS

Yoga Exercise; Flexibility; Anaerobic Endurance

1. INTRODUCTION

Pencak silat is a martial arts sport originating from Indonesia which is currently starting to develop both in terms of regulation and organization (Muhamad et al., 2019; Rosalina, 2018; Tama & Purwono, 2017). The success of a silat athlete is inseparable from the anthropometric structure, namely overweight body weight, disproportionate height. From a physiological point of view, cardio-respiratory endurance ability, muscle endurance, strength, speed, power, flexibility, and agility tend

to be relatively poor (Darminto, 2017; Halbatullah et al., 2019; Hariyanti et al., 2019). There are factors that can trigger the development of an athlete's achievement in sports. As there must be quality in sports training and coaching so that sports achievements can develop with related knowledge, especially in the sport of pencak silat (Nabila et al., 2021). Also, achievement can increase if athletes can be supported with good physique and training programs that suit their needs (Cahyani, 2018; Danu & Susanto, 2019). A fighter needs complete physical conditions in order to be able to get higher achievements in addition to technical, strategic and mental mastery (Halbatullah et al., 2019).

Currently, the achievements of silat athletes cannot be said to be proud, there are still many athletes who still do not have a good physique. This can be seen from the anthropometric structure, namely overweight body weight, disproportionate height, in terms of physiological cardio-respiratory endurance ability, muscle endurance, strength, speed, power, flexibility, and agility. The failure of these Indonesian fighters can be caused by training that has not been programmed properly, training is only incidental and not continuous, and has not used many more modern training methods based on scientific training studies, management attention is not optimal, management is not professionals and lack of funds. The conditions of training and competition, are often found when athletes do sickle kicks, the kicks taken by athletes are not fast enough. From the results of interviews with trainers there are several factors that cause this. These factors include the physical condition of the athlete, this is caused by a training program that is still structured and still uses training methods that are monotonous (Tyler et al., 2014). Based on these descriptions, it can be said that the component of physical condition is an important requirement that must be possessed by every pencak silat athlete in achieving achievement (Dawud & Hariyanto, 2020; Nurhidayah & Satya, 2017).

The physical condition is composed of several complementary components. Strength, endurance, flexibility, agility, balance, accuracy, reaction, coordination, speed and power (Herpandika et al., 2019; Luhut Sinaga et al., 2016). Almost all physical activity requires a combination of strength, speed, flexibility and other components. Athletes from any sport, absolutely and must train all components of the physical condition. This is because the physical condition is a unified whole consisting of several components that cannot be separated. Training achievements will be known by carrying out tests which will later show whether the athlete has the expected quality of physical condition (Herpandika et al., 2019). This shows that physical condition is the basis for evaluating athletes to achieve high performance. One of the important components of physical condition that determines the achievement of a silat athlete is flexibility. Flexibility is the joint's ability to move optimally (Kurniawan et al., 2018). Flexibility is a person's ability to move freely,

balanced, comfortable and strong in the maximum range of motion of joints, muscles and ligaments (Halbatullah et al., 2019; Ibrahim et al., 2015). Flexibility can also be interpreted as a person's effectiveness in adapting to all activities with strong body stretching (Hariyanti et al., 2016). Good flexibility allows one or several joints to move efficiently and plays an important role in preventing injury and correcting poor posture (Pulcheria & Muliarta, 2016).

In addition, flexibility is a person's ability to stretch muscle tissue to the maximum so that all joint motion is full without pain. Flexibility is a person's ability to move with the widest possible range of motion in the joints. Flexibility has an important role for daily movement needs because flexibility is a function of all joints in a person's body (Yaqin et al., 2019). Flexibility does not include natural abilities, but rather the anatomical qualities of the organs to be considered in training (Sudirman et al., 2019), physical exercise affects the strength and mass of muscles, as well as joint flexibility (Pangemanan et al., 2013). An athlete must have good muscle endurance, so that he can carry out continuous activities without time limits. Muscular endurance is the ability of the muscles to perform work continuously for a relatively long time (Prakoso & Sugiyanto, 2017; Surahman et al., 2018). Muscular endurance is the ability to exercise frequently to increase muscle strength to repeat contractions in a number of muscles. One of the endurances is anaerobic endurance. Therefore, anaerobic endurance is different from aerobic endurance. To increase muscle endurance, regular exercise is needed (Rawe et al., 2017). Muscle endurance itself is influenced by certain exercises according to the sport being performed. Anaerobic endurance is the capacity of the heart and lungs and blood vessels to function optimally in a state of rest and exercise to take oxygen and distribute it to active tissues for use in metabolic processes (Akbar & Widiyanto, 2014).

These descriptions provide an overview of the physical condition, especially the flexibility and anaerobic endurance of athletes which are not simply obtained but require programmed training methods. Because one of the solutions that can be offered in overcoming the low flexibility is to develop a training model. The existence of an appropriate training model will be able to have a positive impact on the athlete's physical condition. This is in accordance with research conducted by Purnomo (2019) who found that the training program improved the athlete's physical condition. The magnitude of the change in the condition of the handball athletes can be seen from the difference in the average pretest score of 45.49 with the posttest of 54.54. It is known that the improvement in the physical condition of the Kubu Raya handball athletes was 9.05 or 19.89% after being given an exercise program. Research conducted by Edwardsyah et al. (2019) states that there is no significant effect of circuit training on improving the physical condition of UKO UNP pencak silat athletes. Research conducted by Ismoko & Sukoco (2013) stated that there was no significant difference in the

increase in leg power through the agility hurdle drills and agility ring drills training methods. (2) There is no difference in the effect of the training methods on leg power. (3) There is a difference in the increase in leg power between those who have high coordination and low coordination. (4) There is no interaction between training methods and coordination on increasing leg power. Research conducted by Evenetus et al. (2019) stated that the exercise program with the vasa trainer tool had significant results and influence on increasing arm power, arm endurance and 50-meter freestyle swimming performance but not on arm strength.

Physical condition training in the world is currently experiencing rapid development, as well as physical condition tests which have now entered an all-digital era. Variations in physical condition training from every era continue to increase and are currently very developed. With the development of technology, the training variations are also being improved by the coaches, this is due to dispelling the athlete's boredom during training. A coach has various variations of training in order to keep up with current developments. As Veni said, "Variety of training is one way to get rid of boredom and increase the enthusiasm of athletes to train. The coach must also master various methods and forms of physical condition training that can have a positive impact on the athlete's physical development. Therefore, the creativity of the coach is demanded in training preparation for the athletes. That's why it is necessary to develop an exercise model that can increase flexibility and anaerobic endurance. As well as training models that are in accordance with the culture they have. One area that is rich in tradition and culture is Bali. Therefore, training models that are in accordance with the culture they have. One area that is rich in tradition and culture is Bali. As well as training models that are in accordance with the culture they have. One area that is rich in tradition and culture is Bali. One of the cultures that enriches Balinese culture is yoga. Yoga is effective in reducing disorders associated with the elderly. Yoga movements can improve balance, flexibility, and muscle strength (Yağlı & Ülger, 2012). The practice of yoga develops willpower, discipline and self-control and forces the body to work synergistically and perfectly (Kan et al., 2016; Lazaridou et al., 2013). Therefore, yoga practice has a beneficial effect as a stress remedy (Kirkwood et al., 2005).

Yoga is usually used as a form of exercise combining physical postures with breathing exercises and meditation to train balance, flexibility and strength (Northey et al., 2018; Reid & Foster, 2017). In yoga there are elements that can be used on a small or large level, the model of yoga practice that is given is different according to age and the purpose of yoga is given to the elderly, physical and social (Hoy et al., 2021; Nayak et al., 2015). The practice of yoga has the potential to develop character, this is in accordance with the goal of yoga itself, which is to unite the mind and body to produce a good effect. In practicing yoga, one is expected to be able to feel the effects of

yoga based on awareness of the function of yoga on the body (Alleva et al., 2020; Frayeh & Lewis, 2018). This study aims to analyze the effectiveness of the yoga practice model to increase flexibility and anaerobic endurance in pencak silat athletes.

2. METHODS

A quantitative approach was used to find the effectiveness of the pre-experimental research design in the form of the one group pretest-posttest design. Information about the research design used in this study is presented in Table 1.

Table 1. Research design

Subject	Pre-Test	Treatment	Post-Test
R	O1	P	O2

Subjects in the research development of yoga exercise models for flexibility and anaerobic endurance were atelt pencak silat. The number of subjects in this study were 65 athletes. The subject of this study is the fighters in the BN Banyuning club. The instrument used in this study was a yoga movement assessment questionnaire. The grid is presented in Table 2.

Table 2. Yoga Movement Assessment Instrument

No	Yoga name	Variable
1	Dragon Posture	Flexibility
2	Moon Posture	
3	Mountain Posture	
4	Water Posture	
5	Water Jogging	
6	Horse Jogging	
7	Duck Jogging	
8	Garuda posture	Anaerobic Endurance
9	Monkey Posture	
10	Grasshopper Posture	
11	Tiger Posture	
12	Rabbit Posture	
13	Cobra posture	
14	Butterfly Posture	

In addition to the yoga movement test instrument data, the research data was obtained based on a split test to determine the athlete's flexibility. Split exercise to assess the flexibility of the athlete's muscles in the thigh joint. Apart from that, you can also use the sit and reach test to

determine hip flexibility (Hartman & Looney, 2009; Looney & Gilbert, 2012). The Wingate Anaerobic Test can assess an athlete's peak strength (a measure of muscle strength and speed), anaerobic capacity, or both (Zupan et al., 2009). Anaerobic capacity, or average power, was recorded and averaged over the 30 seconds of the test (Bar-Or, 2013; Chromiak et al., 2004). Classifications were made for female and male athletes based on their peak strength and anaerobic capacity scores.

3. RESULTS

The results of the study were analyzed descriptively (Table 3).

Table 3. Descriptive Analysis Results

Analysis	Pre-test		Post-test	
	Anaerobic	Flexibility	Anaerobic	Flexibility
N	50	50	50	50
Means	4.2034	12.94	4.91	15.88
Std. Deviation	4,13	4,132	1.47	4.48
Minimum	2.90	5.00	2,12	8.00
Maximum	6,80	26	7.90	28.00
Variances	1.80	17.08	2,16	20.00

Based on Table 3, it can be seen that there was an increase in the average condition of flexibility and anaerobic endurance before the yoga practice model was applied. This can be seen from the average value before the application of the yoga practice model, namely for an average anaerobic endurance of 4.2034 and flexibility of 12.94. There was an increase to 4.91 for anaerobic endurance and 15.88 for flexibility. The normality test was carried out by Kolmogorov Smirnov analysis, it was found that the data were normally distributed with sig. >0.05. After the data is declared normal, the next test is the homogeneity test. From the homogeneity test it was found that the value of Sig. > 0.05 which means that the data obtained comes from homogeneous data groups. After the prerequisite tests are met, the next test is the Paired Samples T Test.

The results of the effectiveness test using the t-test there are differences in the flexibility of athletes before and after the application of the yoga training model. It can be seen from the analysis obtained t value of 4.528 with $r = 0.00 < 0.05$. This means that there are significant differences in flexibility before and after yoga training model applied to silat athletes in BN Banyuning. The results of the effectiveness test using the t-test, there are differences in the anaerobic endurance of athletes before and after the application of the yoga training model. It can be seen from the results of the analysis that the t_0 value is -2.463 with $r = 0.017 < 0.05$. This means that there is a significant difference in anaerobic endurance before and after the yoga training model is applied to silat athletes

at BN Banyuning. So, it can be said that with the application of the yoga training model, it is effectively applied as a training program for athletes to increase flexibility and anaerobic endurance.

4. DISCUSSION

The yoga practice model has a significant impact on increasing the flexibility of athletes. The yoga practice model provides an opportunity for athletes to develop their mental and physical conditions. This is inseparable from the yoga movements that are developed. Yoga movements provide exercises to make the body more flexible. Flexibility is the joint's ability to move optimally (Kurniawan et al., 2018). Flexibility is a person's ability to move freely, balanced, comfortable and strong in the maximum range of motion of joints, muscles and ligaments (Halbatullah et al., 2019; Ibrahim et al., 2015). Flexibility can also be interpreted as a person's effectiveness in adapting to all activities with strong body stretching (Hariyanti et al., 2016). Good flexibility allows one or several joints to move efficiently and plays an important role in preventing injury and correcting poor posture (Pulcheria & Muliarta, 2016).

Based on this description, it can be said that the existence of a yoga practice model will have a positive impact on flexibility because yoga activities are given not only to train someone's body but also mentally and yoga practice is not limited by age. Yoga can be practiced by everyone, and has nothing to do with any particular religion. Yoga is an activity that unites the body and mind to balance and harmonize the body's physical and mental functions (Permatananda et al., 2020). Yoga is a therapy that has been extensively researched and used to treat anxiety. Yoga is a discipline of body, mind and spirit. Yoga is effective in reducing disorders associated with the elderly. Yoga movements can improve balance, flexibility, and muscle strength (Yağlı & Ülger, 2012). The practice of yoga develops willpower, discipline and self-control and forces the body to work synergistically and perfectly (Kan et al., 2016; Lazaridou et al., 2013). Therefore, the practice of yoga has a beneficial effect as a stress remedy (Kirkwood et al., 2005).

Yoga is usually used as a form of exercise combining physical postures with breathing exercises and meditation to train balance, flexibility and strength (Northey et al., 2018; Reid & Foster, 2017). In yoga there are elements that can be used on a small or large level. The model of yoga practice that is given is different according to age and the purpose of yoga that is given to the elderly, physical and social (Hoy et al., 2021; Nayak et al., 2015). The practice of yoga has the potential to develop character, this is in accordance with the goal of yoga itself, which is to unite the mind and body to produce a good effect. In practicing yoga, one is expected to be able to feel the

effects of yoga based on awareness of the function of yoga on the body (Alleva et al., 2020; Frayeh & Lewis, 2018).

The yoga practice model has a positive impact on anaerobic endurance. The practice of yoga provides an opportunity for the body to regulate the energy it needs for activities. The existence of yoga is able to maintain personal hygiene, clothing/appearance, health, association, live cheerfully; able to control stress, control oneself (self-discipline) from negative actions, confident, dare to take risks, empathy. Achieve optimal development of fine and gross motor skill aspects, nutritious food, maintain stamina, quality rest and health. Pranayama yoga is the regulation of breathing in and out of the lungs through the nostrils with the aim of spreading prana (energy) throughout the body. Paying attention to the breath going out and breathing going in is meant to distract the mind and body. By adjusting the breath perfectly, athletes can manage the oxygen they need. This will certainly have an impact on anaerobic endurance.

Based on this description, it can be said that the greater the ability of a person's body to absorb oxygen, have a tolerance for the accumulation of lactic acid, the more endurance the athlete is in the job and the longer the athlete can work without oxygen. One of the exercises that can be done is to do yoga, of course. Because with the practice of yoga athletes will be able to practice breathing control. Yoga is usually used as a form of exercise combining physical postures with breathing exercises and meditation to train balance, flexibility and strength (Northey et al., 2018; Reid & Foster, 2017). In yoga there are elements that can be used on a small or large level, the model of yoga practice that is given is different according to age and the purpose of yoga is given to the elderly, the practice model that is given is more fun, while for adults, yoga practice is used for mental health, physical and social (Hoy et al., 2021; Nayak et al., 2015). The practice of yoga has the potential to develop character, this is in accordance with the goal of yoga itself, which is to unite the mind and body to produce a good effect. In practicing yoga, one is expected to be able to feel the effects of yoga based on awareness of the function of yoga on the body (Alleva et al., 2020; Frayeh & Lewis, 2018).

These descriptions are supported by several research results conducted Sivaramakrishnan et al. (2019) states that yoga practice improves physical functions such as strength, balance and flexibility as well as well-being. Cox & McMahon (2019) state that yoga has a positive influence on changes in the body to be more positive. Cox & Tylka (2020) stated that yoga practice can develop character, stabilize attitudes, be able to care for and love yourself more, change physical conditions and change social abilities. The results of the research thoroughly show that, the product model of yoga practice for fighters, as a whole, is feasible and effective to use. Thus, the implication of the

findings is that the yoga practice model should be considered by teachers or coaches as an alternative guide or reference in physical conditioning training activities for athletes, because it is effectively used to improve children's physical condition and is able to teach children to maintain ancestral heritage.

5. CONCLUSIONS

Looking at the results of the model effectiveness test, it is empirically proven that the product results in the form of a yoga practice model for martial arts fighters have good effectiveness. The training model can provide enormous benefits to athletes, including being able to increase the confidence of each athlete in training, increase cooperative efforts, increase training motivation, the training process becomes more comfortable and enjoyable, athletes avoid boredom, increase a positive attitude towards anything is good for coaches, friends, and the training process, improves physical fitness, increases mutual respect for one another, trains athletes to make the best use of their time, athletes learn to develop social skills, and athletes are more daring to show their potential.

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AUTHOR CONTRIBUTIONS

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CONFLICTS OF INTEREST

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