

The Exercise Evaluation of Badminton Athletes Physical Conditions and Sport Exercise Students in Central Java

Khalida Nawa Aprilia¹, Agus Kristiyanto, Muchsin Doewes¹

¹Sport Science-Graduate Program of Sebelas Maret University

INFO ARTIKEL

History Articles:

Received: 13-02-2018
Approved: 10-04-2018

Keywords:

badminton;
physical condition;
principles of practice;
bulutangkis;
kondisi fisik;
prinsip latihan

ABSTRAK

Abstract: Background of this research is to know systematic exercise program physical condition of athletes PPLOP Badminton Central Java by applying the principles of practice. The research method used in this research is program evaluation research. The subjects in this study were athletes and trainers of PPLOP Badminton Central Java consisting of 2 trainers, 4 male athletes and 4 female athletes. The results of the Physical Condition Exercise Evaluation Study are: First, the results of interviews show that for the principle of *recovery* less exercise be noticed. Second, the results of observations showed that of the training program came in the good criteria of 81.83%. However, observation table showed that on the principle of *recovery* and overload shows the value is still in the low criteria that is to overload 69.37% and for *recovery* 69.13% so for the principle of overload and *recovery* in the exercise program must get improvement. Third, the result of improvement of physical condition after get improvement on physical exercise program through overload principle and *recovery* principle are as follows: Analysis of preliminary test data and final test with $db = N - k = 8 - 1 = 7$ and 5% significance level, the limit number of rejection of the null hypothesis in t_{table} is 2.37 and t_{count} is 9.23, $t_{hitung} > t_{table}$ means there is significant difference in initial test and final test on physical condition improvement with an increase of 12.412%. The conclusion of this research is that the improvement of physical exercise program implementation of PPLOP Badminton athletes in Central Java will be maximal if applying whole practice principles.

Abstrak: Latar belakang penelitian adalah untuk mengetahui sistematika program latihan kondisi fisik atlet PPLOP Bulutangkis Jawa Tengah dengan menerapkan prinsip-prinsip latihan. Metode penelitian yang digunakan adalah evaluasi program. Subyek penelitian adalah atlet dan pelatih PPLOP Bulutangkis Jawa Tengah terdiri 2 pelatih, 4 atlet putra dan 4 atlet putri. Hasil penelitian Studi Evaluasi Latihan Kondisi Fisik adalah: Pertama, hasil wawancara menunjukkan prinsip *recovery* kurang diperhatikan. Kedua, hasil observasi menunjukkan program latihan yang diterapkan masuk kriteria baik 81,83%. Akan tetapi, tabel observasi menunjukkan prinsip *recovery* dan *overload* masih kriteria rendah yaitu *overload* 69,37% dan *recovery* 69,13%, sehingga prinsip *overload* dan *recovery* harus mendapatkan perbaikan. Ketiga, hasil peningkatan kondisi fisik setelah mendapatkan perbaikan melalui prinsip *overload* dan *recovery* adalah: Analisis data tes awal dan tes akhir dengan $db = N - k = 8 - 1 = 7$ dan taraf signifikansi 5%, angka batas penolakan hipotesis nol dalam t_{table} adalah 2.37 dan t_{hitung} adalah 9.23, maka $t_{hitung} > t_{table}$ berarti terdapat perbedaan yang signifikan pada tes awal dan tes akhir pada perbaikan kondisi fisik atlet dengan peningkatan sebesar 12.412%. Kesimpulan penelitian ini bahwa perbaikan penerapan program latihan kondisi fisik atlet PPLOP Bulutangkis Jawa Tengah akan lebih maksimal apabila menerapkan keseluruhan prinsip-prinsip latihan.

Address Correspondence:

Khalida Nawa Aprilia
Sport Science
Postgraduate Universitas Sebelas Maret
36 A Ir. Sutami St. Surakarta
E-mail: dilacuyy_cuyy@yahoo.co.id

Badminton is one of the sports in Indonesia whose achievement can bring the name of the country in the international arena as one of the sport's achievement in Indonesia. Badminton is a non contact racket sport which requires jumping, changing direction, rapid arm movements and a wide range of body postures. Badminton can be considered an intermittent individual sport, characterized by combining moments of high intensity interspersed with short periods of low intensity or rest. In badminton, as in the rest of the racket sports, the players have many opportunities to rehydrate during play due to the intervals

between points and sets (Abidin & Adam, 2013). Badminton game is done by hitting movement using racket, standing motion, stepping, running, shifting motion, jumping motion, body movement in various direction from rest position and so on. Of all the movements are arranged in a motion pattern that produces a unity of motion badminton athletes to complete the task. According to (Subarjah, 2000) that, "Judging from the clump of motion and the type of badminton skills, all movements in badminton are based on three basic skills: locomotor, non locomotor and manipulative".

The Regulation of the Minister of Youth and Sports Affairs No. 193/2010 concerning Organization and Working Procedures of the Youth and Sports Ministry affirms that the sports center is a forum for the development of sports includes the field of sports education center, recreation center, sports center of achievement. Education and Training Center for Student Sport (PPLOP) is a sports coaching forum in schools based on existing resources of learners, scientists, trainers and various support in science and technology, laboratories, infrastructure and facilities. Physical condition is a whole unity of components that can not be just separated, either its upgrading or its maintenance. According to Sajoto (1995:8-10) the physical condition of the human body consists of ten components (1) strength, (2) endurance, (3) muscle power, (4) speed, (5) flexibility, (6) agility, (7) coordination, (8) balance, (9) accuracy, and (10) reaction.

To achieve the highest achievement the athlete must do the proper exercise. According to Harsono (1988) self-training is a systematic process of practicing or working, repeatedly, with more days, increasing the burden of training or work. Without good practice, systematically planned and programmed will be very difficult to achieve maximum results. An exercise program is an exercise plan that contains the physical, technique, mental and strategy exercises systematically, directed, measurable and continuous by observing the principles of practice to get to the top of achievement (Peak performance). It is intended that the exercise program that is executed can provide a positive effect for improving the functional quality of the body system. Implementation of an exercise program that does not pay attention to the principles of exercise, will cause negative effects and decrease the functional quality of the body system (Bompa, 1990).

One of the important tasks of a trainer is to develop an exercise program. With an exercise program it is possible that a trainer performs his or her tasks regularly and systematically and is planned to achieve the objectives of the exercise through the desired stages. Therefore, it is imperative for the trainers to develop training programs that will be used as guidance in the implementation of their duties (Argasasmitha, 2007). According to Suharno (1981) Exercise is a process of physically and mentally preparing children trained systematically to achieve optimum performance quality given the burden of regular practice, focused, increasing and repeatedly. The training load given to the athlete in a meeting consisting of technical, physical, mental or combined exercises of some form of exercise is called an exercise unit. Some of the things that trainers need to pay attention to in training sessions are as follows: (a) Preparation of training sessions should consider the exercise load charts in the micro cycle (weekly exercise), (b) Determine the specific training goals for the session, (c) Sessions exercises need to be properly structured to run effectively (Argasasmitha, 2007).

To achieve the highest achievement, the athletes must do the right exercise. Exercise itself is a systematic process of practicing or working, which is done repeatedly, with more days, increasing the burden of training or work (Harsono, 1988). In making the preferred exercise program is how the principle of over compensation/Effect of exercise on the body is all that happens in the exercise. However, if exercise loading is too light, the effect of after-recovery exercise will be less than expected. If the exercise load is too big / heavy then the condition will return as normal. From the loading that occurs then if the exercise is too light, the fatigue rate is low / a little, the recovery time is short, and the effect of the exercise (new stimulus) is little and too early. If training is too heavy then it will cause the high fatigue/it requires long recovery, so the effect of the exercise is low and new stimulus becomes too late. The basic principles of exercise program according to (Fox, Bowers, Foss, 1988) and (Bompa, 1990) are: (1) Individual Needs, (2) Specialization, (3) Progressive, (4) Overload (overload), (5) Recovery (recovery), and (6) Reversibility (reverse). The duration of practice significantly affects the speed, agility, flexibility of shoulder and aerobic endurance. A study involving larger sample size would explain why some physical fitness parameters did not increase with increased duration of practice (Cinthuja et al., 2015)

According Sugiyanto (1996), physical ability is the ability to function organs in the physical activity. Physical ability is essential to support developing psychomotor activities. According to Sajoto (1995) the physical condition component is a unified whole of the components that cannot be separated either the increase or the maintainers. The efforts to optimize the physical condition of an athlete are influenced by the application of a proper exercise program, which is guided by the principles of exercise. The decline of athletes' physical condition is due to the improper application of practice principles. The most important thing that must be considered by the trainer is to apply the training program properly and correctly that guided against the use of principles of practice.

In fact, in each club of badminton coaching, one of them is the Central Education and Sports Exercise Student (PPLOP) Badminton Central Java, the physical ability is still less specific handling, so less support for development on other aspects. Proven in a few matches/competitions they have not got the maximum results. It makes the trainer's material to review/ evaluate at each periodization of the exercise, thus affecting the increased ability of the athletes' physical condition.

Based on the description above, the researchers want to know and prove the research based on the background and events that occur in the field, researchers suspect the physical condition of the athletes has not been in accordance with the desired expectations, if this continues to be left will affect the achievement of maximum performance, especially on badminton. Therefore, it needs to be proven scientifically, through a study entitled "Physical Condition Exercise Evaluation Study on Badminton Athletes of Education and Training Exercise Students (PPLOP) in Central Java 2017/2018".

Based on the background of the problem, the purpose of this research is to figure out the application of training principles on the physical condition of badminton athletes PPLOP Central Java 2017/2018 and to figure out whether there is influence of the implementation of the principles of exercise to improve the physical condition of badminton athletes PPLOP Central Java 2017/2018. Meanwhile, the formulation of the problem in this study is how the application of the principles of exercise on physical exercise condition PPLOP badminton athletes Central Java 2017/2018 ? and is there any influence the application of principles of exercise to improve the physical condition of badminton athletes PPLOP Central Java 2017/2018.

METHODS

Research on physical condition training program in PPLOP Badminton Jawa Tengah Year 2017/2018 uses program evaluation method with qualitative and quantitative approach. Program evaluation aims to see if the program is designed, implemented, and beneficial to the parties involved in the program. In general, the evaluation of this program using a qualitative approach. The program evaluation phases with a qualitative approach are: (Royse, David., Thyer, Bruce A., Padgett, Deborah, Logan, 2006).

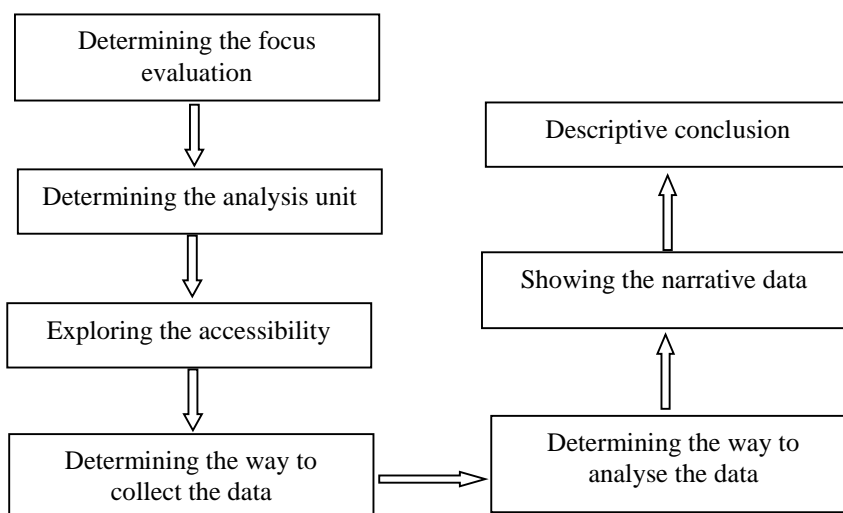


Figure 1. The program evaluation procedure using a qualitative approach

Subjects in this study were badminton athletes PPLOP Central Java which amounted to 8 people and coach who amounted to 2 people. Researchers determine the subject of research based on the issues to be studied about the physical condition of badminton athletes. Supranto (2000) describes the subject of research as an informant, which means people in the background research that is used to provide information about the situation and condition of the research background. In line with that definition, Moleong (2008) describes the subject of research as the observed person as a research target. According Arikunto (2006) said that the research instrument is a tool or facility used by researchers in collecting data to make the work easier and the results better, in a more accurate, complete, and systematic so that more easily processed.

RESULTS

The result of this evaluation research is the result of observation and interview on the head of trainers, assistant trainers and athletes of Central Java Training Center for Training and Student Sports Exercise (PPLOP) in 2017/2018 about physical condition training with the application of principles are as follows:

Interview Result

The results of interviews with head trainers, assistant coaches and athletes PPLOP Badminton Central Java Year 2017/2018 showed that for practice with emphasis on the principle of recovery is still not good. So what happens is the level of fatigue in athletes have not fully recovered and resulted in less maximal exercise results.

Observation Results

Table 1. Observation Result Data of Physical Condition Exercise Program Application for Trainer and Athlete PPLOP Badminton Central Java Year 2017/2018

No	The subject of observation	Observation Results	Maximum Results	Percentage
1	Trainer	205	240	85.41
2	Athletes	777	960	80.93
Totally		982	1200	81.83

From table 1 above can be concluded that the outline of the training program that is applied in PPLOP Badminton Central Java Year 2017/2018 enter on the good criteria that is 81.83% this is the acquisition of the results of the header observation questionnaire trainers, assistant coaches, and athletes. However, in the head trainer's observation table, the assistant coach, and the athlete show that on the principle of recovery and overload shows the value is still in the low criteria that is to overload 69.37% and for recovery 69.13%, so for the principle of overload and recovery in exercise program in PPLOP Badminton must get improvement, so that physical condition of athlete can reach at maximum level which will have an impact on the achievement of the athlete.

Table 2. Percentage of Test Subject Evaluation Results

Percentage	Information
80%— 100%	Good
60%— 79%	Passably
50%—59%	Deficient
<50%	Not Good

(Quoted from Maksum, 2009:5)

DISCUSSION

Discussion of the results of this study provides further interpretation of the results of data analysis that has been proposed associated with relevant theories and previous research. From the result of the above research, the researcher did follow-up by applying the improvement to the program of physical condition in PPLOP Badminton in Central Java by incorporating all the principles of practice.

Implementation of Improved Exercise Program

Improvement of this exercise program is applied to PPLOP Badminton athletes in Central Java Year 2017/2018 which amounted to 8 athletes with details of 4 sons and 4 daughters. The execution date is 21 August 2017 to 2 October 2017 located at Gor Narita, Surakarta and JPOK Fitnes UNS Surakarta. The method used in knowing the improvement of physical condition of athlete is by method of quantitative experiment.

The implementation of the improvement of this training program is conducted with the aim to know how much the principle of recovery and overload principle can influence the improvement of physical condition of PPLOP Badminton athletes in Central Java Year 2017/2018. Implementation is carried out in accordance with the training schedule that has been done in PPLOP Badminton in Central Java.

Test Result *t*

T test is used to calculate the difference value between initial test result and end of physical condition athlete PPLOP Badminton in Central Java Year 2017/2018.

Table 1. Calculate the Difference Test of Physical Condition of PPLOP Badminton Athlete in Central Java

No Subject	Pre-Test (X ₁)	Post-Test (X ₂)	D X ₂ - X ₁	D (D - M _d)	d ² (D - M _d) ²
1	397	451	54.37	7.269	52.8356
2	405	452	47.83	0.735	0.5409
3	411	451	40.06	-7.033	49.4565
4	389	442	53.16	6.060	36.7197
5	386	435	49.14	2.038	4.1528

6	356	408	52.14	5.045	25.4480
7	319	381	61.52	14.425	208.070
8	373	392	18.56	-28.539	814.448
Sum	3035.70	3412.48	376.78	0.000	1191.6722
Mean	379.463	426.560	47.097		
SD	29.941	28.927			

The presentation of the calculation of the value of the difference between the initial test results and the final test of the physical condition of PPLOP Badminton athletes in Central Java Year 2017/2018, are as follows:

$$\begin{aligned}
 t &= \frac{|\Sigma M_d|}{\sqrt{\frac{\Sigma d^2}{N(N-1)}}} \\
 &= \frac{|47.097|}{\sqrt{\frac{1192}{8(7)}}} \\
 t &= 10.2097
 \end{aligned}$$

Conclusion:

With $db = N - k = 8 - 1 = 7$ and 5% significance level, the limit number of rejection of the null hypothesis in table t is 2.37. While the value of t obtained is 9.23. It turns out to be larger than the limit number of rejection of the null hypothesis. Thus the null hypothesis is rejected, which means that there is a significant difference between the preliminary test results and the final test of Badminton Physical Conditions.

Result of Improvement of Physical Condition

The result of improvement of physical condition of PPLOP Badminton athletes in Central Java Year 2017/2018 after implemented the improvement of physical exercise program is as follows.

Mean pretest	=	379.463
Mean posttest	=	426.560
Mean different	=	47.097

$$\begin{aligned}
 \text{Percentage increase} &= \frac{\text{Mean different}}{\text{Mean pre test}} \times 100\% \\
 &= \frac{47.097}{379.463} \times 100\% \\
 &= 12.412\%
 \end{aligned}$$

From the above calculation, it can be concluded that there is an increase of physical condition training at PPLOP Badminton in Central Java in 2017/2018 by applying 12,412% practice principle (improving overload and recovery principle). It shows that the principle of recovery and overload affect the physical condition of PPLOP Badminton athletes in Central Java Year 2017/2018.

CONCLUSIONS

Based on the results of research and discussion of research results that have been described, it can be given some important conclusions are as follows:

The final conclusion states that in PPLOP Badminton athletes in Central Java Year 2017/2018 not yet fully apply the principles of practice, especially on overload principle and recovery principle so that require improvement in training program. Improving the implementation of physical exercise program conducted by the researcher shows that the improvement of physical exercise program will be maximal if applying the whole practice principles. Based on the study of theories, discussion of hypotheses, research results and conclusions obtained from the results of data analysis above, the researchers provide suggestions as follows:

For the trainers to get the results of the exercise to succeed and increase the achievement and physical condition of the athlete it needs a systematic development tiered and well planned by understanding and applying the principles of the practice carefully and accurately. In studying and applying the principles of this exercise should be careful, and require precision, accuracy in the preparation and implementation of the program. The training process that deviates from the principle of practice, will result in harm to athletes and coaches. It is hoped that this research can be used as a consideration for trainers to better understand some of the principles of practice and be able to apply them in the training process.

REFERENCE

- Abidin, N. Z., & Adam, M. B. (2013). Prediction of Vertical Jump Height from Anthropometric Factors in Male and Female Martial Arts Athletes. *Malaysian Journal of Medical Sciences*, 7(1), 39–45. <https://doi.org/10.1371/journal.pone.0037821>
- Argasasmitha, H. (2007). *Teori Keipelatihan Dasar*. Kementerian Negara Pemuda dan Olahraga.
- Arikunto, S. (2006). *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta.
- Bompa, T. O. (1990). *Theory And Methodology of Training*. Debuque: Hunt Publishing Company.
- Cinhuja, P. (2015). Physical Fitness Factors of School Badminton Players in Kandy District. *European Journal of Sports and Exercise Science*, 4(2), 14–25. Retrieved from <http://www.scholarsresearchlibrary.com/articles/physical-fitness-factors-of-school-badminton-players-in-kandy-districtbody-mass-index-badminton-players-practiced-durati.pdf>.
- Fox, E. L, Bowers, R. W., & Foss, M. (1988). *The Physiological Basic of Physical. Education and Athletics*. Jakarta: CV. Tambak Kusuma.
- Harsono. (1988). *Panduan Pengajar Buku Coaching dan Aspek-Aspek Psikologis dalam Olahraga*. Jakarta: CV. Tambak Kusuma.
- Moleong, L. J. (2008). *Metodologi Penelitian Kualitatif*. Bandung: Remaja Rosdakarya.
- Royse, D., Thyer, Bruce A., Padgett, Deborah, K., & Logan, T. (2006). *Program Evaluation, An Introduction*. Toronto: Thomson Books.
- Sajoto, M. (1995). *Pembinaan Kondisi Fisik dalam Olahraga*. Departemen Pendidikan dan Kebudayaan.
- Subarjah, H. (2000). *Psikologi Olahraga*. Direktorat File UPI.
- Sugiyanto. (1996). *Perkembangan dan Belajar Motorik*. Depdikbud.
- Suharno. (1981). *Ilmu Coaching Umum*. Yogyakarta: IKIP Yogyakarta.
- Supranto, J. (2000). *Statistik (Teori dan Aplikasi)*. Jakarta: Erlangga.