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Please follow the reviewer's suggestions. We are waiting for changes until 30/09/2020.
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We have read and understand the e-mails you send us. The email you send to us contains an order so that we immediately make revisions or changes to our article based on reviewers' suggestions.

Therefore, we have made revisions or changes to our article based on the reviewers' suggestions. As for the revisions or changes contained in the article, we give it a green highlight.

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REVIEWERS QUESTIONNAIRE

International Scietific Journal ***PHYSICAL ACTIVITY REVIEW*** , e-ISSN 2300-5076
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Title:

The Effect of Circuit Training on Physical Fitness and Archery Accuracy in Early Athletes

Getting Started

Type of Article: **Original article**

Scale 1-5	Results	Point
The originality of the subject	Averange	3
Is the research background clear and helpful for read-ers unfamiliar with the subject ?	Good	4
Are the test methods used clearly described ?	Averange	3
Are the statistical methods appropriate ? (Not applicable review article)	Good	4
Are the results credible? (Not applicable review article)	Good	4
Is the interpretation of the results clearly presented and adequately supported by the evidence adduced ?	Averange	3
Is drawings / illustrations / tables are correct ?	Good	4
Is the work includes important earlier studies?	Averange	3

Final recommendation: **Reconsider after major revision**

Comments and Suggestions for Author(s)

This work is intereseting, as it is showing good trend about applying general fintess training into specialized shooting type sport like archery. This trend should be encouraged, but only in a case of properly prepared work.

In the attachmend I made couple of suggestions in the comments. The sample is small, and it is not described. No correlation, explaining which factor is really responsible for improvement, was conducted. In the discussion there is lack of reference to other similiar existing studies outside of the country where research was done. Expalnation about mesurement protocol is needed as well. There is no clear if the shooting was done directly after fitness test, was there any breaks between each shot etc. For now I cannot find significant methodological error that will make me reject this work, but there is lot of content that needs to be added for further reconsideration.

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The Effect of Circuit Training on Physical Fitness and Archery Accuracy in Early Athletes

Comment [AE1]: Change to novice

Abstract

This research aims to determine the effect of circuit training on improving physical fitness and archery accuracy in early athletes. This type of research is quasi-experimental research, using the design of two groups pretest-posttest. The physical fitness data collection method uses the Indonesian physical fitness test (IPFT) for ages 10-12 years and the accuracy test by releasing arrows to the target. A sample of 20 novice athletes was determined using a saturated sampling technique in which all populations were sampled. Data analysis using paired sample t-test, to determine differences in variables in groups of male and female. The analysis revealed no difference if the significant value was less than 0.05 ($p < 0.05$). Before analyzing the data, prerequisite tests were carried out which included the Shapiro Wilk normality test and the variate homogeneity test using the Levene's test. The results showed that there is a significant increase in physical fitness in the male and female groups. Therefore, there is a significant increase in the accuracy of aiming archery in groups of male and female. Therefore, the research can be concluded that circuit training is effective for improving physical fitness and archery accuracy in novice athletes.

Comment [AE2]: Abstract should be split into introduction, material and methods, results and conclusions. See other articles published in journal.

Keywords: archery; arm strength; endurance; physical fitness; training methods

INTRODUCTION

Physical condition is one of the important factors in supporting archery, the better the physical condition, the better concentration and more precise in the accuracy of archery. Concentration in archery is the ability to aim accurately at targets. This integration is very important in archery. In this case both eyes will tell you where to release the arrow. One indicator of good physical condition can be seen from the level of physical fitness. In early childhood 10-12 years have begun in physical coaching, therefore the exercise menu needs to be adjusted to one's age [1]. For early childhood training programs that are provided, use the best training load that is with his own weight, because at that age children are still developing. A very common way to assess the state of physical ability is to determine based on diagnostic tests [2,3]. Based on this problem, it is clear that physical condition especially for beginner athletes is very important. So researchers need to improve the components, strength, endurance of arm muscles, endurance of leg muscles, endurance of finger muscles so that it affects the accuracy of archery. According to Palumbo et al. the factors that influence the style or accuracy of aiming are physical conditions, concentration, and technique [4]. The right and correct archery technique is very supportive of optimal performance. With the mastery of proper and correct archery techniques will enable the consistency of archery movements both in training and competition. High technical ability is very helpful in directing arrows to the target. Technical advances around bows and arrows and the availability of new materials have increased the accuracy of aiming and being consistent in archery [5,6].

The training program proposed by JP O'Shea, was carried out with 8 training stations [7,8]. Each training station consists of exercises conducted for 45 seconds, and repetition of the exercise between 15-20 times, rest time at one station, before moving to the next station is 1 minute or less. The training circuit program proposed by ELFox is done 6-15 times the training station [9,10]. One exercise at the station is completed in 30 seconds. The circuit completes between 5-20 minutes, with each station resting period being according to Reneker et al., circuit training is an exercise program consisting of several stations and at each station the athlete performs the type of exercise that has been determined, complete when an athlete has completed training at all stations according to the training dose and a predetermined time, circuit training is usually with an individual load approach, because each individual has different abilities that cannot be compared [11]. This fact gives us an effective concept for carrying out circuit training, which allows alternatives for beginners and advanced participants from the main forms physical demand eg general endurance, maximum strength ility, considered when choosing exercises, every person can have a good time [12,13]. Another opinion about circuit training is a form of exercise consisting of a series of sequential exercises, designed to develop physical fitness and skills related to a particular sport. Several studies so far have examined the effects of adaptive physical activity circuit training programmed to improve cardiorespiratory fitness, strength and balance of leg muscles [14,15]. From various opinions about circuit training, it can be concluded that circuit training is a form of training program consisting of a series of sequential training posts, with the aim of training physical conditions. From various theories about circuit training, by looking at age and physical ability considerations, the circuit training program is made for archery beginners aged 10-12 years with a total of 5 training items, or 5 training stations. One training at the

station is completed in 30 seconds. One circuit completes between 5-20 minutes, with a rest period for each station is 15-20 seconds. The following form of circuit training for beginners aged 10-12 years.

Physical fitness is defined as the ability to do work efficiently, without causing significant exhaustion [16,17]. In general what is meant by physical fitness is physical fitness, which is the ability of someone to do their daily work efficiently without arising from excessive fatigue so that they can still enjoy their free time. Fitness training involves the use of physical activity to increase the functional capacity and efficiency of the body. Other outocomes that are generally accepted goals of fitness activities are caloric expenditure, weight management, stress management, social interaction, decreased risk of ill health, enhaced self- image, and feeling good [18,19]. There are several terms used for the same purpose as physical fitness, namely physical fitness, physical ability, physical harmony. All that is intended to translate the original term that is *physical fitness.* A person who is said to be fit is characterized by a body that does not contain much fat tissue, strong bones, strong muscles, and has joints that have good flexibility and high respiratory endurance [20,21]. From some of the opinions above, it can be concluded that physical fitness is the physical ability of a person in carrying out daily activities without causing significant fatigue, so that he can still do other activities. In addition to traditional forms of daily physical exercise, various types of physical exercise are quite interesting and more interesting than regular forms of exercise [22,23].

Accuracy is defined as a person's ability to make voluntary movements for a purpose, for example in the implementation of shootings (archery). Accuracy is about right on target, for example throwing a ball with a predetermined target. Accuracy is the similarity or closeness of the measurement results to the actual figures or data [24,25]. Regarding the target in the sport of archery in question is how one can shoot the aiming arrow or release the arrow aimed at the target specified in archery. So, accuracy is a follow-up movement carried out by the archer in aiming at the target for the purpose of getting the best score. In addition, aiming with your eyes closed and deliberately concentrating on the follow-up phase of aiming will help. close to the backstop, relax, let the bow shoot, and don't move your bow's hand until far after the arrow impacts the target [26]. Accuracy in the sport of archery means accuracy in directing arrows at the target as precisely as possible, with the hope of getting good results. The accuracy of archery is influenced by several things, including physical condition, technique, and concentration. In archery, concentration plays a very important role, because archery is related to accuracy when aiming arrows at the target. So training and concentration in beginner archery athletes need to be trained so that higher concentration, more confidence and improve aiming accuracy.

METHODS

Participants

There should be description of tested subject like age, height, weight or what data do you have.

This type of research is included in quasi-experimental research. According to Neumark, experimental research is basically testing the relationship between cause and effect [27]. This research will examine the effect of circuit training on increasing physical fitness and accuracy of aiming archery in children aged 10-12 years. The design in this research was to use the one -group pretest-posttest design. According to Ma et al. the one group pretest-posttest design is a type of experiment where a single group pretest-posttest design is a type of experiment where a single group has a pre-experimental evaluation, than the influence of the variable, and finally, a post-experimental evaluation, as can be shown in Figure 1 below [28].

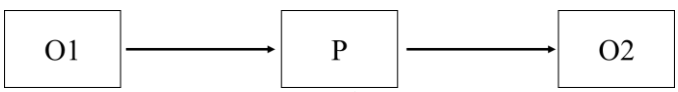

Figure 1. Design of experiment test

Based on Figure 1, O1 shows the pre test (the initial test), P shows the *treatment* (treatment), and O2 shows the post test (final test). However, this research was conducted at Puro Pakualaman Public Elementary School in Yogyakarta City, Indonesia. The research sample was saturated sampling, all of which were sampled as many as 20 students. In conducting the training circuit the instrument of data collection is to classify the level of physical fitness using the norms of Indonesian physical fitness tests (IPFT) Ages 10-12 years. Data collection techniques in this research used IPFT tests for children aged 10-12 years which included running 40 meters, bending the elbows, sitting lying down, jumping upright and running 600

Comment [AE3]: Do you mean push ups?

Comment [AE4]: Commonly used term is sit ups

meters. The instrument used to measure the accuracy of archery is to release the arrow to the target 36 arrows with a distance of 20 meters.

Comment [AE5]: 36 one by one or there were some breaks between each shoot? 36 shots by novice may cause effect of tiredness and affects results

Statistical analysis

The analysis techniques used in this research are as follows Shapiro Wilk normality test and Homogeneity test using Levene's test with F test. Test data conducted in this research are paired sample t-test with the aim of processing interpretation to compare the average of two variables from one sample group by calculating the difference between two variables in each cases of relevance [29]. To find out whether there are differences in the variables between pretest and posttest in the experimental group. Analysis shows there is a difference if the value is significantly less than 0.05 ($p < 0.05$). If using a SPSS 22 computer program with a significant level of 5% or 0.05.

RESULTS

The results of physical fitness tests (IPFT) during the pre-test showed that the level of physical fitness; (1) 40% enough categories, (2) 45% less categories, (3) 15 very less categories, can be seen in the following Table 1.

Table 1. Physical fitness test results during the pre test

No	Physical fitness category	Frequency	Percentage
1	Very good	0	0
2	Good	0	0
3	Enough	8	40%
4	Less	9	45%
5	Very less	3	15%
	Total	20	100%

The results of physical fitness tests (IPFT) during the posttest showed that the level of physical fitness, 15% very good categories, 55% good categories, 30% enough categories, can be seen in the following table 2.

Table 2 . Physical fitness test results during the post test

No	Physical fitness category	Frequency	Percentage
1	Very good	3	15%
2	Good	11	55%
3	Enough	6	30%
4	Less	0	0
5	Very less	0	0
	Total	20	100%

Normality test results for physical fitness variable values and archery scores in the male group for pre-test showed that the physical fitness values were normally distributed ($p=0.799$), archery scores were normally distributed ($p=0.308$). Midlle test aimed at the physical fitness values that were normally distributed ($p=0.835$) and archery scores were normally distributed ($p=0.101$). The post-test showed that the physical fitness values were normally distributed ($p=0.494$) and archery scores were normally distributed ($p=0.815$). While the normality test results on the variable physical fitness values and archery scores in the female group for pre-test showed that the physical fitness values were normally distributed ($p=0.399$), archery scores were normally distributed ($p=0.453$). Midlle tests showed that the physical fitness values were normally distributed ($p=0.813$) and the archery scores were normally distributed ($p=0.522$). The post test results give results that the physical fitness value is normally distributed ($p=0.838$) and the archery score is normally distributed ($p=0.705$). concluded that the data normally distributed can be seen in the following Table 3.

Table 3 . Normality test results physical fitness scores and archery scores

Group	Variable	Pre test	Middle test	Post test

Male	Physical Fitness	0.799	0.835	0.494
	Archery Score	0.308	0.101	0.815
Female	Physical Fitness	0.399	0.813	0.838
	Archery Score	0.453	0.522	0.705

Homogeneity test results for the value of physical fitness variables and archery scores in the group of male and female for the pre-test showed that the physical fitness values of the variance were homogeneous (p=0.950), archery scores for the variance were homogeneous (p=0.507). Midlle test shows that the physical fitness value of the variance is homogeneous (p=0.425) and the archery score of the variance is homogeneous (p=0.154). Post-test showed that the physical fitness value of the variance was homogeneous (p=0.769) and the archery score of the variance was homogeneous (p=0.831). concluded that homogeneous data can be seen in the following Table 4.

Table 4 . Homogeneity test results physical fitness scores and archery scores

Group	Variable	F test	Sig
Pre test	Physical Fitness	0.004	0.950
	Archery Score	0.459	0.507
Middle test	Physical Fitness	0.667	0.425
	Archery Score	2.211	0.154
Post test	Physical Fitness	0.089	0.769
	Archery Score	0.047	0.831

Based on the results of the t test on circuit training is effective against increasing physical fitness and accuracy of aiming archery at male groups. The results of the analysis of the increase in physical fitness showed that t count 6.647> t table 2.262 with a significant level of p=0.000> 0.05. It turns out that the price of t arithmetic is at the acceptance of H_a, because t arithmetic is greater than t table. Thus the null hypothesis (H_o) is not accepted and H_a which states there is a difference in the level of physical fitness between pretest and posttest is accepted. While the results of an analysis of increasing accuracy in aiming archery that t count 8.245> t table 2.262 with a significant level of p=0.009> 0.05. It turns out that the price of t arithmetic is at the acceptance of H_a, because t arithmetic is greater than t table. Thus the null hypothesis (H_o) is not accepted and H_a which states there is a difference in the level of accuracy of aiming archery between pretest and posttest is accepted. Thus, it can be concluded that circuit training is effective against increasing physical fitness and accuracy of aiming archery at the male group can be seen in Table 5.

Table 5 . Paired sample test results *t-test* variable physical fitness values and male group archery scores

Variable	Mean		t test	Sig
Physical Fitness value	*Pre test*	= 11.80	-4.823	0.001
	Middle test	= 16.70		
	Middle test	= 16.70	-2.045	0.071
	Post test	= 18.80		
	Pre test	= 11.80	-6.641	0.000
	Post test	= 18.80		
Archery Score	*Pre test*	= 145.60	-3.301	0.009
	Middle test	= 171.80		
	Middle test	= 171.80	-4.403	0.002
	Post test	= 204.70		
	Pre test	= 145.60	-8,245	0.009
	Post test	= 204.70		

Based on the results of the t test on circuit training is effective against increasing physical fitness and accuracy of aiming archery at female's groups. The results of the analysis of the increase in physical fitness showed that t count 13.292> t table 2.262 with a significant level of p = 0.000> 0.05. It turns out that the price of t arithmetic is at the acceptance of Ha, because t arithmetic is greater than t table. Thus the null hypothesis (H_o) is not accepted and H_a which states there is a difference in the level of physical fitness between pretest and posttest is accepted. While the results of an analysis of increasing accuracy in aiming

archery that t arithmetic 5.591> t table 2.262 with a significant level of p = 0.000> 0.05. It turns out that the price of t arithmetic is at the acceptance of Ha, because t arithmetic is greater than t table. Thus the null hypothesis (H_o) is not accepted and H_a which states there is a difference in the level of accuracy of aiming archery between pretest and posttest is accepted. Thus, it can be concluded that circuit training is effective against increasing physical fitness and the accuracy of aiming archery at female's groups can be seen in Table 6.

Comment [AE6]: Maybe you should try to find which component of this circuits affects improvement in archery the most? Like correlation between degree of improvement of each component with improvement of archery score?

Table 6 . Paired sample test results t-test variable IPFT value and female's group archery score

Variable	Mean			t test	Sig
IPFT value	*Pretest*	=	13,20	-3,656	0.005
	Middletest	=	16.70		
	Middletest	=	16.70	-3,596	0.006
	Posttest	=	19.80		
	Pretest	=	13,20	-13,229	0.000
	Posttest	=	19.80		
Archery Score	*Pretest*	=	155.30	-5,608	0.000
	Middletest	=	187.70		
	Middletest	=	187.70	-4,231	0.002
	Posttest	=	214.50		
	Pretest	=	155.30	-5,591	0.000
	Posttest	=	214.50		

DISCUSSION

Based on the results of the t test on circuit training is effective against increasing physical fitness in the group of male. The results of the analysis of increased physical fitness showed a significant level of p=0,000> 0.05. Thus it states there is a significant difference between pretest and posttest, and it is concluded that circuit training is effective in increasing physical fitness in the male group. While the results of the analysis of increasing accuracy in aiming archery showed a significant level of p=0.009> 0.05. Thus it states there is a significant difference in the level of accuracy of archery between the pretest and posttest, and it is concluded that circuit training is effective in increasing the accuracy of aiming archery in the group of male. Based on the results of the t test on circuit training is effective against increasing physical fitness in a group of female. The results of the analysis of increased physical fitness showed a significant level of p=0,000> 0.05. Thus it states there is a significant difference between pretest and posttest, and it is concluded that circuit training is effective in increasing physical fitness in a group of female. While the results of the analysis of increasing accuracy in aiming archery showed a significant level of p=0,000> 0.05. Thus it states there is a significant difference in the level of accuracy of archery between the pretest and posttest, and it is concluded that circuit training is effective in increasing the accuracy of aiming archery in the group of female.

Comment [AE7]: Dots should be used as separators

Comment [AE8]: I find this confusing it indicates that 0.000 is larger than 0.05 – it should be otherwise.

The results show that, circuit training can improve physical fitness in groups of male and female to have a significant effect on improving physical fitness and improve accuracy in aiming archery. This is because there are several factors that influence it, including the form of training requested by athletes, various forms of enjoyable training, seriousness in doing the exercise, adequate training time, training program The circuits provided cover all physical fitness components, controlled circuit training. According to the results of survey the level of physical fitness of students in Indonesia is still in the bad category [30]. However, circuit strength training shows significant interaction effects and effect sizes that are relevant for a 12 week training period [31,32]. Strength training must be planned and systematic work during the micro, mezo, and macro cycles over the years of the training plan [33]. The high level of physical fitness of an individual athlete is one of the main factors in achieving sports success [34]. While there was a significant effect on increasing the accuracy of aiming archery in the male group, this also happened in the female group.

For this reason, the form of circuit training programs provided tends to lead to forms of training aimed at increasing muscle fitness and endurance. Other factors that make archery targets with accuracy in male and female groups increase because researchers provide training in between visualization exercises, hoping

to help athletes concentrate, because concentration is important in archery accuracy besides physical conditions. From the discussion above, proper circuit training for sports increases muscular endurance, which has been proven by how accurate archery is. From the results of the research and discussion above, circuit training has a significant effect on increasing physical fitness in male and female groups. this is supported by Daniel's statement that circuit training is effective in increasing and maintaining muscle and cardiovascular endurance among school children [35]. Experienced archers show better accuracy and at the same time less heart rate compared to inexperienced archers [36]. This can help physical education teachers design programs that allow students to maintain their muscular and cardiovascular endurance levels.

This discussion lacks comparison to other studies outside of Indonesia – physical fitness may be compared to other countries as well. The same goes for archery – it is rather popular in Korea or Japan.

The purpose of discussion is not only conclude your achievement, but also compare your achievement with similar research – if there is no corresponding and you are sure about total novelty of your research – prove it also in the text.

CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis conducted in this research, it can be concluded that: circuit training has a partially significant effect on physical fitness and accuracy of archery aiming at beginner athletes. Furthermore, for further research, the researcher provides suggestions for expanding further in terms of variables such as concentration levels, anxiety levels. Because there are various variables other than circuit training that can affect athlete fitness in improving archery accuracy. For trainers, it is expected to be an evaluation for the future in taking steps, taking into account that by conducting circuit training at a maximum ability of 70-80% can improve archery accuracy, and circuit training methods can be used to improve the physical condition of novice athletes.

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