The Effectiveness of Instruments and Norms of Physical Ability Tests for Athletes Aged 13-18 Years in East Nusa Tenggara Province

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Article Info

Abstract

The purpose of this study was to determine the effectiveness of the instrument and the norms for testing the physical ability of athletes aged 13-18 years. This type of research is descriptive research with survey techniques using the test method. The population in this study were Student Education and Training Center athletes in East Nusa Tenggara Province, totaling 69 athletes consisting of 41 boys and 28 girls. The sampling technique used in this study is nonprobability sampling of 69 athletes. The instruments used in this study were the 400 meter running test, sit and reach test, power hop test and multistage fitness test. The data obtained in this study were processed using t-test statistics with a significance level (α) = 5%. The results of research based on research and tests that have been carried out have a significant effect. Judging from the results of calculating the correlation coefficient of the influence and contribution of the old and new norms, namely: for male athletes, the value of R = correlation coefficient is equal to 0.720, while the magnitude of the contribution of the new norm to the old norm is shown by the R Square value of 0.518, which is 51.8%. Whereas for female athletes, the results obtained are R = correlation coefficient of 0.921, which means that the influence is large, while the contribution of the new norm to the old norm is shown by the R Square value of 0.849, which is 84.9%. So it can be concluded that there is an effectiveness of the instruments and norms for testing the physical ability of athletes aged 13-18 years in East Nusa Tenggara Province.

INTRODUCTION

Physical condition is the main factor that must be had by an athlete even though it does not leave out other aspects such as techniques, tactics and mental aspects (Kuswardini, 2012). One of the important elements or factors to achieve an achievement in sports, in addition to mastery of techniques, tactics and Mental ability is a physical condition (Musrifin & Bausad, 2020). Physical ability includes two components, namely the physical fitness component and the motor fitness component. Physical fitness consists of muscle strength, flexibility, endurance, and cardiovascular - respiratory endurance. Physical fitness is important because with relatively good physical fitness, a person will also have good health (Rohmah & Muhammad, 2021)

Physical fitness is a very important component of human activity (Muzakki & Saputra, 2020). All components of physical fitness, if measured, require norms and benchmarks to be used as guidelines in determining the level at which a person has physical fitness, and it is necessary to develop test norms and physical measurements. A fit person means dynamically healthy (Indah et al., 2021). Physical conditioning requires exercise with serious attention planned with Be careful and systematic to level better fitness and organ function (Rahmalia & Lengkana, 2022).

Given the guidelines so far using test and measurement books, as well as criteria norms with reference to standards referred to research results abroad, while in terms of anthropometry, physical abilities, regional topography, nutritional intake, the lifestyle of Indonesian children is different when compared with other nations abroad. Tests and measurements are an integral part of various human activities, as well as sports

training activities (eldawaty, sefri hardiansyah, 2018).

The guidelines for testing norms and measuring physical abilities in the country also use standard benchmarks for national elite athletes or Pelatnas athletes who are nationally centered and who have participated in the Olympiad, ASEN Games, SEA Games, and these norms are recommended for use in regional athletes. The more thorough the information obtained (through tests and measurements) the better the decisions made (Sepriadi & Hardiansyah, 2019). This is not in accordance with regional characteristics, anthropometry, nutritional intake of students in East Nusa Tenggara. Contextual test and measurement standard norms need to be developed to suit regional characteristics. So it is necessary to develop test and measurement norms for children aged 13-18, especially athletes at the Regional Student Education and Training Center in East Nusa Tenggara Province based on anthropometry, nutritional intake, climate, lifestyle and daily habits that they live.

Norm-referenced assessment assumes that students' abilities are different and can be described according to a normal distribution (Sahri, 2018). There are several researchers who have succeeded in developing contextual instruments to support athlete sports performance. For example, which has succeeded in developing physical ability standards, right-left grip strength, back muscle strength, arm muscle strength, agility, speed, flexibility and endurance, has not measured the overall physical abilities of pencak silat (Heldawati et al., 2022). Compiled norms in basketball including agility, endurance, leg power (vertical jump), arm power (push ups), and flexibility (sit and reach), measurement of muscle endurance with core strength and stability test (Setyawan

& Sugiyanto, 2016). In addition succeeded in compiling physical ability norms with 8 test items, including leg strength (wall sit test), agility (side step) (Saputro & Siswantoyo, 2018). Based on the results of previous studies, no researchers have looked at the Effectiveness of the Instruments and Norms of Physical Ability Tests for Athletes Age 13-18 in East Nusa Tenggara Province, so this research is the only study that has developed a physical ability test that includes 18 broader test items. in measuring the physical ability of athletes from several sports.

METHODS

This research was conducted in two stages, the first stage was planned as a stage of approach and problem identification at the research location. This stage was carried out with the aim of knowing the effectiveness of the instrument and the norms for testing the physical ability of athletes aged 13-18 years in the province of East Nusa Tenggara. Then the second stage, stage two, is data collection which is carried out by referring to the steps and techniques of data collection. The study was conducted on athletes aged 13-18 years in East Nusa Tenggara Province. The sample selection criteria were PPLP athletes aged 13-18 years in sports in East Nusa Tenggara PPLP. This research is only looking for the effectiveness of the instrument and the norms for testing the physical ability of athletes aged 13-18 years in the province of East Nusa Tenggara. The research conducted was included in the type of descriptive research with survey techniques using the test method, using a test in the form of a running instrument.

Data collection techniques used in this study are as follows:
1. Test Method, at this stage the researcher gives tests to athletes aged 13-18 years to find out the effectiveness of the instrument and the norms of physical ability tests. Each test item starts from measuring height and weight, after that looking for Body Mass Index (BMI), measuring lower leg length, 20 meter sprint running, Shuttle run, Split right, left and middle legs, standing broad jump, push up during 1 minute, sit ups for 2 minutes, Power hop right and left leg, sit and reach, 300 meter run, Bleep test and Balke, as well as additional tests for athletics, 50 m run, 100 m run, 400 m run, and 10,000 run meters. The ideal body composition between height and weight is one of the things that affects athlete achievement ((Adi Putra Susilo & Wiriawan, 2021).
2. Documentation, at this stage documentation in the form of photos and supporting documents when the sample is carrying out the research.

The statistical test used to measure the effectiveness of the instrument and the norms of the physical ability test through testing the mean difference is calculated using the t-test formula as follows (Sudjana, 2016) and also quantitatively using the Pearson Correlation calculation which is used to test the validity and reliability of the instrument using software assistance. Statistical Package for the Social Sciences (SPSS) 25.

Participants

The test participants in this research activity were the regional Student Education and Training Center athletes in East Nusa Tenggara province, totaling 69 people. With details of 41 sons and 28 daughters. The regional Student Education and Training Center athletes in the province of East Nusa Tenggara have regional characteristics, anthropometry, nutritional intake, climate, lifestyle, daily

habits and different psychological characteristics. Psychological characteristics consist of motivation, self-confidence, anxiety control, mentally preparation, the importance of the team, and concentration (Nopiyanto et al., 2019). The participants in this study had ages ranging from 13-18 years, especially athletes who entered the regional Student Education and Training Center in East Nusa Tenggara Province.

Sampling Procedures

The sample is part based on the number and characteristics possessed by the population (Ramadhan et al., 2021). The meaning of this definition is that the part of the population to be examined represents the population and if the population is less than 100 then all of the samples are taken, but if the research population is more than 100 then the sample taken is 10% - 15% or 20% - 25% or more. According to Suharsimi Arikunto (in Septiksari, 2019) if the subject is less than 100 people, it is better to take all of them so that this research is a population study. Sampling techniques can basically be grouped into two, namely probability sampling and non-probability sampling. The sampling technique used in this study is non probability sampling. According to (Sugiyono, 2019), non-probability sampling is a sampling technique that does not provide equal opportunities or opportunities for each element or member of the population to be selected as a sample. Non-probability sampling consists of systematic, quota, incidental, saturated, purposive and snowball sampling. In this study, researchers used saturated sampling, according to (Sugiono, 2016) saturated sampling is a sample which, when added in number, will not increase representation so it will not affect the value of the information that has been obtained. In this study the researchers

distributed questionnaires to athletes Student Education and Training Center from Provice East Nusa Tenggara which totaled 69 people.

Materials and Apparatus

In this study, the tools and materials used are as follows:
1. Stationery
2. Meter
3. Scales
4. Cones
5. Duct Tape
6. Chalk powder
7. Stopwatch
8. Test form
9. Field or floor that is flat and clean
10. Mattress
11. Start flag
12. Whistle
13. Laptops
14. Loudspeakers
15. Jumping Board

Procedures

This study examines the effectiveness of test instruments and test norms for athletes at the East Nusa Tenggara Province Student Education and Training Center aged 13-18 years. Athletes have different specifications for sports, including: athletics, sports, pencak silat, boxing, wushu, degree fighting, kempo and karate. of male and female athletes. Accuracy of instrument selection is an important part of research, it is related to drawing conclusions from research (Winarno, 2016). Instruments or data collection tools are tools used to collect data in a study (Supriyadi, 2023). It is known that the condition of the athletes is concentrated in a hostel provided by the East Nusa Tenggara Provincial government. Before carrying out the research, the research team conveyed the implementation procedures to be carried out by the athletes. The participation of the research team was as a tester,

measuring, recording and analyzing the results obtained. The activities carried out by the athletes are following each test item, which starts with measuring height and weight, then looking for Body Mass Index (BMI), then measuring lower leg length, 20 meter sprint, Shuttle run, Split. right leg, left leg split and mid leg split, standing broad jump, push up for 1 minute, sit up for 2 minutes, right leg power hop and left leg power hop, sit and reach, 300 meter run, Bleep test and Balke, as well as additional tests for athletics, running 50 meters, 100 meters, 400 meters and running 10,000 meters.

Design or Data Analysis

To obtain a test for the effectiveness of the use of benchmark norms for testing the physical abilities of male and female athletes, the researchers used a validity test with a correlational test. Furthermore, testing the differences in the norms of physical test measurements, athletes must first test normality and homogeneity. After the data is normal, the next step is to test the homogeneity of the data using the SPSS 25 statistical application program. After the homogeneity test is carried out using the SPSS statistical application program, homogeneous data are obtained. Then the hypothesis which states that the data obtained from a homogeneous sample. Linearity test between the two norms, both old and new norms. The ANOVA test was carried out using the SPSS 25 program.

RESULT

The data obtained from research using ANOVA analysis are as follows:

Table 1. Old and New Male Athlete Measurement Norms Data

Number	Total Score	
	Old Norms	New Norms
1.	45	45
2.	49	49
3.	56	48
4.	46	46
5.	40	45
6.	46	46
7.	40	44
8.	42	42
9.	50	50
10.	44	44
11.	41	41
12.	35	36
13.	46	46
14.	50	39
15.	46	49
16.	52	52
17.	46	49
18.	44	44
19.	47	53
20.	45	51
21.	43	53
22.	42	45
23.	52	43
24.	42	42
25.	36	36
26.	43	43
27.	45	45
28.	43	43
29.	44	46
30.	45	47
31.	33	36
32.	48	51
33.	48	48
34.	53	53
35.	49	48
36.	39	39
37.	53	53
38.	50	52
39.	43	56
40.	28	31
41.	42	46

It can be seen from the data on the use of old and new norms that there is little difference between one another, sometimes the use of old norms is higher than new norms or vice versa. To obtain a test of the effectiveness of the use of benchmarks for athletes' physical ability tests, the researcher used a validity test with a correlational test.

Table 2. Correlational Test of Old Norms and New Norms for Male Athletes

		beginning	end
Beginning	Pearson Correlation	1	.720**
	Sig. (2-tailed)		.000
	N	41	41
End	Pearson Correlation	.720**	1
	Sig. (2-tailed)	.000	
	N	41	41

The results of male athlete calculations show a correlation of 0.720, r count compared to r table by finding df = N -2 will be 41 – 2 = 29. In the Pearson correlation coefficient table a value of 0.201 is obtained with a significant level of 0.5. r count is greater than r table (rcount 0.720 > rtable 0.210) showing a significant positive correlation between the use of the old test norms and the new test norms of the physical ability test norms for male athletes aged 13-18 years.

Table 3. Data Normality Test of Old Norms and New Norms for Male Athlete

	Kolmogorov-Smirnov			Shapiro-Wilk		
Group	Statistic	df	Sig.	Statistic	df	Sig.
Mark Long	.122	41	.131*	.966	41	.256
New	.089	41	.200*	.969	41	.322

The results of the analysis show that the data is normal according to the SPSS statistical test, namely the significance value is 0.256 and 0.322 > 0.05, so the data is normally distributed.

Table 4. Test of Homogeneity of Variable New Norms and Old Norms for Male Athletes

	Levene Statistic	df1	df2	Sig.
Mark Based on Mean	.007	1	80	.932
Based on Median	.008	1	80	.927
Based on Median and with adjusted df	.008	1	79.5	.927
Based on trimmed mean	.008	1	80	.929

The results of the analysis are homogeneous, this is indicated by the results of the calculation which obtained a significance value of 0.932 and 0.929 which is greater than 0.05.

Table 5. Linearity Test for Male Athletes Data

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	645.964	1	645.964	41.900	.000a
	Residual	601.256	39	15.417		
	Amount	1247.220	40			

Based on the results of the linearity test, a significance value of 0.000 was obtained, while the contribution from the new norms for male athletes can be seen in table 6 below :

Table 6. Old and New Female Athlete Measurement Norms Data

Number	Total Score	
	Old Norms	New Norms
1.	55.0	55.0
2.	51.0	53.0
3.	48.0	47.0
4.	45.0	46.0
5.	47.0	51.0
6.	40.0	41.0
7.	42.0	42.0
8.	32.0	33.0
9.	33.0	33.0
10.	40.0	40.0
11.	38.0	38.0
12.	42.0	40.0
13.	38.0	38.0
14.	33.0	35.0
15.	36.0	37.0
16.	29.0	30.0
17.	32.0	32.0
18.	37.0	37.0
19.	54.0	44.0
20.	49.0	49.0
21.	44.0	45.0
22.	43.0	44.0
23.	44.0	47.0
24.	50.0	50.0
25.	44.0	51.0
26.	46.0	46.0
27.	39.0	40.0
28.	45.0	43.0

From the data above to test the Validity and Reliability of the measurement results, it is necessary to test the normality of the data, both the old and new Norms of measurement of female athletes.

Table 7. Data Normality Test of Old Norms and New Norms for female Athletes

		Kolmogorov-Smirnov			Shapiro-Wilk		
	Norms	Statistic	df	Sig.	Statistic	df	Sig.
Mark	Long	.085	28	.200*	.981	28	.879
	New	.068	28	.200*	.980	28	.860

The results of the normality test show normal data. This is evidenced by the significance values of the old and new norms, namely 0.879 and 0.860 > of 0.05. Furthermore, the data homogeneity test was carried out on the Old Norms and New Norms.

Table 8. Test of Homogeneity of Variable New Norms and Old Norms for Female Athletes

		Levene Statistic	df1	df2	Sig.
Mark	Based on Mean	.001	1	54	.972
	Based on Median	.001	1	54	.972
	Based on Median and with adjusted df	.001	1	53.6	.972
	Based on trimmed mean	.001	1	54	.975

Based on the homogeneity test, it was obtained that the data had a significance value of 0.972 and 0.975 > 0.05, so the data was homogeneous. Furthermore, the Linearity Test of Old Norms and New Norms for Female Athletes uses the SPSS Program to test ANOVA.

Table 9. Linearity Test for Female Athletes Data

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1065.928	1	1065.928	145.808	.000ᵃ
Residual	190.072	26	7.310		
Total	1256.000	27			

The calculation results in the table show that the significance value is 0.000. Next, Old Norms and New Norms for Female Athletes.

DISCUSSION

Instruments are the most important part in determining the quality of a study, whether it is research with quantitative, qualitative or evaluation methodologies, because the validity or validity of the data obtained will be largely determined by the quality of the instruments used, in addition to the data collection procedures followed (Supriyadi, 2020). The validation process is needed to validate the instrument design being developed so that it is suitable for use (Marpaung, et.al, 2021). An instrument is a tool that meets academic requirements so that it can be used as a tool to measure a measuring object or collect data about a variable (Sappaile, 2022).

Instruments are measuring tools used to assess something in data collection in order to obtain the desired information (Linda & Sukmawarti, 2021). Instruments or data collection tools are tools used to collect data in a study (Supriyadi, 2023). The instrument is a tool used to measure the variables that the researcher wants to measure (Anam, 2017). It can be concluded that the instrument is a tool for collecting data in tests which are an important part of the research process. Effectiveness is a condition that shows the level of success or achievement of a goal as measured by quality, quantity, and time, according to what was previously planned (Prawiro,

2018). Effectiveness as the accuracy of use, results in use or support goals. In other words, the instruments and norms that have been used by comparing the old test norms and the new norms can show the accuracy of the results and achieve the desired test results. From research conducted with a sample of 69 athletes aged 13-18 years in East Nusa Tenggara Province, consisting of 41 male PPLP athletes and 28 female PPLP athletes, the following results were obtained:

1. Men's Research Results

Based on the results of analysis of data on male athletes, it was obtained: the Person correlation coefficient obtained a value of 0.201 with a significant level of 0.5. r count is greater than r table (rcount 0.720> rtable 0.210) showing a significant positive correlation between the use of the old test norm and the new test norm of the athlete's physical ability test norm. Furthermore, the data normality test was carried out to show that the data was normal data. Then proceed with the test of differences in the athlete's physical test measurement norm, data is obtained which shows that the data is normal data according to the SPSS statistical test, namely the significance value is 0.256 and 0.322 > 0.05, so the data is normally distributed. The next step to test homogeneity is to obtain a significance value of 0.932 and 0.929 which is greater than 0.05. Then the hypothesis states that the data is obtained from a homogeneous sample. Based on the results of the linearity test, a significance value of 0.000 was obtained. Then the value of R = correlation coefficient is equal to 0.720, while the magnitude of the contribution of the new norm to the old norm is shown by the R Square value of 0.518, which is 51.8%.

2. Daughter's Research Results

Based on the results of the analysis of female athlete data, it was obtained: The results of the normality test showed normal data as evidenced by the old and new normal significance values of 0.879 and 0.860 > of 0.05. The homogeneity test of the Old Norms and New Norms data obtained significance values of 0.972 and 0.975 > 0.05, so the data is homogeneous. Furthermore, the Linearity Test obtained from the calculation results in the table shows that the significance value is 0.000. Correlation test results show that R = correlation coefficient of 0.921 means that the influence is large, while the contribution of the new norm to the old norm is indicated by the R Square value of 0.849, which is 84.9%.

Based on the research and tests that have been carried out, namely testing the effectiveness of instruments and testing norms for the physical abilities of athletes aged 13-18 years in East Nusa Tenggara Province, it turns out that they have a significant effect. This can be seen based on the results of calculating the correlation coefficient of influence and contribution of old and new norms, namely: for male athletes, the value of R = correlation coefficient is equal to 0.720, while the contribution of the new norm to the old norm is shown by the R Square value of 0.518, namely 51.8%. Meanwhile, for women, the result is R = correlation coefficient 0.921, which means that the influence is large, while the contribution of the new norm to the old norm is shown by the R Square value of 0.849, which is 84.9%. So it can be interpreted that there is an effectiveness of instruments and norms for testing the physical ability of athletes aged 13-18 years in East Nusa Tenggara Province.

CONCLUSION

Based on the results of research that has been carried out on testing the effectiveness of instruments and norms for testing the physical abilities of athletes aged 13-18 years in East Nusa Tenggara Province, it can be concluded that there is an effectiveness of instruments and norms for testing the physical abilities of athletes aged 13-18 years. This is shown from the results of the data carried out by researchers showing that the correlation coefficient influences and contributions of old and new norms, namely: in male athletes, the value of R = correlation coefficient is equal to 0.720, while the contribution of the new norm to the old norm is shown by the R Square value of 0.518 namely 51.8%. Whereas for girls, the result is R = correlation coefficient 0.921, which means that the influence is large, while the contribution of the new norm to the old norm is shown by the R Square value of 0.849, which is 84.9%. Thus there is the effectiveness of the instruments and norms for testing the physical ability of athletes at the Education and Training Center for students aged 13-18 years in the Province of East Nusa Tenggara.

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