Sport and Physical education

Relationship between the Anthropometrics and Physical Fitness Variables among Somatotype of School Children

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Abstract

One of the effective solutions for predicting the sports performance and talent finding is to use anthropometric characteristics and physical fitness factors. Therefore purpose of the study was to examine the relationship between the anthropometrics and physical fitness variables among under 14 somatotype of male school children. To achieve the present study, 164 somatotype of under 14 age of school male children were assigned from Jaffna central college. Their anthropometrics variables such as height (HE), weight (WE), body mass index (BMI), arm span(AS) & sitting height(SH) have been measured before the physical fitness test of a day. The physical fitness test measured speed (SP), leg explosive power (LE), upper body strength (US), agility (AG) & endurance (EN). Pearson correlation coefficient was administered to find out relationship between anthropometric and physical fitness variables. Result revealed that U.S has correlated with all the anthropometric variables i.e HE(r=0.400),WE

(r=0.413),BMI(r=0.376),AS(r=0.402), SH(r=0.338) besides SP correlated with BMI(r=0.270), AG correlated with WE(r=0.274) & BMI(r=0.357). On the other hand any anthropometric variables have not correlated with EN and LE with the rest of variables. Therefore this study was concluded that only certain anthropometric variables have interrelationship with certain physical fitness.

Key words- Anthropometrics, physical fitness variables

Introduction

Physical fitness and anthropometric variables are crucial to succeed in sports professional. These variables are platform and fundamental for children to show their talents in sports. It may help to select the appropriate of sports or games. This selection will lead to peak achievement in national or

international competition. Previous achievements of sports leading countries, which followed talents identification progress to assess the physical fitness and anthropometric variables of children. This progress was operated in many sports leading countries such as East Germany, Russia and Bulgaria. The results obtained from these countries were unimaginable and amazing. Most of the sportsmen, they got medals in 1972 Olympic Games through scientifically in East Germany. This method also was followed by Bulgaria in Olympic in 1976 and 80 percentages of sportsmen got medals in this Olympic through talented identification process.

Anthropometric variables such as height, weight, arm span, sitting height and body massindex are playing key role in various sports skill which enhances their performance thus it is considered as important parameters in sports. It is ensured in certain sports such basketball and volleyball, for this sports, the sports man is elected based on anthropometric parameters because anthropometrics play key role in this sports skill and performance in contrast certain sports such as 100M, 200M and 400M don't be selected based on anthropometrics features because that sports depend on physical fitness capacity. We select the athletes based on their speed, strength, endurance and agility for athletics. Although majorities of western previous studies have highlighted that remarkable anthropometrics variable produce amazing sports performance.

Research Problems

Some of sports leading countries such as America, UK, China, Russia and Germany are utilizing well developed scientific system for identify the talent of children. They measured physical fitness and anthropometrics as key parameters to identify the talent of children. Distinguish anthropometrics may be advantage to enhance sports skills and physical fitness. In contrast anthropometric variables don't influence on physical fitness or performance because physical fitness is determined based on muscles factors, physical & physiological characters, genetic and training but not determined based on anthropometric features. Thus it is big debate among scholars that whether anthropometrics variables has influenced on physical fitness. Therefore present study examined the relationship between the anthropometric variables and physical fitness among under14 somatotype of school children.

Methodology

Selection of Subjects

According to instruction of ministry of education and sports, under14 year's somatotype of children of Jaffna Central College have been randomly assigned for this study. Prior to test sufficient instructions were given to all the subjects regarding trails of test, purpose, and all the procedures. All the subjects were volunteers to participate in this study and consents collected from parents. Who are sick and physical abnormality they have been eliminated from study. Finally 164 subjects have recruited for this study.

Test Protocol

The subjects have followed 15 minutes similar warm up and stretching exercise before commencing the physical test. Anthropometric variables were measured before a day of physical test. Following anthropometric variables were taken to account such as height, weight, body mass index, arm span and sitting height. Physical fitness test conducted in following order such as speed, leg explosive power, upper body strength, agility and endurance. This is shown below.

Measured Variables	Conducted Test and Tools
Speed	30M sprint
Leg Explosive Power	Standing Long Jump
Upper body Strength	Medicine Ball Throw
Agility	Shuttle Run
Endurance	600M Race
Height	Stadiometer
Weight	Electronic Weighing Machine
BMI	Formula
Arm Span	Line gauge
Sitting Height	Line gauge

Statistical Analysis

Collected data were interpreted by Pearson's correlation coefficients to test the significance of the relationship between the anthropometric and physical fitness variables.

Results

We evaluated the relationship between anthropometric variables and physical fitness. Which results displayed in Table-I that showed leg explosive power did not correlate with any anthropometric variables such as height($r=0.005$, $P>0.05$), weight($r= -0.059$, $P>0.05$), BMI($r=0.054$,$P>0.05$), arm span($r=0.077$,$P>0.05$) & sitting height($r=0.068$, $P>0.388$). Moreover speed has not been correlated with anthropometrics variables like height($r=0.083$, $P>0.05$), weight($r=0.176$,$P>0.05$), arm span($r= -0.049$,$P>0.05$) & sitting height($r=0.045$, $P>0.05$) but BMI($r=0.270$, $P<0.05$) positively correlated with speed. Although upper body strength was positively correlated with all the anthropometrics such as height($r=0.400$, $P<0.05$), weight($r=0.413$, $P<0.05$), BMI($r=0.357$, $P<0.05$), arm span($r=0.402$, $P<0.000$) & sitting height($r=0.338$, $P<0.05$) variables which are clearly shown in table-I. Agility did not correlate with height($r= -0.02$, $P>0.05$), arm span ($r=0.029$, $P>0.05$) & sitting height ($r=0.158$, $P>0.043$) but agility positively correlated with weight($r=0.274$, $P<0.05$) & BMI($r=0.376$, $P<0.05$). In contrast height($r=0.042$, $P>0.05$), weight($r=0.061$, $P>0.05$), BMI($r=0.102$, $P>0.05$) & sitting height($r=0.127$, $P>0.05$) did not correlate with endurance but arm span($r=0.164$,$P<0.05$) has correlated with endurance.

Table-I

Relationship Values of Physical fitness and Anthropometrics of male school children are shown in Table I

Variables	Speed (SP)		L.Explosive (LE)		U.Strength (US)		Agility (AG)		E
	r	P	r	P	r	P	r	P	
Height	0.083	0.290	0.005	0.951	0.400	0.000	-0.023	0.774	0.
Weight	0.176	0.024	-0.059	0.453	0.413	0.000	0.274	0.000	0.
BMI	0.270	0.000	0.054	0.493	0.376	0.000	0.357	0.000	0.
Arm span	-0.049	0.534	0.077	0.330	0.402	0.000	0.029	0.714	
Sitting .Height	0.045	0.566	-0.068	0.388	0.338	0.000	0.158	0.043	

Discussion

Sports talents of school children can be pinpointed at the age of 10 to 16 years. Peak sports performance can be obtained from potentials anthropometric and physical fitness possess sports man. It ensures that an outstanding sportsman may have extraordinary physical characters and anthropometrics measurement which may lead to improve sports performance. Several explore studies conducted among various age, ethic and sex sport men regarding relationship between anthropometric and physical fitness variables. Majority of studies agreed that there are relationships between anthropometric and physical fitness. On other hand present study revealed that there are no correlation between anthropometric variables and leg explosive power and endurance.

Speed can be enhanced through improving physical system and muscles characters. These factors may be improved by proper training. However proper training has not upgraded speed. Previous research studies highlighted the role of muscles characters on speed, the result revealed that speed is associated with genetic. Some studies concluded that genetics and training are equally important components for athlete achievements but not height, weight, arm span and sitting height, it is ensured in present study. Therefore correlation may be impossible between anthropometric variables and speed. On other hand speed is depend on nature and nurture components for success in athletic. Moreover speed may be determined by body fat. Approximate level of body fat can be assessed by body mass index. Body mass index play a vital role in physical fitness because weight gained has a negative impact on athletic performance without disputes. In contrast reducing weight can ensure the improvements of athletic performance. Therefore it supports to present study that the speed and body mass index have inter relationship.

Upper body strength is a key component that contributes optimal athletic performance. Greater upper body strength may be interaction on height, weight, body mass index, arm span and sitting height. It was confirmed in this study. Agility is one of the crucial variables that may be associated with greater or frequent of movement. This movement can be done with less weight because increasing the body mass index affect the movement of the body therefore agility has relationship with weight and body mass index. Further endurance is having interrelationship with lungs and cardio respiratory fitness. Increasing the cardiovascular capacity may upgrade the endurance performance therefore present anthropometric variables don't have interrelationship with endurance capacity.

Conclusion

Identification of children talents at early stage may produce elite sports skills and performance through proper training. Measuring the anthropometric and physical characters that help to discover and explore areas of the talent for particular sports. In this view the present study found that upper body strength has been positively correlated with anthropometric variables therefore remarkable anthropometrics may produce better outcome in sports skills and performance on other hand leg explosive power and endurance performance don't have interrelationship with anthropometrics characters.

Therefore certain anthropometric variables only influence on certain physical fitness.

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