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Anthropometry Factors and Physical Dominan Conditions in Futsal Playing Capabilities

Imam Setiawan[1]; M. Furqon Hidayatullah; Muchsin Doewes[2]

[1] Master Program in Sport Science, Sebelas Maret University, Surakarta, Indonesia

[2] Department of Sport Science, Postgraduate Program, Sebelas Maret University, Surakarta, Indonesia

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Abstract

This study aims to find out to determine the anthropometric factors and dominant physical conditions in the ability to play female futsal. The population of this research is 14 female futsal teams at IAIN Purwokerto. This type of research is quantitative, using a Confirmatory Factor Analysis design. The data collection technique used in this study was by test and measurement. Data from the test results and measurements are then processed and calculated using the KMO and Bartlett's Test program. The results of the study obtained anthropometric factors that were dominantly influential in determining the performance of futsal athletes, namely the ratio of leg length and height. Factors of physical condition that are dominantly influential in determining the performance of futsal athletes are agility.

Keywords: Anthropometry, Physical Condition, Futsal

Introduction

Futsal is actually a complex sport, because it requires special techniques and tactics. Similarly, in physical conditions, futsal games have differences with other sports. The characteristics of the futsal sport are the need for durability of speed, strength endurance, and relatively long agility. Futsal sports require excellent physical condition for the players. Excellent physical condition greatly supports the appearance of a player. Each player is required to have excellent individual technical abilities and ability to play strategies that must be good. Physical players are sometimes a problem in the highest competition in the field of sports in Indonesia in general and futsal in particular.

In the futsal game, it requires mastery of complex techniques. According to Tenang (2008: 67) that "futsal games require mature ball mastery skills and techniques". Therefore without adequate mastery of basic techniques the goal of futsal will not be achieved. According to Irawan (2009: 22) that "futsal players must have qualified basic techniques, such as passing (receiving), receiving (receiving), feed the stomach (chipping), herding (dribbling), shooting (shooting) and heading (heading). Travassos et al. (2011: 17) states that futsal is "a soccer game performed in a five-to-five room arranged by FIFA which is played on a field that has a hard surface of 40 x 20 m or an area given a line that has a certain size or commonly called pitch.

Anthrophometry is one of the factors that cannot be separated in sports achievement. M. Sajoto (1995: 11) states, "One aspect in achieving achievement in sports is the biological aspect which includes the structure and posture of the body, namely: (1) the size of the height and length of the leg, (2) the size, width and weight, (3) somatotype (body shape). This means that every sport requires different forms of body. For example, the body shape of a branch of futsal is certainly different from the body shape in gymnastics, athletics, swimming and so on. To achieve basic technical skills in playing futsal, a futsal player must have an ideal body shape in accordance with the demands of the futsal sport.

Having ideal body proportions plays an important role in supporting the appearance of a futsal player, including mastering the basic techniques of playing futsal. Because to play the basic technique of playing futsal there are dominant anthropometric parts in it. By having ideal body proportions, it will be able to play the basic technique of playing futsal better, effectively and efficiently. For example, a futsal player whose long legs certainly has a different muscle size and range structure than futsal players whose legs are short, so this will have a different influence on mastering the basic techniques of playing futsal.

On the other hand, mastering the basic techniques of playing futsal is inseparable from the support of good physical condition. The physical condition in principle is a capability that is born by every human being. The physical condition in which consists of several types of physical conditions plays an important role in supporting basic technical skills in playing futsal. M. Furqon H. (2002: 32) states, "The component of the physical condition of basic motion consists of speed, strength, endurance, agility, flexibility, reaction time, power, coordination and others".

The physical condition of each person plays an important role in sports activities, including mastering the ability to play futsal. Physical conditions play a role in mastering the ability to play futsal, because in biomotorics there are several components of physical conditions that are very important to master the basic techniques of playing futsal. Based on the problems raised above, it illustrates that basic technical skills in playing futsal can be achieved by a futsal player having to do training from an early age. Exercise must be carried out systematically, continuously and programmed as a step that must be taken to improve the ability to play futsal. On the other hand, basic technical skills in playing futsal can be achieved with the support of several factors. Factors that can support the basic technical skills of playing futsal include anthropometry and physical conditions. Anthropometry and physical conditions can support the ability to play futsal, because when playing futsal there is an anthropometry section and a dominant physical condition in it. But the anthropometry section and what physical conditions are dominant are not known with the basic technical skills of playing futsal. To know this, it is necessary to study and examine more deeply, both theoretically and practically through anthropometry tests and measurements and physical conditions with the ability to play futsal.

Methodology

The study was conducted at the futsal Score Stadium Purwokerto arena and the IAIN Purwokerto Student Center Building in January 2019. The population of this study was 14 female IAIN Purwokerto futsal teams. This type of research is quantitative, using a Confirmatory Factor Analysis design. Factor analysis is used to determine the dominant factors in explaining a problem. Variables that have been collected will be processed and analyzed using the Computerized Statistical Program using the SPSS system (Statistical Product and Service Solutions) Version 22 and using AMOS 20. The data collection techniques used in this study are tests and measurements. Data from the test results and measurements are then processed and calculated using the KMO and Bartlett's Test program.

Result And Discussion

Tabel 1. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,632
Bartlett's Test of Sphericity	Approx. Chi-Square	21,734
	Df	21
	Sig.	0,415

The results obtained by the Kaiser-Meyer-Olkin measure Measure of Sampling Adequacy abbreviated as KMO-MSA and Bartlett's Test of Sphericity. The results of the KMO-MSA test on the 7 tested variables obtained a value of 0.632> 0.5 while the Bartlett's Test of Sphericity number showed an Approximate Chi-Square number of 21,734 with a Degree of Freedom (df) 21 and a significance of 0.415. The magnitude of the correlation between the measured independent variables has a value between 0 and 1, to state that the strong relationship between KMO-MSA numbers must be above 0.5. This shows that the collection of variables in this study is significant and can be further processed.

Table 2. Anti-image Matrices

		BMI	TB leg ratio	Agility	Foot Coordination	Strength of the Abdominal Muscles	Power Of Leg Muscles	Speed
Anti-image Covariance	BMI	.465	.005	-.114	.208	.196	-.079	-.107
	TB leg ratio	.005	.759	.137	-.130	.049	.145	.173
	Agility	-.114	.137	.647	-.201	.159	.150	.057
	Foot Coordination	.208	-.130	-.201	.610	.146	-.066	.084
	Strength of the Abdominal Muscles	.196	.049	.159	.146	.495	.051	.137
	Power of Leg Muscles	-.079	.145	.150	-.066	.051	.647	.264
	Speed	-.107	.173	.057	.084	.137	.264	.401
Anti-image Correlation	BMI	.693a	.008	-.207	.392	.408	-.144	-.249
	TB leg ratio	.008	.639a	.196	-.191	.080	.207	.314
	Agility	-.207	.196	.606a	-.320	.281	.232	.112
	Foot Coordination	.392	-.191	-.320	.524a	.267	-.105	.169
	Strength of the Abdominal Muscles	.408	.080	.281	.267	.665a	.089	.307
	Power of Leg Muscles	-.144	.207	.232	-.105	.089	.523a	.519
	Speed	-.249	.314	.112	.169	.307	.519	.673a

Measures of Sampling Adequacy(MSA)

Then the data is processed by looking at the magnitude of the partial correlation between the two variables by assuming that other variables must be small. This detection is done by looking at the anti image correlation that produces the value of Measure of Sampling Adequacy (MSA) between 0 and 1. If the MSA = 1 variable can be predicted without errors by other variables, if the MSA> 0.5 variables can still be predicted and can be analyzed further and if the MSA <0.5 variable cannot be predicted and cannot be analyzed further or excluded from other variables. In the anti image matrices tab, the value of MSA> 0.50, then all independent variables can be analyzed further.

Table 3. Communalities

	Initial	Extraction
BMI	1.000	.638
TB leg ratio	1.000	.350
Agility	1.000	.701
Foot Coordination	1.000	.780
Strength of the Abdominal Muscles	1.000	.720
Power of Leg Muscles	1.000	.292
Speed	1.000	.750

Extraction Method: Principal Component Analysis.

The results of comunalties for IMT variables are 0.638, which means that 63.8% of the variants of this variable can be explained by the factors formed in the rotated component matrix, and so on with other variables. Variable TB leg ratio (ratio of leg length and height) number 0.350 means 35%. The variable agility is 0.701, which means 70.1%. The ankle coordination variable is 0.780 which means 78%. The variable of abdominal muscle strength is 0.720 which means 72%. Leg muscle power variable is 0.292 which means 29.2%. Variable speed is 0.750 which means 75%. This percentage describes the percentage of the variants of the variables can be explained by the factors formed in the rotated component matrix.

Table 4. Rotated Component Matrixa

	Component	
	1	2
Speed	-.795	.342
Foot Coordination	.787	.401
BMI	-.650	.465
TB leg ratio	.587	-.067
Power of Leg Muscles	.482	-.244
Agility	-.012	.837
Strength of the Abdominal Muscles	.285	-.799

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 3 iterations.

Table 5. Main Factors of Reduction Results at SPSS Analysis

Factor 1		Factor 2	
Coordination of ankles	0.787	Speed	0.342
Ratio of leg length and height	0.587	BMI	0.465
Power of leg muscles	0.482	Agility	0.837
Strength of the abdominal muscles	0.285		

Conclusion

Based on the research that has been taken, this study concludes that physical factors in futsal athletes with anthropometric factor analysis and physical condition factors, namely from 7 existing variables were processed and analyzed by confirmatory factor analysis to determine factors for futsal athletes.

1. The anthropometric factor which is dominantly influential in determining the performance of futsal athletes is the ratio of leg length and height.

2. Factors of physical condition that are dominantly influential in determining the achievements of futsal athletes are agility.

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