The Validity and Reliability of Arrowhead Agility Test in Football

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Abstract: The present study investigates the validity and reliability of Arrowhead Agility Test for football players. Agility is one of critical aspects for athletes, especially football players. The purpose of this descriptive study was to discover how valid and reliable the Arrowhead Agility Test was. The samples were 20 members of UKM Sepakbola UPI Bandung (UPI Student Club for Football) chosen purposively. The results revealed the Arrowhead Agility Test had very high validity (r = 0.981) and very high reliability (r = 0.995). It can be concluded that the Arrowhead Agility Test can be used as a benchmark for agility tests because it has very high validity and reliability and can be used by sports coaches to evaluate the training process.

1 INTRODUCTION

Football is a favorite sport for all circles in the world, including in Indonesia, from children, adolescents, adults and the elderly (Bangsbo, 1991). This sport is favored mainly by the men but some women are also fond of this sport. Football is not just a mere hobby at the moment, but it has become an ideal that people want to achieve. We commonly see and hear football into the profession of many people because of the football people earn income in the form of material that is not small, for example in the professional league of athletes earn income through this sport.

To be able to play the ball well, football players must have excellent physical condition. With excellent physical condition the athlete will be able to play well for 2 x 45 minutes in one game. Sometimes a lot of athletes put aside this physical condition, whereas with the fit physical condition the athlete performance will be good in the field.

One of the physical conditions that have an important role in football is agility (Sambamurthy, Bharadwaj, and Grover 2003). According to Wilmore in Harsono (1988, pp. 171) explains that: "....the ability to change direction rapidly while maintaining total body balance and awareness of body position". It means that agility is the ability to change the direction and position of the body quickly and precisely while moving, without losing awareness of the position of his body. Agility is the ability of a person to change position and direction as quickly as possible in accordance with the situation at hand (Little, 2015).

From some of these opinions the authors can conclude that the agility is the ability of a person in changing the direction and position of his body quickly and precisely at the time of moving, in accordance with the situation faced in a certain arena without losing his body balance.

In accordance with the above explanation about the importance of agility for every player in football is one of the supporting factors to improve football achievement itself.

To know the level of agility, we need to process measurement. The measurement process requires a measuring instrument, because with the measuring tool it will get data that can explain the level of one's agility. All data obtained through a correct measurement will be able to explain the status or condition of a measured object.

In the book entitled Tests and Measurements of Sports (2014, p3, 3) Arikunto in Nurhasan and Cholil put forward the notion of the test, namely: "A test is a tool or procedure used to know or measure something in an atmosphere in the specified manner and rules ".

Measurement is the process of collecting data / information from a particular object, in the process of measurement required a measuring instrument. The measuring instrument can be a) test in the form of questions, b) psychomotor test, c) in the form of attitude scale and a standard measuring instrument

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such as meter size, weight, size of temperature degree (Thorndike, 1949).

In measuring agility there are several measuring instruments that can be used as a reference by the trainers in the field with various characteristics and different assessments, but all the measuring tools are used to know the ability of agility. There are other types of agility tests such as: Shuttle Run Test, Zig-Zag Run Test, Illinois Agility Run Test, Arrowhead Agility Test, Balsom Agility Test, etc. All measuring instruments can be applied to each sport because basically to know the physical abilities especially the agility, in general between the game sports and the individual sports have the same assessment process with the assessment procedures in accordance with the measuring instruments used.

And one of the measuring tools for knowing the agility capabilities that trainers can use in the field, according to Bangsbo and Mohr (1994, p.95) is the Arrowhead Agility Test, by this formula:

Arrowhead Agility Test: right + left = result (1)

The researchers reasoned to choose the Arrowhead Agility Test because the measuring instrument is more similar to the condition of football matches during the execution of the test. Arrowhead Agility Test agility test for validity value is still up to the quality of face validity.

Researchers are interested in finding the coefficient of validity and reliability so that Arrowhead Agility Test can be a standard agility tool. This needs to be tested its validity, because a measuring tool can be used if it has a validity and reliability that meets the requirements in accordance with the rules of research. Therefore, this research is emphasized on the validity and reliability test. The results of this test instrument research will get the level of coefficients through the process of calculation and data analysis. The coefficients are numbers (constants) which serve as a reference for empirically stating the low validity and reliability of the measuring instrument. Theoretically, the validity and reliability coefficients ranged from 0 to 1.0 but in reality the validity and reliability coefficients of 1.0 are practically never found (Belafsky, 2001).

Meanwhile, in comparing the validity and reliability test of Arrowhead Agility Test, the researchers use standard measuring instrument to measure agility i.e. Illinois Agility Run Test which has a validity coefficient score of 0.90 and reliability coefficient of 0.94 studied by Alan Amanda (2014, pp. 3). The Illinois Agility Run Test is used to obtain data that is then correlated to find the validity and reliability coefficients of the Arrowhead Agility Test. Validity indicates the ability of an instrument to measure what should be measured. This Arrowhead Agility Test Measurement tool needs to be examined about the degree or coefficient of validity and reliability resulting from the statistical calculation data. A measuring instrument can be said to have a high validity if the instrument performs its size function, or gives a result that matches the resulting data relevant to the purpose of the measurement. A measuring instrument can also be said reliable if the tool always shows the same result in measuring a symptom at different times (consistent). Reliability is also a requirement for test validity. A test that is not reliable by itself will not be valid because it will always produce different data, so the measuring instrument is not suitable to use on something to be measured.

Related to the description of these problems, it can be formulated the research problem as follows: Does the Arrowhead Agility Test measurement has a high validity and reliability score?

2 METHOD

This study used descriptive method, which was carried out for three days (Stone, 2008). The design of this study is the initial test and test-retest. The population in this study is the athlete of UPI Football Club, which amounts to 45 athletes. The sample in this study was taken using purposive sampling technique, where the researcher took 20 athletes of UPI Football Club with certain consideration. The instrument of this study is the Arrowhead Agility Test, as shown below:

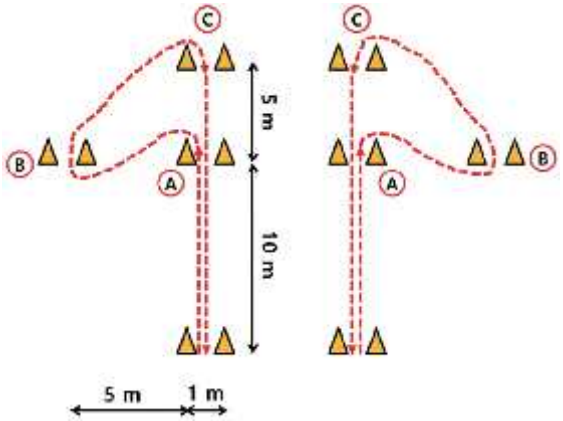

Figure 1: Arrowhead agility test.
(Source: Bangsbo dan Mohr)

Arrowhead Agility Test is a measuring tool which is used to determine the level of one's agility with an arrow bow test form.

2.1 The Ability Test of Agility by Arrowhead Agility Test

2.1.1 Purpose

To evaluate the speed, body control, and changing direction ability of different angles and directions.

2.1.2 Tools / Facilities Needed

- Stationeries
- Stopwatch
- Cones
- Measuring tape
- Whistle
- Assessment format

2.1.3 Test

- The length of the test area is 15 M and the width is 5 M.
- The testi stands behind the start line that has been arranged by the cones by using training clothes and sneakers (running).
- In a countdown of three (three, two, one, "run") testies run as fast as possible from the starting line to cones A, then move towards the right to cones B, continued to cones C and hold back to the finish line, and vice versa.
- Testi completes two paths, one to the right and one to the left with recovery for 5 minutes.
- If the testi violates the rules by running off track, then the test is considered a failure.

2.1.4 Scoring

The best time was taken among three times of trials. Time units used are seconds with two decimals behind the comma.

3 RESULTS AND DISCUSSION

The data obtained from the test results are still in the form of raw data, so it must be processed and analyzed statistically. The data contained in this research is processed and analyzed using significance test of correlation coefficient (r). The result of descriptive statistics of this research data can be seen in table 1, result of normality test using liliefors normality test because the samples in this research are less than 30, and it can be seen in table 2, test result of validity Arrowhead Agility Test in table 3, result reliability test in table 4, and the result of significance test of correlation coefficient (r) in table 5 below:

Table 1: Descriptive statistics result of arrowhead agility test and Illinois agility run test.

	N	Minimum	Maximum	Mean	Standard Deviation
Arrowhead Agility Test Awal	20	18,16	16,10	17,13	0,53
Arrowhead Agility Test (Test-Retest)	20	18,07	16,02	17,04	0,50
Illinois Agility Run Test	20	18,03	16,72	17,40	0,34

Table 2: Normality test *liliefors.*

Instrument	L_0	L_a	Conclusion
Arrowhead Agility Test	0,0858	0,190	Normal
Illinois Agility Run Test	0,1148	0,190	Normal

Table 3: Validity test result.

Instrument	Result	Criteria
Arrowhead Agility Test dan *Illinois Agility Run Test*	0,981	Very High

Table 4: Reliability test result.

Instrument	Result	Criteria
Arrowhead Agility Pre-Test and *Arrowhead Agility Test-retest*	0,995	Very High

Table 5: Significance test results of correlation coefficient (r).

r	N	t_0	t_t	Conclusion
0,981	20	21,434	2,086	Significant

Based on table 5 above, the calculation of Significance Test of Correlation Coefficient is using t test. From these results obtained that T_count: 21.434 and T_table: 2.086 with a real level: 0.05 and

dk: 18, therefore, T_count (21,434)> T_table (2.086), so Ho is rejected. In conclusion there is a significant relationship between the Arrowhead Agility Test and the Illinois Agility Run Test.

4 CONCLUSIONS

Based on the results of research and calculation and analysis of research data on the level of validity and reliability of agility test by Arrowhead Agility Test is as follows:

- Level or degree of validity of agility test of Arrowhead Agility Test is 0.981 and it is included into the very high criteria.
- Level or degree of reliability test of Arrowhead Agility Test is 0.995 and it is included into the very high criteria.

REFERENCES

Bangsbo, J., Nørregaard, L., Thorsoe, F., 1991. Activity profile of competition soccer. *Canadian journal of sport sciences= Journal canadien des sciences du sport*, 16(2), pp.110-116.

Bangsbo, J., Mohr, M. (1994). Fitness testing in football: AFC.

Belafsky, P. C., Postma, G. N., Koufman, J. A., 2001. The validity and reliability of the reflux finding score (RFS). *The laryngoscope*, 111(8), pp.1313-1317.

Csikszentmihalyi, M., Larson, R., 2014. Validity and reliability of the experience-sampling method. *In Flow and the foundations of positive psychology* (pp. 35-54). Springer Netherlands.

Di Mascio, M., Ade, J., Bradley, P. S. 2015. 'The reliability, validity and sensitivity of a novel soccer-specific reactive repeated-sprint test (RRST)', *European Journal of Applied Physiology*, 115(12), pp. 2531–2542.

Little, T., Williams, A. G., 2005. Specificity of acceleration, maximum speed, and agility in professional soccer players. *The Journal of Strength and Conditioning Research*, 19(1), pp.76-78.

Nurhasan., Cholil, H. D. 2014. *Tes dan Pengukuran Keolahragaan*. Bandung: FPOK UPI.

Santosa, H. Y. S., Sidik, Z. D. 2012. *Ilmu Faal Olahraga*. Bandung: PT. Remaja Rosda Karya. UPI.

Sambamurthy, Bharadwaj, Grover. 2003. "Shaping Agility through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms." *MIS Quarterly* 27 (2):237.

Stone, H., Sidel, J., Oliver, S., Woolsey, A., Singleton, R.C., 2008. Sensory evaluation by quantitative descriptive analysis. *Descriptive Sensory Analysis in Practice*, pp.23-34.

Thorndike, R. L., 1949. Personnel selection; test and measurement techniques.