



PROCEEDINGS

THE 1ST YOGYAKARTA INTERNATIONAL SEMINAR ON HEALTH, PHYSICAL EDUCATION, AND SPORTS SCIENCE.

Evidence-Based Practice of Sports Science in Education, Performance, and Health.

October 14th, 2017. Eastparc Yogyakarta, Indonesia



Published by
Faculty of Sport Sciences
Universitas Negeri Yogyakarta



FAKULTAS ILMU KEOLAHRAGAAN
UNIVERSITAS NEGERI YOGYAKARTA
1 OKTOBER 1951 – 1 OKTOBER 2017

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YISHPESS PROCEEDINGS

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Published by
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Published by:

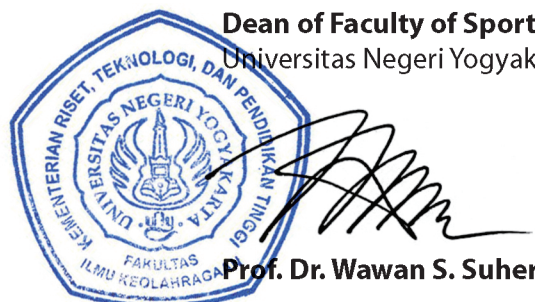
Faculty of Sport Sciences
Universitas Negeri Yogyakarta
October 14th, 2017

OPENING SPEECH

As the Dean of Faculty of Sport Sciences Universitas Negeri Yogyakarta, I would like to welcome and congratulate to all speakers and participants of the First Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) 2017 entitled "Evidence-Based Practice of Sport Science in Education, Performance, and Health".

This international seminar is actually an implementation in the framework of the assessment of the achievements and sports culture in society that can support the achievements of the Indonesian people, so that there will be a significant role of practitioners, academicians, sport people, and sports observers from Universities, Institutions and Sports Organizations to help actively facilitate in the development, assessment of innovative sports science development so as to achieve sport achievements at the National and International level.

Finally, we thank all the committee of YISHPESS for their hard work in organizing this activity, and congratulate the invited speakers and all participants. Hopefully, this seminar is significant for the development of physical education, health, and sports sciences.

**Dean of Faculty of Sport Sciences,
Universitas Negeri Yogyakarta**
Prof. Dr. Wawan S. Suherman, M.Ed.


PREFACE

Alhamdulillahirobilalamin, thank Allah the First Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) has been prepared well and on time. With all humility, we welcome and congratulate the speakers and participants of Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) organized by the Faculty of Sport Sciences, Universitas Negeri Yogyakarta.

The YISHPESS 2017 is designed to updating and applying evidence-based practice in sports science aspects, including: education, performance and health. We hope that the invited speakers of this seminar can reduce the gaps between academic and field to get best output in the daily sport and health practices.

We would like to thank to Rector and the board of Universitas Negeri Yogyakarta for supporting this seminar come true. Praise and be grateful to the Lord, so that this proceeding can be issued. Hopefully, the publication of this proceeding can bring benefits to the participants in particular and readers in general.

Yogyakarta, October 14th, 2017
Chairperson of the Committee



Dr. Or. Mansur, M.S.

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Increase VO_2 Max Badminton Athletes Use exercises Footwork with Method HIIT (High Intensity Interval Training)

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Abstract

Objectives: This study aims to to determine the effect of exercise *footwork* HIIT with a method to increase in VO_2 max in badminton athletes.

Methods: This study used an experimental approach to see the effect of footwork practice with HIIT (High-Intensity Interval Training) method of VO_2 Max. Population of this research are athletes badminton UNP which amounted to 38 people and technique of sampling by using purposive sampling that is eligible athlete son amounted 35 people. Data collection in this study used fitness test (bleep test) to measure Vo_2 Max.

Results: The results of this study indicate that there is influence of Footwork training with HIIT (High-Intensity Interval Training) method to increase Vo_2 max in badminton athletes

Conclusions: Footwork as one aspect of the techniques in badminton game if manipulated in such a way by using the principles of interval training, especially HIIT (*High-Intensity Interval Training*) can increase VO_2 max in badminton athletes.

Keywords: Footwork, HIIT (High-Intensity Interval Training), VO_2 Max,

INTRODUCTION

To be a good badminton athletes require various components supporting achievement that includes physical components, component engineering, component tactics and no less important is the mental component. The physical components as fundamental basis becomes important things to get attention in the components of achievement for badminton athletes. The match at the world level average is played within 30-60 minutes of aerobic signaled the need to endurance associated with heart and lung function. One indicator of the quality of one's life is to look at the capacity of maximum oxygen consumption or the more we know the term VO_2 max.

VO_2 Max is a dominant factor for a long able to perform activities such as in permanent badminton. Aerobic capacity is essentially a big picture motor abilities (motor power) of a person's aerobic process. Maximum level of oxygen uptake take (VO_2 max) is an important determinant of cardio respiratory fitness and aerobic performance (Sudhir Modala1, P. K, 2015)

The above description suggests that the dominant requirement in the game of badminton is the need to perform lengthy activity within a fixed or high intensity movements. This entails the need for capacity maximal oxygen consumption or VO_2 max highis needed (Leite, C. M. F., UGRINOWITSCH, Herbertm. F. S. P. C. and Benda, R. N, 2013).

As one of the basic techniques in the game of badminton increasing mastery of *footwork* becomes important things that must be mastered in order to be a good badminton player. "*Footwork* is movements of footsteps governing bodies to position their bodies in such a way so as to facilitate the movement hit *the shuttlecock* according to the position" (Subarjah, 2000)

Setting a good move and it will give benefits among others : (1) able to move quickly all point or the corner of the field in an effort to return the blow opponents, (2) got a corner highest batting because it allows us to move quickly before the ball drops, (3) more effective

and efficient use of energy, (4) more flexibility in the conduct of various types of punches quickly, robust, accurate and varied, (5) is able to make refund-return of a blow from a difficult position though. Instead of failure in regulating the movement of the legs will result in: (1) often late in repayment opponent's punches which resulted in the opening of the cracks or the target of the attack the next opponent, (2) Blow becomes primed so that it will fail to press or urge the opponent, (3) Power will be quickly depleted due to the helter-skelter to move to the corner of the field, (5) Quality blow will be reduced as well as in the variation, due to the return ball that has been dropped to make alternative repayment blow to limited, (6) Returns a blow from a difficult position often fail even if successful returns the ball usually half or easily controlled by your opponent (Donie. 2009)

Various methods of exercise developed for athletes to have the and master the techniques of *footwork* properly so that the movement of the player's body is getting better, faster and more harmonious in stepping pursue *shuttlecock*, stepping in off knocks and move in close all side of the field.

During this time many coaches see that *footwork* is a technical component in the game of badminton. As for the improvement of physical conditions such as the durability typically they use a common physical exercises in the form of activities run by various methods. To develop cardiovascular endurance exercises were developed to share methods which are run continuously (*continuous* running), *cross-country*, *fartlek* (*speed Play*) or by the method of *interval training*.

Method of interval training is one method that combines rationally between loading time at recess to the case when we look at the use of the muscles between the run and the same *footwork* as dominant use leg muscles. According Herodek et al there are lots of ways of doing *HIIT* (*High-Intensity Interval Training*) for holding the basic principle is: do the movements, alternating between high intensity and period breaks must or low intensity movement. Some basic principles are; (a) perform the exercises alternate between intervals of *hard effort* with a recovery interval of *hard effort* that, (b) sought ratio intervals of 1: 3 (*high effort: recovery*) in order to obtain optimal results, (c) the design of the exercise is made in a way that the training load increased progressively to achieve development that is expected, (d) because a recovery period of 3 times the hard effort period is expected to achieve adequate rest, (e) the pulse rate should be monitored is continuous to ensure the achievement of the target of maximum heart rate (MHR), (f) the period of heating and cooling is critical to the practice *HIIT* (Herodek, K. et al. , 2014)

In this study the authors are interested in combining forms of exercise *footwork* as one of the techniques in badminton game using the approach method *HIIT* (*High-Intensity Interval Training*) toward increased capacity of oxygen consumption maximum (Vo_2max) in athletes badminton.

Based on the background of these problems are formulated formulation of the problem of how the influence of drills *footwork* with method *HIIT* (*High-Intensity Interval Training*) to increase Vo_2max in athletes badminton? In this study is expected to result in a finding how to practice technique, especially *footwork* in the game of badminton modified in such a way to approach a particular method is a method *HIIT* (*High-Intensity Interval Training*) may give effect to the improvement of the physical condition especially good aerobic endurance.

METHOD

Participants. The population in this study are all Nikken UNP badminton athletes who are members of the UNP Nikken badminton club numbering 38 people of which 35 athletes male and 3 female athlete. The sampling technique used in this study using *purposive* sampling student only son who actively participates in an exercise activity badminton totaling 30 people.

Measurement. Instrument development is based on the variables found in the bleep test instrument grid. Bleep test or also called *multistage 20-meter test* is a test to run continuously during audible beeb that have been recorded. Purpose of this test is to measure the level of efficiency of functioning of the heart and lungs, which is shown through measurements of maximum oxygen uptake (*maximum oxygen uptake*). The magnitude of VO_{2max} is calculated based on the level (level) and feedback (*shuttle*) which can be achieved by the person taking the test, and converted by norms table VO_{2max} (Harsuki, 2003)

Procedure. The method used in this research is the Pre-Experiment. According to (Sugiyono, 2010) that the pre-experimental research results constitute the dependent variable is not solely influenced by independent variables ". This can occur in the absence of the control variables and the sample was not chosen randomly. The design of the design used in this study is *one group pretest posttest de sign*. In this case before treatment is given first the sample is given pre test (preliminary test) . Furthermore, the athletes are given the treatment in the form of drills *footwork* with method *HIIT* during 16 sessions where exercises carried out 3 times a week. Furthermore, at the end of treatment (exercise) samples are given *post-test* (final test). This design is used in accordance with the goals to be achieved is to determine the effect of drills *footwork* with method *HIIT* to increase the capacity of VO_{2max} badminton athletes.

Statistic Analysis. description of data and testing of this hypothesis is processed using descriptive and inferential statistics with the formula t-test. Before the t test analysis, first tested the requirements analysis, the data normality test and t test can only be used to test the mean difference of samples taken from a normal population. After normality test, t- test analysis performed for the first and second hypothesis, the t formula samples relating (Suharsimi, Arikunto, 2006)

RESULT AND DISCUSSION

Results Research. From these data descriptor table seen an increase in mean average data from the athletes treated by *Footwork* using the method *HIIT* by 2.76. Based on testing using the normality test Liliefors obtained, for the pre-test value L_0 at 0.1184 and the value of L_0 Post test of 0.0879 the L_{table} at table Liliefors Test Critical Value is based on a sample of 30 with a significance level $\alpha = 0, 05$ in can $L_{table} = 0.1618$ The test criteria is if L_0 is smaller than L_{table} means $L_0 (0.1184) < L_{table} (1618)$ for the *pre-test*, and $L_0 (0.0879) < L_{table} (in 1618)$ for post-test), so it was concluded that sample data came from a normal distributed population. Furthermore, different test analysis results mean that states there are significant exercises *Footwork* with method *HIIT* to increase capacity VO_{2max} significant(X1). This is based on the results of the analysis of the mean difference test, which gained $t_{calculate} = 6.874 > t_{table} = 1,70$ at significance level $\alpha = 0.05$ can be concluded that there are significant exercises *Footwork* with method *HIIT* to increase the capacity of VO_{2max} badminton athletes FIK UNP significantly.

Discussion. This study aims to look at the effect of drills *footwork* with *HIIT* method to increase the capacity of VO_{2max} at Nikken UNP badminton athletes. From the overall analysis shows that an increase in VO_{2max} after the athlete given exercise treatment VO_{2max} method with *HIIT*.

This is in line with research conducted by Tabata and his friends were summarized in a journal titled "*Effects Of Moderate-Intensity Endurance And High-Intensity Interval Training On Anaerobic Capacity And VO_{2max}* " where Tabata and his colleagues concluded that exercise *HIIT* (High-Intensity *interval Training*) can provide a positive influence on the increase in VO_{2max} and to increase anaerobic capacity (TABATA, I. *et al.* 1996).

Another study Helgured and his friends were published in the journal entitled *Aerobic High-Intensity Intervals Improve VO_{2max} More Than Moderate Training* shows that exercise *HIIT* was significantly more effective than the activity total at lactate threshold or HR Max 70% in fixing VO_{2max} . Changes VO_{2max} in accordance also with changes in stroke volume (SR), which

shows the close relationship of the two (Helgerud, J. *et al.* 2007).

Footwork with method *HIIT* implemented by combining the loading time with rest periods. Do loading time given for 60 seconds, 45 seconds, 30 seconds and 15 seconds. To determine the intensity of the exercise is to take the best capabilities of the implementation of the amount of *footwork* in time specified.

The best capabilities of each *footwork* for 60 seconds, 45 seconds, 30 seconds and 15 seconds is the intensity of 100%. As for *HIIT* intensity used was 70% -90% of the best capabilities with a ratio between the time of loading (work) with a rest period (rest) is 1: 2 to 1: 4, the higher the intensity is given the greater the ratio between the time work and rest periods. It is by considering some of the benefits of interval training system that is (a). More rigorous in controlling its intensity (b). As a systematic approach day by day, enabling easy in observing the progress, (c). Faster fix potential energy than other methods of exercise conditions (Fox E.L, B. R. 1993).

From the results of research conducted by Jacob S. Thum and colleagues published in a journal called *High-Intensity Interval Training elicits Enjoyment Higher than Continuous Moderate Intensity Exercise* shows that Even *HIIT* more physically demanding activities that are more severe than the *MICT* (*Moderate Intensity continuous Exercise*) but more fun for more efficiency in the use of time as well as loading varied stimuli. Thus, in the study 92% prefer *HIIT* of the *MICT* (Bartlett, J. D. *et al.* 2011).

In the implementation of drills giving treatment *footwork* with method *HIIT* looks athletes more challenged and excited to do the exercises because they are challenged with a target which must be made in each loading and also they like the variety of the various forms of exercises *footwork* they do.

Interesting things related to the method of *HIIT* exercise turns *HIIT* is safer if done by loading rational. The study shows that the control of the intensity of exercise has an important role in preventing and controlling hypertension. The important thing is how to control the loading duration, intensity and recovery time (Ciolac, E. G. 2012).

As one of the techniques in the game of badminton purpose of the *footwork* is bringing the body in a good position when performing a punch and take a hit. Footwork Goodwill provide effectiveness and efficiency in the use of power in the game of badminton. Exercise *footwork* is considered important because it is the basis for determining the quality of a blow. Footwork Good allows the athlete to move more quickly and efficiently and be better prepared to receive or deliver a blow is more varied and quality.

Characteristics of badminton game is a game that is held in a long period of time duration over 30 minutes in which there is a long rally interspersed with interval time between the rally. The rally in the rally the player will move according to the direction of the ball by using a good stepping technique. Victory is determined not only by the high quality of the possessed, but the level of play that is balanced victory is often determined by the ability to play with a long time with high intensity. For that aerobic endurance is one pre-requisite be a good badminton player. While aerobic capacity is an indicator of *VO2max* as the ability to consume the oxygen maximum.

Giving exercises *footwork* with interval method in *HIIT* technically has the advantage that technically makes moving quickly trained athlete, tactical technique a good step. Physiological basis drills *footwork* with *HIIT* method to provide precise control *VO2max* it can increase capacity as one of the determinants of the components of general endurance or aerobic endurance.

CONCLUSION AND RECOMMENDATIONS

Conclusions. Based on the overall results of a calculation which has been done in this study, it can be

deduced that that there are significant exercises Footwork with HIIT method to increase the capacity of Nikken UNP badminton athletes VO_2max significantly. It can be interpreted that the practice footwork by HIIT method can increase the capacity of VO_2max in athlete badminton

Recommendations. Successful increase in VO_2max with practice *footwork* by the method of interval is dependent upon controlling the duration of exercise, intensity and a good rest it should be important to watch out for the trainers to get the benefits and advantages of the method HIIT in an increase in VO_2max .

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 1 OKTOBER 1951 – 1 OKTOBER 2017

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ISBN 978-602-8429-74-0

