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AGE DIFFERENTIATION, SPORT SKILL INTERVENTION AND PHYSICAL FITNESS STATUS OF YOUNG ADULTS IN A DEVELOPING NATION

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Abstract:
The purpose of the study was to examine the effect of sport skill acquisition in two selected sports on the physical fitness status of young adolescence. Experimental research design was adopted for the study. The American Alliance for Physical, Health Education, Recreation & Dance (AAPHERD) Youth Fitness Test (1976). A battery test designed to measure both the performance-related and health-related components of physical fitness respectively was administered on 160 participants who took part in an eight week structured exercise intervention using the pre-post- test method. The result revealed a significant effect of the sport skill training intervention on physical fitness status of participants. Thus it could be concluded that basketball and badminton skill training had a significant effect on the physical fitness of adolescent based on their age.

Keywords: sport skill, skill acquisition, training, physical fitness, performance-related components; health-related components

1. Introduction

Age is an important variable that affects motor performance for adolescents. It is a period that is characterize with growth and development challenges, identity formation and the development of positive self-evaluation. They are also faced with the choice of what they will like to become in life and sports the introduction of sports can enhance the desire for acquisition of sport specific skills that may guaranty lifelong participation and a career path in sports. Côté & Hay (2002), in their investigations of elite Australian and Canadian athletes, have identified three distinct stages of sport participation that athletes pass through prior to the attainment of expert performance: the sampling years

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(5–12), the specializing years (13–15), and the investment years (16+). The sampling years are typified by the athlete participating in a wide range of different sports. It is during this period that skills such as running, jumping, and throwing that are fundamental to performance in many sports are acquired and refined. In the specializing years, athletes begin to narrow their focus and participate in fewer activities. In the investment years, athletes become devoted to a single sport by making maximal performance in this sport their primary life focus.

Baker, Côté & Abernethy (2003) stated that research on the hierarchy of motor skill development (e.g., Seefeldt, 1980, 1982) supports the approach that sport involvement should progress from a focus on fundamental motor skills in early childhood to more sport-specific skills in adolescence and early adulthood.

Adolescents' development involves life tasks such as the development of identity, achieving independence from the family while staying connected and fitting into a peer group. The developmental process entails numerous changes which occur from childhood to adulthood. It is also a time when the individual is required to act in accordance with social roles, engaging with peers and members of the opposite sex and to complete the requirements of schooling and making decisions regarding a future career.

Current realities has shown that aside entertainment, sports has become a leading 'gateway' to stardom and economic independence as a breakthrough in the world of sports will bring an individual out of obscurity and abject poverty. Also in the recent times, many early and late adolescents are emerging as champions in globally acclaimed sport competitions especially from developed nations. This can only signify that early detection and development had occurred in other to bring out the innate ability of these youngsters. Also, skills are better learnt when the 'athletes' are very young as the involvement of children in high performance competitions is on the increase and many world records are being broken while some are being set by these youngsters across sports. Therefore, early identification and development of prospective athletes in their formative years is gradually gaining ground in Nigeria and the philosophy of 'catching the young' is becoming the order of the day in the acquisition of sport skills and many age category competitions are springing up.

The energy, endurance and perseverance demand for winning or excelling is very enormous and as such great deal of time and resource are being expended to maintain fitness across sports. Furthermore, fitness is generally defined with a focus on two goals; performance and health. Performance-related fitness refers to the components of fitness that are central for optimal work or sport performance (e.g., agility, balance, coordination, power, reaction time, and speed), whereas health-related fitness refers to the components that more directly relates to health status such as cardiorespiratory fitness, muscular strength and endurance, flexibility, and body composition. Physical fitness is considered a multidimensional construct, including different components such as cardiovascular endurance, muscular strength/power, flexibility, and motor coordination (Vanhees, Lefevre, Philippaerts, et al, 2005).

A great deal of attention has been given to the role of physical activity and physical fitness in the enhancement of psychological health (Whitelaw, Swift, Goodwin & Clark, 2008). Generally, strength training and aerobic training have been proposed as two of the most important types of physical activities to have beneficial effect on self-esteem (Fox, 2000, Larun, Nordheim, Ekeland, Hagen & Heian, 2006). Fox (2000) suggests that weight and resistance training may be superior to endurance training in improving body image and self-esteem. Enhanced physical fitness usually leads to an increase in lean body mass and physical abilities and a decrease in body fat mass, which in turn may affect the way adolescents perceive their physical self. Physical fitness is important throughout life, but it is particularly crucial during childhood and adolescence. Childhood and adolescence are crucial periods of life; since dramatic physical and psychological changes take place at these ages. Likewise, lifestyle and healthy / unhealthy behaviours are established during these years (Hallal, Victoria, Azevedo & Wells, 2006).

A study carried out by Schneider, Dunton & Cooper (2008) involving 146 (n=79 experimental; n = 67 control) although only 120 females were finally analysed – n= 61 (intervention); n = 59 (control). Intent to treat analyses showed that nine month improvement in cardiovascular fitness were significantly larger for the intervention group than the control or comparison group. Participants who increased their fitness did experience enhanced global physical self-concept. In another study, on how perceived sport competence mediates the relationship between childhood motor skill proficiency and adolescent physical activity and physical fitness, involving 276 students. For male and female combined fitness was significantly positive. (Barnett, Morgan, Van Berden, & Beard (2008). Goudas, Dermitzaki, Leondari & Danish (2006) employed a wait-list control group design and how physical Education students tested in seat and reach, seat-up test, results showed gains in physical fitness.

The objective of the study therefore was to determine whether participation in organized programme of badminton and basketball skill training will affect the physical fitness status of in-school adolescents in Nigeria. It was also to determine whether the will be any significant difference on athletes who participated in the skill acquisition programme and those who did not participate.

2. Methodology

2.1 Research Design and Procedures

This study employed the experimental research design. Selected instruments for both the psychological and practical aspect of the study were administered to the participants for the study before (pre-test) and after (post-test) treatment for the study. The participants were divided into experimental and control groups. The experimental groups were taught the selected sport skills for a period of ten (10) weeks; twice a week for a 50 minutes duration daily.

2.2 Population and Samples

The population for this study consisted of all in school adolescents in junior and senior secondary schools in Osun State. The sample size comprised 160 students. The stratified random (intact-class) sampling technique was adopted in the selection of samples for the study. A Local Government Area (LGA) was selected randomly using balloting method. Out of the nine schools in the LGA, two co-educational secondary schools were selected purposively for the study. The purpose sampling technique was used because of their proximity to the intended facilities and the multi-representation of students from different background which fully represents the target participants. Also, these schools were selected because of The population was two age groups namely; 12-14 year old representing early adolescence and 15-18 year old representing late adolescence drawn from the Junior Secondary School class 2 (JSS2) and the Senior Secondary School 2 (SSS2) classes respectively

The experimental groups were 40 participants each from Atakumosa High School Osu (Basketball), and Ibodi Grammar School, Ibodi (Badminton). The control groups (80 boys and girls) were 40 participants each from another intact-class from the same selected schools. Age differentiation was put into consideration in the selection and these two classes needed for the study. All participants were novice or adolescents that have no knowledge of the skills of the selected sports.

2.3 Instrumentation

The research instruments used to collect data was The American Alliance for Physical, Health Education, Recreation & Dance (AAPHERD) Youth Fitness Test (1976). A battery test designed to measure both the performance-related and health-related components of physical fitness respectively. The Physical Fitness Inventory comprises the following performance-related components; muscular power, muscular strength, agility and speed were selected for the study. The following fitness tests were adapted to measure each; Muscle power (Vertical jump test); Muscle endurance (sit-up test) speed (20 metres sprint test) and Agility (T-Test). Equipment such as stop watches, measuring tape, traffic cones and a wall was used in conducting the tests. The instruments were checked for test re-test reliability and returned a correlation coefficient of 0.84.

The results are sufficient enough to conclude that instruments were adjudged valid and reliable for the present study since they all showed consistency with values above average (i.e. 0.5 mid-values).

2.4 Data Collection

Data for this study was collect from selected participants divided into experimental and control groups. The instrument was administered on the experimental and control groups (pre-test) before the commencement of the skill acquisition programme after which only the experimental groups were taken through a 50 minute two day per week skill training for 10 weeks in the selected sports of basketball and badminton. After the 10 weeks of skill training session the questionnaires for the study were administered

(post-test) to the experimental and control groups respectively. The researcher made use of ten research assistants that are proficient in the selected sports and were trained on how to administer the questionnaires they also assisted in teaching the skills.

2.5 Data Analysis

This involved inferential statistics such as the t-test, and analysis of variance (ANOVA) through SPSS, was used to treat data collected. The level of significance for all analysis was at 0.05.

3. Results

Table 1: Descriptive statistics showing pre and post-treatment physical fitness by age

Students' Groups	Students' Age	Pre			Post		
		N	$\overline{X}$	SD	N	$\overline{X}$	SD
Basketball	12-14 Years	22	7.3182	.83873	22	8.6364	.78954
	15-18 Years	15	7.0000	1.19523	18	8.8333	.85749
	Total	37	7.1892	.99549	40	8.7250	.81610
Badminton	12-14 Years	21	8.1905	.98077	21	9.1905	.87287
	15-18 Years	19	8.0000	.74536	19	8.8947	.73747
	Total	40	8.1000	.87119	40	9.0500	.81492
Control	12-14 Years	43	8.0233	.59715	43	8.2791	.73438
	15-18 Years	35	7.7143	.85994	37	7.8378	1.01416
	Total	78	7.8846	.73821	80	8.0750	.89690
Total	12-14 Years	86	7.8837	.83199	86	8.5930	.85925
	15-18 Years	69	7.6377	.96970	74	8.3514	1.03939
	Total	155	7.7742	.90129	160	8.4813	.95148

Table 1 present the mean pre and post-treatment physical fitness score of students between ages 12-14 and 15-18 years old in basketball, badminton and control. The overall mean physical fitness score of the age groups in the pre and post-treatments are $\overline{X}$ = 7.88 ± .83; 8.59 ± .86 and $\overline{X}$ = 7.64 ± .97; 8.35 ± 1.04 for ages 12-14 yrs. and 15=18 yrs. respectively. Analysis of Variance was carried out to determine if there was significant effect of training on physical fitness status of participants by age groupings, the results are presented in Table 2.

Data in Table 2 showed that there was significant effect of training on pre and post treatment groups by age ($F = 9.40$, $P < 0.05$). Significant effect was also noticed among the various groups ($F = 20.48$, $P < 0.05$). However, there was no significant effect of training on physical fitness status of pre and post treatment groups based on age groupings.

Table 2: ANOVA summary table showing difference in basketball, badminton and control groups physical fitness based on age

	Sum of Squares		Df	Mean Square		F		Sig.
	Pre	Post		Pre	Post	Pre	Post	
Corrected Model	20.966[a]	33.647[a]	5	4.193	6.729	6.000	9.396	<.05*
Intercept	8095.073	10614.371	1	8095.073	10614.371	1.158E4	1.482E4	<.05*
Groups	18.279	29.331	2	9.139	14.666	13.077	20.477	<.05*
Students' age group	2.530	1.159	1	2.530	1.159	3.621	1.619	>.05
Groups Students' age	.109	2.725	2	.055	1.363	.078	1.903	>.05
Total	9493.000	11653.000	155					
Corrected Total	125.097	143.944	154					

* Sig = P < 0.05

The Multiple-comparison analysis (post-hoc) was attempted to determine where the significant effect lie. Table 12 present a summary of the post hoc analysis.

Table 3: Summary of post hoc analysis on the effect of sport skills training on pre and post-treatment physical fitness based on age

	Pre-Treatment				Post-Treatment		
Students' Groups	**Students' Groups**	**Mean Difference**	**Std. Error**	**Sig.**	**Mean Difference**	**Std. Error**	**Sig.**
Basketball	Badminton	-.9108*	.19068	*.000	-.3250	.18924	.232
	Control	-.6954*	.16688	*.000	.6500*	.16388	*.001
Badminton	Basketball	.9108*	.19068	*.000	.3250	.18924	.232
	Control	.2154	.16258	.418	.9750*	.16388	*.000
Control	Basketball	.6954*	.16688	*.000	-.6500*	.16388	*.001
	Badminton	-.2154	.16258	.418	-.9750*	.16388	*.000

* Sig = P < 0.05

As presented in Table 3 it was shown that difference between the pair of 'basketball and badminton' groups, 'basketball and control' groups in the pre-treatment physical fitness are significantly different in favour of students in badminton group (I-J = -0.91) and control group (I-J = -0.70), but between the pair of 'badminton and control' groups there is no significant difference (I-J = 2.15). This is an indication that the pre-treatment physical fitness of the students in badminton and control groups is better than that of those in basketball group. However, after the sport skill trainings the difference in the physical fitness of basketball and badminton groups became non-significant (I-J = -0.33) while the difference between ''control and basketball groups as well as 'control and badminton' groups are significant (I-J = -0.65) and (I-J = 0.98) respectively. Thus it could be concluded that basketball and badminton skill training had a significant effect on the physical fitness of adolescent based on their age.

4. Discussion

Thirdly, the result of the analyses showed that there was significant effect of the skill training of badminton and basketball on the physical fitness of adolescents who participated than their counterparts who did not participate in any skill training. This result is consistent with the findings of a study carried out by Schneider, Dunton & Cooper (2008) involving 146 (n=79 experimental; n = 67 control) although only 120 females were finally analyzed – n= 61 (intervention); n = 59 (control). Intent to treat analyses showed that nine month improvement in cardiovascular fitness were significantly larger for the intervention group than the control or comparison group. Also, significant improvement in cardiovascular fitness between intervention groups was reported. Participants who increased their fitness did experience enhanced global physical self-concept.

Several epidemiological and intervention studies (Wareham, Van Sluijs & Ekelund, 2005; Must, & Tybor, 2005, Ortega, Ruiz, Castillo, & Sjostrom, 2008)) have identified the positive role of physical activity and physical fitness on children and adolescents well-being. The interaction effect of gender and age on the physical fitness of adolescents who participated in the badminton and basketball skill training was not significant. However, participants, with reference to this study who participated in badminton and basketball training might have gained physical fitness, skill performance and general motor efficiency of such magnitude capable of stepping up positive feeling about the "body" that had been put to effective and rewarding usage.

4.1 Conclusion and Recommendation

The study concluded that the Physical fitness status of participants was significant affected by the sport skill training programme in both basketball and badminton; however age had significant effect on participants who participated in the sport skilling training programme. Base on the findings of the study effort should be made by coaches and handlers to design suitable and appropriate physical fitness programme and make it part of the training schedules. Athletes should also at all-time engage in proper warm up and endurance exercises before participating in vigorous physical activity

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