**ANTROPOMETRY AND PHYSICAL FITNESS FACTORS DETERMINANT DRIBBLING AND PASSING FUTSAL ABILITY OF STUDENT EXTRACURRICULAR AGED 12-15 YEARS**

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Abstract

**Objectives**

the objectives of this study was to determining the anthropometic and physical fitness factors of determinant dribbling and passing futsal ability students extracurricular age 12-15 years.

**Methods**

The population of this study was all extracurricular futsal players who are in Surakarta. Sample of 80 students. Obtained by simple random sampling technique. Technique of collecting data using test and measurement .This research uses a quantitative approach with exploratory factor analysis (EFA) design aided with the computer program of Software SPSS Version 17 for Windows.

**Results**

The results showed that there were 3 factors that affect the ability of dribbling and passing futsal in students aged 12-15 years. These factors were (1) first factor representing leg length, foot length, balance, flexibility, (2) second factor representing dribbling-passing and endurance capability, (3) Third factor representing agility, speed, and coordination.

**Conclusions**

The conclusions in the study of anthropometric factors and the dominant physical fitness of dribbling and futsal were the first factors, these factors consist of variable limb length, foot length, flexibility, balance. The second factor, this factor consists of dribble and passing variables and endurance . The third factor, this factor consists of variables are variables agility, speed, coordination

**Keywords :** Anthropometry, Physical Fitness, Dribbling and Passing, Exploratory Analysis, Futsal

INTRODUCTION

Sports achievements alone in Indonesia according to the Law of SKN number 3 of 2015 is a sport that foster and develop sportsmen in a planned, tiered and sustainable through the competition to achieve achievement with the support of knowledge and technology sport. Futsal sports entered Indonesia around the year 1998-1999. Sport started getting familiar in the community but has not progressed like football. The history of Indonesia itself was officially recorded in 2002, when Indonesia was in good faith by AFC (Asian Football Confederation) to organize the final round of Asian futsal championship in Jakarta. Seeing what Indonesia achieved, within a period of less than 4 years the State of Indonesia is able to host the holding of inter-state futsal, it is a pride and achievement for Indonesia. In the Southeast Asian region alone, Indonesia ranks third, the urur is still under Thailand and Vietnam. As for the world scene, Indonesia itself is ranked 45 out of 114. It makes homework for futsal sport in the country, a job that is not easy as it reverses the palm of the hand. Need long-term in preparing a team to get to the world stage. An achievement that Indonesian society dreams of futsal sport. The futsal game requires the dominant basic techniques during the game, one element with the other not biased to each other, but during execution in the game, will show the percentage of which basic technique is often done. That is dribble and passing. From the results of observations on the ability to play futsal at the age of 12-15 it is known that the ability to dribbling and passing is still low. found that 30 students who follow futsal coaching, only 13 students who master the technique dribbling and passing correctly while 17 other students are still in the category of moderate and less. This means for ages 12-15 years, students who master dribbling and passing of 43.4%.

 According to M. Sajoto (1995: 11) that "one aspect of achievement in sport is the biological aspect that includes structure and posture. anthropometric characteristics can be determinative in enhancing or determining performance and ability level (reilly al., 2000). Manfried Scholich (1986) says that physical fitness as a whole is the basis of preparedness to compete. History of science development shows a direct relationship between the increased status of a science with the level of development of measurements in the field of science. (Arma and Muslim.1978: 1). With the advancement of science and technology, indicating that a measurement of humans and sport is necessary, it is as written by Arma and Muslim (1978: 19) that testing is important in sports.

The anthropometric factors and physical fitness are factors that the trainers need to know in terms of providing training programs to the students noting the anthropometric factors and physical fitness requirements of the extracurricular futsal age of 12-15 make the background in this study. Therefore the authors will conduct research about Antropometry And Physical Fitness Factors Determinant Dribbling And Passing Futsal Ability Of Student Extracurricular Aged 12-15 Years.

**METHOD**

 The approach taken in this research is quantitative research method using Exploratory Factor Analysis design. One multivariate is used in sports to measure the dominant variables of anthropometry and physical fitness in dribbling and passing abilities in futsal where 9 variables have been collected will be processed and analyzed using computerized statistics program with SPSS system (Statistical Product and Service Solution ) version 22. Multivariate statistics require many mathematical calculations that are not possible to do manually.

The sample in this research is 80 students of Extracurricular Faculty of Junior High School in Surakarta, Variable in this research is length of leg, foot length, endurance, speed, agility, balance, coordination, ability and ability of passing and dribbling. Factor analysis can be regarded as one of the quite complex statistical techniques therefore this analysis is usually done with the help of computer by using software or package of statistic program like SPSS. (Siswandari 2015: 153). Steps in performing factor analysis:

1. Obtain a correlation matrix of all the variables studied, using Kaiser-Meyer\_olkin's statistics of Sampling Adequacy (KMO) to decide whether in general a factor analysis is feasible to use. High KMO values (between 0.5 to 1.0) have an indication that factor analysis is suitable or feasible to use but if the value is below 0.5 then factor analysis is unlikely to be used.

2. Factor extraction, With this extraction it is possible to classify as many P variables or items / items into Q factor factors (where Q <P). Thus it can be said that the extraction of these factors is intended to determine the number of factors (eg Q fruits) required to represent the real variables. The extraction method used is Principle Component (pc).

3. Rotation factor, The extraction of research factors will derive the factor matrix which is the initial model obtained before the rotation.

4. Interpreting computer output, Barlett's test of sphericity, Kaiser-meyer-olkin measure of sampling adequacy (KMO), Eigenvalue, Factor Loading, Communality, Percentage of variance, Residual.

In addition to interpreting the final step factor that needs to be done in the factor analysis is the model accuracy test with residual or residual (error prediction). This reveals the detection of whether the resulting model of factor analysis is appropriate or not.

**RESULTS**

Based on the results of data analysis using the software SPSS 17 for Windows there is influence between factors with dribbling ability and passing futsal on extracurricular age 12-15 years. The result of analysis is 3 factors:

Tabel 1. Number of Factors Generated After Factor Analysis From Total Variance Explained Table In Section Initian Eigenvalue

|  |  |  |
| --- | --- | --- |
| **Total** | **% of Variance** | **Cumulative %** |
| 3.283 | 36.475 | 36.475 |
| 1.320 | 14.662 | 51.137 |
| 1.139 | 12.650 | 63.788 |

Based on the data table 1. about the number of factors generated after factor analysis with SPSS Version 17 for Windows, it can be seen, from 9 variables treated yield 3 factors yng have eigenvalue above 1.0, artiny there are 3 new factors generated from factor analysis. The first factor with eigenvalue of 3.283, the second factor with eigenvalue of 1.320, the third factor with eigenvalue of 1.139.

Tabel 2. Factors Formed after Factor Rotation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Faktor | Variabel | FactorLoading | Eigenvalue | % Of Varians | Cumulative % |
| 1 | x2 | 0.929 | 3.283 | 36.475 | 36.475 |
| x1 | 0.844 |
| x8 | 0.819 |
| x6 | 0.244 |
| 2 | x9 | 0.758 | 1.32 | 14.662 | 51.137 |
| x3 | 0.752 |
| 3 | x5 | 0.357 | 1.139 | 12.65 | 63.788 |
| x4 | 0.661 |
| x7 | 0.609 |

The first factor is the highest and most powerful factor affecting dribbling and passing futsal. This factor has eigenvalue 3.283 and has a value of variance 36.475% means this factor contributes 36.475% to the ability of dribbling and passing futsal. This factor consisted of variable length of leg, foot length, flexibility, balance with factor loading ranged from 0244 until 0.929 mean correlation indicator with new factor is between 0.244 until 0.929. The high correlation lies in the variable length of the leg and the lowest is the balance variable.

The second factor is the second highest factor affecting dribbling and passing futsal. This factor has eigenvalue 1.320 and has a value of 14.662% variance means this factor contributes 14.662% to the ability of dribbling and passing futsal. This factor consists of dribble and passing variables and endurance with loading factors ranging from 0.758 to 0.752 means the correlation of indicators with new factor is between 0.758 to 0.752. The high correlation lies in dribbling and passing variables and the lowest is variable endurance.

The third factor is a third order factor affecting dribbling and passing futsal. This factor has eigenvalue 1.139 and has a value of 12.650% variance means this factor contributes 12.650% to the ability of dribbling and passing futsal. This factor consists of variable agility, speed, coordination with loading factor ranging from 0.357 to 0.609 means the correlation of indicators with new factor is between 0.357 to 0.609. The high correlation lies in the variable speed and the lowest is the agility variable.

**DISCUSSION**

Instead, accurate kickers contained significantly greater quantities of relative lean mass and significantly lower quantities of relative fat mass in their kicking leg, which might explain their ability to mediate and control foot velocity production in accordance with heightened limb co-ordination and control; providing accurate kickers with a greater opportunity to strike the ball in the right place, at the right time and in the right direction (Urbin et al., [2011](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4879450/#ref35)). A possible explanation for the findings of this study is that flexibility is significantly affected by the movement autonomy to which the joint is regularly subjected (Erlandson et al., 2008).

 Dribbling and passing , Technique refers to the relationship and harmony a player demonstrates with the ball and describes the performance of a solitary action in isolation from the game, e.g. pass or dribbling (Bate, 1996). Dribbling a ball was chosen in this study as this represents one of the most exciting aspects of the game for spectators, and a great deal of time is devoted in training to its practice (Reilly & Thomas, 1979). assessed the aerobic fitness of indoor soccer players at different competition levels and reported that these players had higher maximum oxygen uptake levels, better running economies and higher ventilator thresholds than athletes who played other team sports at the same level (Alvarez et al. 2009)

conducted a study on twenty young people being trained elite male players aged 16.4 ± 0.9 years, weight 67.2 ± 9.1 kg, and height of 176.3 ± 7.4 cm. All participants were tested for speed and countermovement jump (CMJ). Participants were divided into experimental group (n = 10) and control group (n = 10). In the group, the results indicate that the experimental group had a statistically marked improvement in their performance in the speed and CMJ (2.7 cm) (Tonnessen E., Shalfawi S.A., Haugen T., Enoksen E., 2011,). Based on our results, we can conclude that the futsal and soccer players differ in the intensity exertion during the game, but not in motor activities such as agility. Agility is a veryimportant component of futsal and soccer and it represents a common characteristic. (Milanović, Z. et al.2011) Based on that fact it can be said that the players in this two sports are very similar in agility performance. In soccer, speed plays an important role; the accelerated pace of the game calls for rapid execution of typical movements by every member in a team. In many instances, successful implementation of certain technical or tactical maneuvers by different team members is directly related with the degree of velocity deployed (Kollath & Quade, 1991)

**CONCLUSION**

The conclusion in the study of anthropometry factor and the dominant physical fitness in dribbling and futsal is the first factor. This factor consists of variable limb length, foot length, flexibility, balance. The high correlation lies in the limb length variable and the lowest is the equilibrium variable. The second factor, this factor consists of Dribble and passing variables and endurance. The high correlation lies in dribbling and passing variables and the lowest is variable endurance. The third factor, this factor consists of variables are variables agility, speed, coordination The high correlation lies in the variable speed and the lowest is the agility variable.

**SUGGESTION**

 Based on the results of research on the analysis of factors, it can be submitted some suggestions as follows: For coaches should understand the various factors that influence and support futsal playing skills especially dribbling and passing futsal skills. In addition to factors, trainers also understand variables other than anthropometry and physical fitness to make it easier to train and improve dribbling and passing skills. The trainer needs to develop a careful plan of practice with a sequence of logical exercises before the technique dribbling and passing skills is actually taught to the futsal athlete. To colleagues to be able to do further research on research instruments in futsal game.

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**REFERENCES**

Arma Abdulllah dan muslim. 1978. Pengukuran Tes Dalam Keolahragaan.Yogyakarta: Yayasan FKIK-IKIP.

Bate, D. (1996). Soccer skills practice. In T. Reilly (Ed.), Science and Soccer (p. 228). London: E & FN Spon.

Bruce Cogill 2003.*Anthropometric Indicators Measurement Guide*,March .

California Department Of Health Care Services, Systems Of Care DivisionChild Health And Disability Prevention Program, Health Assessment GuidelinesMarch 2016.

Eugene F. Provenzo, Jr.. 2009. [*Encyclopedia of the Social and Cultural Foundations of Education*](http://e-resources.perpusnas.go.id:2109/ps/eToc.do?contentModuleId=GVRL&resultClickType=AboutThisPublication&searchType=BasicSearchForm&docId=GALE%7C2FMD&userGroupName=idpnri&inPS=true&rcDocId=GALE%7CCX3074500030&prodId=GVRL)*.* Thousand Oaks, CA: SAGE Publications,. Vol. 1 p36-38.

Guyton, Hall. (2008), *Buku Ajar Fisiologi Kedokteran*, Jakarta: EGC.

Hairy Junusul.1989. *Fisiologi Olahraga Jilid 1*. Jakarta. Proyek Pengembangan Lembaga Pendidikan Tenaga Kependidikan

Handoyo, A . 2012. *Bermain Futsal*, Jakarta, Nobel Edumedia.

Herman, V and Engler, R. 2011. *Futsal ”Technique – Tactics – Training*”: UK, B.O.S.S Druck und Medien GmbH.

Imam Ghozali 2014. *Model Persamaan Struktural Konsep Dan Aplikasi Dengan Program AMOS 22.0*, Semarang: Badan Penerbit Universitas Diponegoro.

International Standards For Anthropometric Assessment Published By The The International Society For The Advancement Of Kinanthropometry. First Printed In 2001.

Johnson, BL. & Nelson, JK., 1986. *Practical Measurement for Evaluation in Physical Education*, New York: Macmillan Publising Company.

Justinus Laksana. 2012, *Taktik dan Strategi Futsal Modern*, Depok: Be Champion.

K. Lee Lerner and Brenda Wilmoth Lerner. 2008. [*The Gale Encyclopedia of Science*](http://e-resources.perpusnas.go.id:2109/ps/eToc.do?contentModuleId=GVRL&resultClickType=AboutThisPublication&searchType=&docId=GALE%7C1RHW&userGroupName=idpnri&inPS=true&rcDocId=GALE%7CCX2830100139&prodId=GVRL)*.*. Detroit: Gale,. Vol. 1. 4th ed .p243-244.

Karen Christensen and David Levinson. 2005. [*Berkshire Encyclopedia of World Sport*](http://e-resources.perpusnas.go.id:2109/ps/eToc.do?contentModuleId=GVRL&resultClickType=AboutThisPublication&searchType=BasicSearchForm&docId=GALE%7C5BCM&userGroupName=idpnri&inPS=true&rcDocId=GALE%7CCX3455200190&prodId=GVRL)*.*. Great Barrington, MA: Berkshire Publishing,. Vol. 2.p702-713.

Kolath, E., & Quade, K. (1993). Measurement of sprinting speed of professional and amateur soccer players. In T. Reilly, J. Clarrys, & A. Stibbe (Eds.), Science and football II (pp. 1-36). London: E & FN Spon

Lhaksana, J dan Pardosi, I, H .2008. *Inspirasi dan Spirit Futsal*, Depok, Raih Asa Sukses.

M. Asriady Mulyono. 2014, *Buku Pintar Panduan Futsal*, Jakarta, Laskar Aksara.

M. Sajoto. 1995. Peningkatan Dan Pembinaan Kekuatan Kondisi Fisik Dalam Olahraga, Semarang: Dahar Prize.

McGinnis, Peter Merton, 1954. *Biomechanics of sport and exercise*. United States: Human Kinetics

Michailidis Y., Fatouros I.G., Primpa E., Michailidis C., Avloniti A., Chatzinikolaou A., Barbero- Álvarez J.C., Tsoukas D., Douroudos I.I., Draganidis D., Leontsini D., Margonis K., Berberidou F., Kambas A. (2013), *Plyometrics' trainability in preadolescent soccer athlete,* J. Strength Cond Res. 2013 Jan; 27(1): 38-49. doi: 10.1519/JSC.0b013e3182541ec6, Source: Department of Physical Education and Sport Sciences, Democritus University of Thrace, Komotini, Greece, [http://www.ncbi.nlm.nih.gov/pubmed/22450 257](http://www.ncbi.nlm.nih.gov/pubmed/22450%20257)

Miller KS (2012). *The Effects on Soccer Dribbling Skills When Training With Two Different Sized Soccer Balls*. Unpublished Master Thesis. Health, Sport, and Exercise Sciences and the Graduate Faculty of the University of Kansas, U.S.A.

Murhananto . 2008. *Dasar-Dasar Permainan Futsal*, Jakarta, Kawah Media.

National Health And Nutrition Examination Survey Iii Body Measurements (Anthropometry), 1988. Westat, Inc.1650 Research Boulevardrockville, Md 20850,(301) 251-1500,October.

Neil J. Salkind. 2002 [*Child Development*](file:///D%3A%5CDATA%20NIZAM%5CDATA%20KULIAH%20S2%5CTHESIS%20UNS%5CJUDUL%20NIZAM%5Cjurnal%20physical%20fitness%5CeToc.do?contentModuleId=GVRL&resultClickType=AboutThisPublication&searchType=BasicSearchForm&docId=GALE%7C0PHQ&userGroupName=idpnri&inPS=true&rcDocId=GALE%7CCX3401000111&prodId=GVRL)*.* New York: Macmillan Reference USA,. p141-143.

\_\_\_\_\_\_\_\_\_\_\_\_\_2006. [*Encyclopedia of Human Development*](http://e-resources.perpusnas.go.id:2109/ps/eToc.do?contentModuleId=GVRL&resultClickType=AboutThisPublication&searchType=BasicSearchForm&docId=GALE%7C5CKF&userGroupName=idpnri&inPS=true&rcDocId=GALE%7CCX3466300024&prodId=GVRL)*.* Thousand Oaks, CA: SAGE Reference,. Vol. 1. p28-35.

\_\_\_\_\_\_\_\_\_\_\_\_2007. [*Encyclopedia of Measurement and Statistics*](file:///D%3A%5CDATA%20NIZAM%5CDATA%20KULIAH%20S2%5CTHESIS%20UNS%5CJUDUL%20NIZAM%5Cjurnal%20anthropometry%5CeToc.do?contentModuleId=GVRL&resultClickType=AboutThisPublication&searchType=BasicSearchForm&docId=GALE%7C0711&userGroupName=idpnri&inPS=true&rcDocId=GALE%7CCX3470700031&prodId=GVRL). Thousand Oaks, CA: SAGE Reference, Vol. 1 p35-38.

Riyanto, Agus. 2009. *Pengolahan Data Dan Analisis Data Kesehatan*. Yogyakarta: Nuha Medika.

Reilly, T., & Thomas, V. (1979). Estimated daily energy expenditures of professional association footballers. Ergonomics, 22, 541-548.

Scholich Manfred. 1986. *Circuit Training (edisi 1).* German Democratic Republic: Grafischer Grossbetrich Volkerfreundscchaft.

Said Junaidi. 2011.*Olahraga Usia Dini (Pembinaan olahraga usia dini)*, Fakultas Ilmu Keolahragaan, Unnes.

Sudarminto. 1997. *Biomekanika Olahraga 1,* Fakultas Keguruan dan Ilmu Pendidikan, Surakarta: Universitas Sebelas Maret.

Siswandari. 2015. *Statistika Computer Based.* Surakarta: UNS Press.

Suparman, dkk. 1984, *Kesehatan, dan Kesegaran Jasmani dan PPPK*, FKIP, UNS.

Suharsimi Arikunto.2010, *Prosedur Suatu Pendekatan Praktik* , Jakarta: Rineka Cipta.

Teori Kepelatihan Dasar ( Materi Untuk Kepelatihan Tingkat dasar), 2007,Lembaga Akreditas Nasional Keolahragaan.

Tonnessen E., Shalfawi S.A., Haugen T., Enoksen E. 2011, The effect of 40-m repeated sprint training on maximum sprinting speed, repeated sprint speed endurance, vertical jump, and aerobic capacity in young elite male soccer players., Forța Cond Res. 2011 septembrie, 25 (9) :2364-70. Doi: 10.1519/JSC.0b013e3182023a65

Urbin M.A., Stodden D.F., Fischman M.G., Weimar W.H. (2011) Impulse-variability theory: implications for ballistic, multijoint motor skill performance. Journal of Motor Behavior 43(3), 275-283.

White, Gary and Griffiths, David. 2013. *Futsal Coaching Manual*.,http://www. washingtonyouthsoccer. org., 20 Maret 2017.

Wiarto Giri. 2013. Fisiologi dan Olahraga, Yogyakarta, Graha Ilmu.

Widiastuti. 2015, *Tes dan Pengukuran Olahraga*, Jakarta, Rajawali Pers.

William Sims Bainbridge. 2004. [*Berkshire Encyclopedia of Human-Computer Interaction*](file:///D%3A%5CDATA%20NIZAM%5CDATA%20KULIAH%20S2%5CTHESIS%20UNS%5CJUDUL%20NIZAM%5Cjurnal%20anthropometry%5CeToc.do?contentModuleId=GVRL&resultClickType=AboutThisPublication&searchType=BasicSearchForm&docId=GALE%7C5BCI&userGroupName=idpnri&inPS=true&rcDocId=GALE%7CCX3455100021&prodId=GVRL)*.*. Great Barrington, MA: Berkshire Publishing,. Vol. 1. p26-31.