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Educating Aerobic Exercise and Skill-Related Fitness of Athletes in University of Ilorin

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ABSTRACTS

Fitness is regarded as having sound strength and endurance, which promotes a healthy mind. Exercise is repetitive bodily movements done to improve or maintain one or more of the components of fitness. Skill-related health concepts are the underlying skills that are needed in sports competition includes body balance, speed, agility, power, coordination, and reaction time. This study examined the influence of aerobic exercise on the physical related fitness of athletes in the University of Ilorin. The factors investigated are muscular power, agility, body balance, speed of athletes in the University of Ilorin. A descriptive research design of survey type was used for the study. The population of the study was 150 athletes in the University of Ilorin. The purposive sampling technique was used to select the entire 150 registered population by questionnaire. Frequency and percentage were used to analyze the demographic data of respondents and the four null hypotheses were tested using the inferential statistic of chi-square at 0.05 alpha level. The findings revealed that; aerobic exercise has a significant effect on the muscular power, agility, body balance, and speed of athletes in the University of Ilorin. Based on the findings, the study recommends that University of Ilorin athletes should engage in power explosive exercise with the help of the coaches to improve their muscular power, Athletes in the University of Ilorin should engage their players in the Illinois Agility run test to determine their agility level and engage in agility exercise to maintain and improve their agility fitness level.

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1. INTRODUCTION

Physical fitness is considered a measure of the body's ability to function efficiently and effectively in work and leisure activities to be healthy, to resist hypokinetic diseases, and to meet emergencies. The United States Department of Health and Human Services defined physical fitness as "a set of attributes that people have or achieve that relates to the ability to perform physical activity."

Exercise is repetitive bodily movements done to improve or maintain one or more of the components of health-related fitness: aerobic capacity, muscular strength, muscular endurance, flexibility, and body composition. One of the best ways to keep muscles healthy and strong is through exercise. Exercise training on athletes may improve many physical and health-related functions, such as reaction time, coordination, memory, and mental flexibility.

According to American College of Sports Medicine guidelines for exercise testing and prescription, aerobic exercise is defined as any activity that uses large muscle groups, can be maintained continuously, and is rhythmic in nature which includes walking, cycling, jogging, running, and swimming among others. Regular aerobic exercise activity will produce advantageous impacts for any age giving the activity is specific and proper to the degree of fitness of the person. Dynamic activities accurately performed would raise the degree of fitness and improve health. Exercise makes requests on the body frameworks well beyond typical consistent exercises and, as result, the frameworks adjust anatomically and physiologically. Accessible experience and logical proof show that regular physical activity gives individuals, both male, and female, incorporating individuals with disabilities with a wide scope of physical, social, and psychological wellness benefits.

According to [Armstrong and McManus \(2010\)](#), physical activity and training are significant for starting and continuing individual wellbeing. As such, support from adolescence and the likelihood to take part in sports and physical exercise must be sustained. The amount of physical activity needed to maintain a healthy weight, lose weight, promote good health; including prevention of hypokinetic diseases are recommended by various organizations in the United States, to be 30 minutes of moderate physical activity in most of the weeks.

Many physiological changes are determined by using everyday aerobic exercises. Regular aerobic physical activity increases exercise capacity and play a role in developing both the physical and health-related components of fitness and they have known benefits of regular aerobic exercise ([Shahana et al., 2010](#)).

Skill-related health concepts are the underlying skills, which are needed in the sport competitions includes body balance, speed, agility, power, coordination, and reaction time. It has been observed by researchers over the years, that countries have recognized the importance of regular physical exercise in the development and improvement of related physical components of the body such as muscular power, agility, balance, reaction time.

Agility is a rapid whole-body movement with a change of velocity or direction in response to a stimulus. As agility involves reacting to a stimulus, agility is a skill that utilizes the information-processing model. Before athletes can execute a movement, they need to find relevant environmental information and process it in relation to previous knowledge. After the athlete has processed the information, they can execute the correct movement. Agility is the capacity to quickly change direction while sprinting, also well known as a change of direction, is an important performance determinant in many team sports such as ice hockey, soccer, handball, basketball.

Change of Direction predominately characterizes an athletes' ability to decelerate in the shortest possible time and to re-accelerate quickly in a new direction ([Chaabene et al., 2018](#)).

Change of Direction is the physical quality of agility while perceptual and decision-making factors constitute the underlying cognitive components of agility. Change of Direction is multifactorial and includes physical qualities such as straight sprinting speed, reactive strength, concentric strength, and power. Furthermore, the technical execution of Change of Direction tasks can also be influenced by the underlying biomechanical specifics such as the angle-velocity trade-off.

Previously, different training protocols have been applied to enhance agility (Polman *et al.*, 2004). Significant improvements have been reported in the ability to quickly turn left and right after a 12-week Change of Direction training program in soccer players. In another study, Miller *et al.* (2006) investigated the impact of a 6-week plyometric training program in untrained individuals and observed significant improvements in Change of Direction performance using the Illinois Agility Test. Despite these findings, it seems that single-mode training does not translate to improvements in agility performance. Hence, integrative neuromuscular training incorporating fundamental and specific movements through dynamic stability, balance, core strength, plyometric and agility exercises may improve movement biomechanics and minimize the risk of sustaining injuries.

A universal concept for agility included three factors. These three factors include cognitive, physical, and technical aspects. Body balance, posture, and balance control are fundamental in daily life to safely accomplish any type of movement and motor task that involves displacement of body segments or the entire body. Balance is the process of maintaining the body's Center of gravity vertically over the base of the support, and it relies on rapid and continuous feedback from visual, vestibular, and somatosensory structures for the subsequent execution of smooth and coordinated neuromuscular actions. The risk of body imbalance, fall, or subsequent injuries will not only be reduced with efficient postural balance but also contributes to the optimization of motor performance in several athletic disciplines.

Each sport involves specific motor skills that require the completion of particular postures and movements (Paillard, 2017). Balance is an important factor in performing athletic skills, but the relationship between sports competition results and balance is not yet fully understood. A lower level of balance is associated with injuries, such as sprains and, muscle, tendon, and ligament strains among others. Maintaining a standing posture on a stable surface is a major determinant of balance. A sway analysis in a simple task, such as quiet standing, is used as a variable of its description.

Muscular power refers to a great force production over a short period, such as in fast leg kicks and explosive jumping. It is also a fitness component that combines speed and strength. In sports, athletes who are strong and move quickly show good power fitness. Examples include football players, sprinters, and throwers. These athletes generate a high level of force over short distances in the fastest possible time.

The Development of muscular power is a multifactor phenomenon. It involves the composite integration of strength, rate of force development, skills, and coordinates. Power has many different contexts, from everyday activities and job functions to elite athletic performance.

Speed is one of the basic components necessary for bio-motor responses in some sports. Every sports activity both games, competitions, and games always require speed bio motor components. It is the ability of the complex; speed is an ability that allows a basketball player to move as quickly as possible at the level of specific resistance. Linear action such as acceleration and velocity can be influenced by changing the movement mechanism of the arms or legs. Thus, the ability to develop speed in a short time (acceleration) is an important component to support performance in a wide range of sporting activities.

Speed is an important motor feature that determines the efficiency in many sports branches, should be trained as early as possible. It increases very rapidly at the ages of 6 to 13. In boys and girls, it increases continuously until adolescence, and there are almost no differences in performance. However, although speed success continues to increase in males, it slows down to pause in girls with adolescence.

Nowadays, ineffective aerobic exercises training for the development of physical related components of fitness is seen as a gap for this study in our country in general and in this study area in particular and, therefore, effective selected aerobic exercises were used to determine the effects of aerobic exercise on the physical related components of fitness of athletes in the University of Ilorin.

Regular aerobic training activity, fitness, and exercise are significantly important for the physical fitness and wellbeing of all athletes, whether they take part fully in exercise or some kind of average health-enhancing physical activities as well as achieving peak level performance in sports, good body structure, and composition.

The researcher observed that despite the effects of aerobic exercise on the skill-related components of athletes, it is obvious that not all athletes of the University of Ilorin understand the need for aerobic exercise concerning active participation in their sport of choice. Poor body structure and composition are more rampant among athletes as a result of their lazy attitude towards exercise or lack of vast knowledge on the importance of aerobic training.

Evidence among University of Ilorin athletes suggests the value of exercise has been known theoretically not practically. Hence, the need to investigate the influence of aerobic exercise on the skill-related fitness of athletes. The application of aerobic exercise has caught the attention of researchers to examine the influence of aerobic exercise on the skill-related fitness of athletes in the University of Ilorin, Ilorin, Kwara State.

The following hypotheses were tested in this study;

- (i) Aerobic exercise will not have a significant influence on the muscular power of athletes in the University of Ilorin
- (ii) Aerobic exercise will not have a significant influence on the agility of athletes in the University of Ilorin
- (iii) Aerobic exercise will not have a significant influence on the body balance of athletes in the University of Ilorin
- (iv) Aerobic exercise will not have a significant influence on the speed of athletes in the University of Ilorin.

2. METHODS

This study employed a descriptive research design of the survey type. The population for this study comprises 150 University of Ilorin athletes from the following team sports; soccer (50), athletics (15), table tennis (10), badminton (20), volleyball (25), and basketball (30) registered by the University of Ilorin Sports Council.

The research instrument was a Self-structured questionnaire, it was divided into two sections. Section A consists of demographic data information for each respondent, while section B contains information on the variables of the study which are muscular power, agility, body balance, and speed. The questionnaire was close-ended of four points Likert rating scale of Strongly Agree (SA)=1, Agree (A)=2, Disagree (D)=3, Strongly disagree (SD)=4. To ensure that the instrument measures what it is intended to measure, it was given to three (3) lecturers in the department of Human Kinetics Education, the University of Ilorin for validation.

The reliability of the instrument was ascertained using the test-re-test method on (10) badminton athletes and (10) soccer athletes after which the values were compared. The copies of the questionnaire were administered to the respondents with the help of three (3) trained research assistants. The completed copies of the questionnaire were collected on the spot. Descriptive statistics of frequency and percentage were used for the demographic variables of the participants and inferential statistic of chi-square was used to test the hypotheses set at 0.05alpha level.

3. RESULTS AND DISCUSSION

Table 1 presents the frequency distribution of the respondents by type of sport, age, and years of participation. **Table 2** indicated the calculated Chi-square value of 30.643 and the table value of 16.919 with the degree of freedom of 9 at 0.05 alpha level. Since the calculated value is greater than the table value, the null hypothesis is rejected. This implies that Aerobic exercise significantly influenced the muscular power of athletes in the University of Ilorin.

Table 3 shows the calculated Chi-square value of 19.440 and the table value of 16.919 with the degree of freedom of 9 at 0.05 alpha level. Since the calculated value is greater than the table value, the null hypothesis is rejected. This implies that Aerobic exercise significantly influenced the agility of athletes in the University of Ilorin. The information in table four indicated the calculated Chi-square value of 24.305 and the table value of 16.919 with the degree of freedom of 9 at 0.05 alpha level (**Table 4**). Since the calculated value is greater than the table value, the null hypothesis is rejected. This implies that Aerobic exercise significantly influenced the body balance of athletes in the University of Ilorin. **Table 5** presents the findings indicating the calculated Chi-square value.

Table 1. Frequency distribution of the respondents on sports, years of playing, gender, age, religion, and level.

Variables	Frequency	Percentage (%)
Sports		
Soccer	50	33.3
Athletics	15	10.0
Table tennis	10	6.7
Badminton	20	13.3
Volleyball	25	16.7
Basketball	30	20.0
Total	150	100.0
Years of playing		
0-2 years	60	40.0
3-5 years	66	44.0
6-8 years	18	12.0
9 years- above	6	4.0
Total	150	100.0
Gender		
Male	107	71.3
Female	43	28.7
Total	150	100.0
Age		
17-20 years	56	37.3
21-24 years	87	58.0
25 years and above	7	4.7
Total	150	100.0

Table 2. Chi-square (χ^2) analysis showing the significant effect of aerobic exercise on the muscular power of athletes in the University of Ilorin.

S/No	Items	Row Total	Df	Cal. Value	Critical Value	Sig.	Remark
1	5	750	9	30.643	16.919	0.000	Ho Rejected

$P < 0.05$ alpha level

Table 3. Chi-square (χ^2) analysis showing the significant effect of aerobic exercise on the agility of athletes in the University of Ilorin.

S/No	Items	Row Total	Df	Cal. Value	Critical Value	Sig.	Remark
1	5	750	9	19.440	16.919	0.022	Ho Rejected

$P < 0.05$ alpha level

Table 4. Chi-square (χ^2) analysis showing the significant effect of aerobic exercise on the body balance of athletes in the University of Ilorin.

S/No	Items	Row Total	Df	Cal. Value	Critical Value	Sig.	Remark
1	5	750	9	24.305	16.919	0.004	Ho Rejected

$P < 0.05$ alpha level

Table 5. Chi-square (χ^2) analysis showing the significant effect of aerobic exercise on the speed of athletes in the University of Ilorin.

S/No	Items	Row Total	Df	Cal. Value	Critical Value	Sig.	Remark
1	5	750	6	28.227	12.592	.000	Ho Rejected

$P < 0.05$ alpha level

Chi-square value that shows in **Table 5** is 28.227 and the table value of 12.592 with the degree of freedom of 9 at 0.05 alpha level. Since the calculated value is greater than the table value, the null hypothesis is rejected. This implies that Aerobic exercise significantly influenced the speed of athletes at the University of Ilorin.

Hypothesis one revealed that aerobic exercise significantly influenced the muscular power of athletes at the University of Ilorin. The development of muscular power involves the composite integration of strength, rate of force development, skills, and coordinates. Power has many different contexts from everyday activities and job functions to elite athletic performance.

Hypothesis two showed that aerobic exercise significantly influenced the agility of athletes in the University of Ilorin. Agility is a rapid whole-body movement with a change of velocity or direction in response to a stimulus. As agility involves reacting to a stimulus, agility is a skill that utilizes the information-processing model. Change of direction is an important performance determinant in many team sports such as ice hockey, soccer, handball, basketball. Change of Direction predominately characterizes an athlete's ability to decelerate in the shortest possible time and to re-accelerate quickly in a new direction (Chaabene *et al.*, 2018). Miller *et al.* (2006) investigated the impact of a 6-week plyometric training program in untrained individuals and observed significant improvements in Change of Direction performance using Illinois Agility Test. Despite these study findings, it seems that single-mode

training does not translate to improvements in agility performance. Hence, integrative neuromuscular training incorporating fundamental and specific movements through dynamic stability, balance, core strength, plyometric and agility exercises may improve movement biomechanics and minimize the risk of sustaining injuries.

Hypothesis three revealed that aerobic exercise significantly influenced the body balance of athletes in the University of Ilorin. The risk of body imbalance, fall, or subsequent injuries will not only be reduced with efficient postural balance, but also contributes to the optimization of motor performance in a number of athletic disciplines. Each sport involves specific motor skills that require the completion of particular postures and movements (Paillard, 2017).

The fourth hypothesis supports the findings of Acar and Eler (2019), who examined the effect of balance exercises on speed and explain that speed, which is an important motor feature that determines the efficiency in many sports branches, should be trained for as early as possible. It increases very rapidly at the ages of 6 to 13. In boys and girls, it increases continuously until adolescence, and there are almost no differences in performance. Although speed success continues to increase in males, it slows down to pause in girls with adolescence.

Based on the findings of this study, the following was recommended:

- (i) University of Ilorin athletes should engage in power explosive exercise with the help of the coaches to improve their muscular power.
- (ii) Athletes in the University of Ilorin should engage their players in the Illinois Agility run test to determine their agility level and engage in agility exercise to maintain and improve their agility fitness level.
- (iii) University of Ilorin athletes should endeavor to always engage in balance exercises such as the Bass test, brace test, test on a beam balance, Standing Stork Test to maintain good body posture and improve body stamina.
- (iv) Athletes at the University of Ilorin should engage in speed exercises such as fartlek training to improve their speed level to achieve peak level performance at all times.

4. CONCLUSION

Fitness is regarded as having sound strength and endurance, which promotes a healthy mind. Exercise is repetitive bodily movements done to improve or maintain one or more of the components of fitness. Skill-related health concepts are the underlying skills that are needed in sports competition includes body balance, speed, agility, power, coordination, and reaction time. This study examined the influence of aerobic exercise on the physical related fitness of athletes in the University of Ilorin. The factors investigated are muscular power, agility, body balance, speed of athletes in the University of Ilorin. A descriptive research design of survey type was used for the study. The population of the study was 150 athletes in the University of Ilorin. The purposive sampling technique was used to select the entire 150 registered population by questionnaire. Frequency and percentage were used to analyze the demographic data of respondents and the four null hypotheses were tested using the inferential statistic of chi-square at 0.05 alpha level. The findings revealed that; aerobic exercise has a significant effect on the muscular power, agility, body balance, and speed of athletes in the University of Ilorin. Based on the findings, the study recommends that University of Ilorin athletes should engage in power explosive exercise with the help of the coaches to improve their muscular power, Athletes in the University of Ilorin should engage their players in the Illinois Agility run test to determine their agility level and engage in agility exercise to maintain and improve their agility fitness level.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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