

Analysis Factor Physical Test Muaythai Sport of Regional Training Center East Java 100 (Puslatda Jatim 100)

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Abstract

This study aims to determine how many variables of physical test items are dominant and effectively used in the sport of muaythai regional training center of east java 100. This type of research is quantitative with a development research approach. This research was conducted in 3 stages, namely stage I tabulating the test items that have been determined by the team of East Java experts, stage II processing data and reducing test items that do not meet statistical prerequisites, stage III factor analysis of all test items that meet statistical prerequisites. . The data is processed using the application (SPSS, in stage I all the results of the physical tests totaling 16 test items are entered into SPSS and processed by factor analysis, there are two variables reduced and not included in the next factor rotation, stage II the test is carried out. Kaiser Meyer Olkin Measure of Sampling (KMO) the result is $0.640 > 0.5$ with the results of the barlett's test 201.084 with a significance of 0.000, there is 1 variable with MSA < 0.5 , namely Sit and reach (S&R) of 0.493, on the communality table. Based on the results of the communality test there are two variables < 0.5 variable (X5) Chin Up 0.476 and (X16) Sit and Reach 0.368 these variables do not meet the requirements of communality and must be removed from the test Stage III Bartlett Test of Sphericity is 183.067 at a significance of 0.000 with a KMO of 0.669. The conclusion from the results of the factor analysis of the item physical test items for muaythai in this study, there are 5 factors that are formed from 12 variables (+ 2 sub-variables formed from variable X14) which are correlated, from the initial 16 items on physical tests (with 5 sub-variables formed from 2 variables). The dominant factor for the formation of physical test items for muaythai is items related to leg and leg muscles (square jump, wattbike, kneel-up, triple jump and hamstring), the second dominant factor is the abdominal muscles which are represented by two items (sit ups). and a russian twist).

Keywords

muaythai; physical test; training center; Puslatda Jatim 100



I. Introduction

Muaythai is a martial art sport originating from Thailand, muaythai was created around 2000 years ago in the Thai kingdom at the beginning of the creation of this sport which aims to protect Thai soldiers in warfare. Muaythai has experienced very rapid development in recent years and has begun to be recognized by the world community, including in Indonesia. The Muaythai Indonesia Executive Board (PBMI) was founded on February 18, 2013, within 7 years of Muay Thai experiencing very rapid development, starting the socialization of various national championships and forming administrators in various provinces to cities and regencies in Indonesia. Muaythai finally competed in a

multi-national event, namely the 2020 National Sports Week, all the main organizations of Muaythai province in Indonesia prepared their athletes to face this 4-year multi event, one of which is East Java, Muaythai East Java is very serious about preparing its athletes so that the East Java muaythai athletes joined in (Puslatda Jatim 100).

East Java Province since 2005 has made a long-term coaching program throughout the year to face the National Sports Week, namely Puslatda Jatim 100. In implementing all sports and numbers competing in the National Sports Week are trained centrally as well as being monitored regularly to monitor the progress of all athletes of (Puslatda Jatim 100). To monitor the development level of athletes every month physical tests are held for all sports that are members of (Puslatda Jatim 100) including Muaythai athletes. In every month the athletes will do a physical test, the athletes will go through various kinds of physical test items which are an assessment used to see how far the strength increases to monitor the effectiveness of the exercise. Each sport and match number is distinguished in the implementation of the physical test. In this study, the researcher wanted to analyze the physical test items for the muay thai sport regional training center east java 100.

III. Research Methods

This research is a quantitative development research or development research using a correlational approach with design non-experimental. Quantitative data is a characteristic of a variable whose values are expressed in numerical form (Sugiyono in Nasution, 2021). In quantitative research methods, it can be interpreted as a research method with the characteristics of testing hypotheses and using good and standard test instruments (Maksum, 2009: 136). Constructive validity is related to the extent to which a measuring instrument has clarity of dimensions, concepts or theoretical basis. To be able to perform construct validity, a test needs to be tested.

IV. Results and Discussion

4.1 Results

Multivariate analysis uses interdependence analysis techniques using factor analysis methods. After the data has been collected and tabulated or processed, the next step is to analyze the data using a factor analysis model. According to (Hair, et al. 2010 92). Factor analysis is a method that can reduce a set of original variables into several new variables called factors or dimensions. Factor analysis is a statistical method or approach that can be used to analyze the relationship between variables and describe these variables with a statistical approach that includes findings or several ways that are believed to be sources that can underlie a set of real variables. If there is a set of variables that have been correlated with factor analysis, it can be reduced and rearranged in order to simplify the variables. This is done to find out as much information as possible or to minimize the missing information. The process of factor analysis is to find a relationship (interrelationship) between a number of variables - the variables are independent of one another. Therefore, one or more sets of variables that are less than the initial number of variables can be created. Singgih Santoso (2005: 11). This step is to check the factor matrix (component matrix), where you can choose the variable that has the largest numbers. It can show the factors where each of these variables is present, so it can be seen which variables are included in the factor. The processing technique uses the SPSS program.

4.2 Discussion

Based on the parameters of the physical test for muaythai sports, sixteen 16 items of physical tests were defined including the Test *Sit Up* (X1), the Test *Kneel Up* (X2), *Russian Twist* (X3), Test *Full Hamstring* (X4), Test *Chin Up* (X5).), Test *MFT* (X6), Test *Triple Jump* (X7), Test *20 Meter Sprint* (X8), Test *Clean And Press* (X9), Test *Watt Bike* (X10), Test *Average Reaction Speed* (X11), Test *Jugling 3 Balls* (X12), Test *Square Jump* (X13), Test *Ankel Flexybility* (X14) which is divided into ANL and ANR, Test *Upper Body Flexibility* (X15), and *Sit Test and Reach* (X16). Then based on the results of the physical test, it is known that there are two variables that do not have a variation in the score so that they do not meet the requirements for further testing, namely Variable (X12) *Jugling 3 balls* and Variable (X15) *Upper body flexybility*.

In stage II, a factor analysis test is carried out by excluding variables that do not meet the prerequisites for factor analysis in stage I. The data are obtained from fourteen (14) variables that meet the prerequisites for the factor analysis test. The test results show that testing the entire correlation matrix (correlation between variables), as measured by the amount of the Bartlett Test of Sphericity or Measure Sampling Adequacy (MSA). With the KMO results of $0.640 > 0.5$, which means that the correlation of all variables is interrelated and is sufficient for the prerequisite for further analysis with MSA. The MSA value in the table above is shown in the line *Anti Image Correlation* with the sign "a". Of the 14 variables, there are 13 variables with $MSA > 0.5$. There is only 1 variable with $MSA < 0.5$, namely *Sit and reach (S&R)* of $0.493 < 0.5$ which means there is no significant correlation of the variables *Sit and Reach* that support performance Muaythai Sports. Then the communality table shows 14 variables tested that meet the requirements of 12 communality variables, namely greater than 0.5 ($communality > 0.5$). Keep in mind that if there is a variable with a value *Extraction* in the table *communalities* < 0.5 , then the variable is not eligible to be removed from the communality and testing as well as you need to repeat the initial analyst without including the factor of the variables that are not eligible *komunalitas*. berdasarkan results testing the communality of all variables > 0.5 , thus the variable (X5) *Chin Up* and (X16) *Sit and Reach* are reduced or not included in further testing. For that we discuss 2 variables that were reduced in testing in Phase II.

a. Chin Up

In stage II of the communality table, it is known that the variable (X5) gets a score of $0.476 < 0.5$, which can be concluded that the variable X5 cannot explain the factor. This means that the amount of variance that *Chin-up* has that is not owned by other variables is that the *chin-up community value* is low. Or it can be concluded that the physical test item *chin up* cannot represent and explain the factors. if the terms of the movement of *Chinup*, is actually very important in the sport of Muaythai as the current position of close combat / *Clean* muscle strength *Biceps* and *Triceps* is needed in winning positions *Clean* in order to carry out an attack knee / *Knee* or elbow strike / *Elbow*. Maybe the variable is *chin up* already represented by other variables, for example *Clean and Press*.

b. Sit and Reach

In the stage II communality table the score for the X16 *Sit and Reach* $0.368 < 0.5$, this variable means that this variable cannot explain the factor and must be eliminated in the next test, sit and reach is a test that measures flexibility of the legs, waist and hips. . It is very important in martial arts, especially muaythai, it is important that the sit and reach item is important, but not necessarily communal with other variables so that it gets a low score.

In the discussion of the results of the research in stage III, there are 12 variables (+ sub Variable X14 which is divided into 2 parts). From the results of the factor analysis, it is known that KMO is 0.669, which means that KMO has met the requirements for further testing, namely *MSA Measures of Sampling Adequacy* and the results of the MSA prerequisite, it is known that all variables get a score above 0.5 as well as the results of Phase III communality all get scores above 0.5 then formed 5 components that can represent variables. After forming 5 components that represent variables which then become the matrix components for grouping the variables and rotating the matrix components in an unordered discussion, according to the results of the factor components having the greatest correlation with the following results:

1. Watt Bike

Variable X10 has the greatest correlation of all variables with the first factor with a score of 0.795 is greater than 0.5, which means that the variable watt bike has a very significant significance in muaythai sports. This bike watt test actually measures the consistency of the explosive power of the leg muscles where the leg muscles are very dominant in muaythai sports because leg attacks are the most dominant attack in every match.

2. Average Reaction Speed

Variable X11 correlates very significantly with the first factor with a score of -, 764> 0.5 very significant. In muaythai sports, the reaction speed is very necessary because in Muaythai matches the situation changes so rapidly that it takes reaction speed in carrying out attacks, anticipating attacks and taking advantage of opponents' negligence. So it is not surprising that this item is so influential in the sport of muaythai

3. Ankel Flexibility

In collecting variable data (X14) or Ankel Flexibility it is divided into 2 parts, namely the left leg of the ANL (Ankel Left) which correlates with the first factor with a score of 0.681> 0.5, whereas ANR (Ankel Right) right foot correlates with the first factor of 0.680> 0.5. This test is to measure the flexibility of the ankle / Achilles tendon even though it is significant, in fact this item is not too dominant in muaythai sports but it would be better if the athlete has good ankle flexibility to avoid Achilles tendon and calf injury.

4. Kneel Up

Variable X2 kneel up correlates with the first factor with a score of 0.571> 0.5, the Kneel Up test is a modified test to measure the explosive power of the leg muscles, it is very suitable for muaythai sports which in every activity always use the leg muscles. There are several things that should be observed, almost all subjects studied can do it even with different repetitions. Maybe in the future this test will use weights using a barbell disc or a medicine ball.

5. Hamstring Full

Variable is specifically for measuring the strength of the hamstring muscles from the results of the rotation Variable X4 Hamstring Full test correlates with the first factor with a score of 0.519> 0.5. At the start of giving this test almost all muaythai athletes cannot do it, and now all athletes can do the test. this though with different reps. Hamstring strength is very much needed by all muaythai athletes because the intensity of

impact in the leg area often occurs, if muaythai athletes are not trained in that area they will be easily injured as before giving this treatment, the intensity of injury to muaythai athletes in the hamstring area often occurs. Although now there are some Muaythai athletes who have suffered injuries in this section, the process healing is faster than before giving this exercise.

6. Triple Jump

Variable X7 Triple Jump has a very significant correlation with the second factor with a score of $0.885 > 0.5$. This test is to measure the strength of the leg muscle explosive power, it can be noted that in the previous variables there are a lot of tests that measure the strength of the leg and leg muscles such as watts. Bike, hamstring full, kneel up or clean and press. The team of KONI experts in East Java is very aware that the martial arts sport is very important to train in the leg and foot area. It can be seen that the results of the data analysis of the factors giving exercise in this area have a significant correlation.

7. Multistage Fitness Test

Variable X6 is the only test item that measures endurance and VO2Max is correlated with a second factor with a score of $0.867 > 0.5$. The significance of this variable is quite high, if it is seen that this variable has a very important contribution in knowing the physical condition of muaythai athletes, in general this test is always in the spotlight, only by looking at the results of this test the researchers or reviewers can see the actual condition of the athletes.

8. Sit Up

Variable X1 Sit Up correlates with the 3rd factor with a score of $0.788 > 0.5$ which is very significant when viewed from the results of the SPSS factor analysis, abdominal muscle strength can be said to be quite important in muaythai sports from kicking, hitting to holding attacks in the abdominal area. It all depends on the strength of the abdominal muscles, this test aims to determine the strength of the muscles in the area around the abdominal area, so it is very important when doing a kick or twist in this area it determines the power or not of the attack. So it is not surprising when the results of the data show a very high level of significance for this test item.

9. Russian Twist

Similar to the sit-up variable, the X3 Russian Twist variable is concentrated on the strength of the muscles around the abdominal area, but emphasizes the effectiveness of the twist movement. This variable correlates with a factor of 3 with a score of $0.774 > 0.5$. Like sit-ups, the East Java KONI team experts consider the strength of the abdominal area to be very important, so that there are 2 tests that concentrate on the strength of the abdominal muscles. This is evident from the results of the SPSS factor analysis of the 2 test items that have a very significant score.

10. Square Jump

Variable X13 Square Jump concentrates on leg muscle strength and the acceleration of leg muscle explosive power, this variable correlates with the 4th factor with a score of $0.738 > 0.5$. While the East Java KONI expert team focuses very much on the ability of the lower extremities, especially the leg and leg muscles, it is very important for Muaythai sports that require explosive leg muscle power, this can be seen from the results of data processing the significance of this test item is very high

11. Clean and Press

One The only variable that measures the coordination of muscle strength throughout the body is the X9 variable, namely clean and press, this variable correlates with a factor of 4 with a score of $-0.721 > 0.5$. From the terminology clean and press is divided into two parts where the barbell from the floor is lifted over the shoulder, then pushed upwards. This test is very important for martial arts, it can be seen that the results of the SPSS variable X9 Clean and press get a very significant score. That means there is a real correlation between all variables with this test item.

12. Sprint 20 Meters

The X8 variable Sprint 20 Meter is a test item that focuses on speed acceleration, this test item correlates with a factor of 5 with a score of $0.777 > 0.5$. As we all know speed is very important for martial arts, especially muaythai. However, this test only measures acceleration in track running so it is less complex for martial arts, even though the results of the factor analysis are correlated and significant, but this test falls into the 5th factor category, so it is necessary to think again about the specific speed test items for you.

V. Conclusion

Factor analysis is a method that can be used to reduce the number of variables contained in the physical test items Muaythai sport which is members of the Jatim 100 program. So that fewer variables are obtained by grouping them into general factors. The parameters that are estimated in the factor analysis are the loading value and communality by using a covariance matrix or correlation matrix, to simplify the analysis when the factor loading is almost the same, factor rotation is used. From the results of the factor analysis of the item physical test items for muaythai in this study, there are 5 factors that are formed from 12 variables (+ 2 sub-variables formed from the X14 variable) which are correlated, from the initial 16 physical test items (with 5 sub-variables formed from 2 variables). The dominant factor for the formation of physical test items for muaythai is items related to leg and leg muscles (square jump, wattbike, kneel-up, triple jump and hamstring), the second dominant factor is the abdominal muscles which are represented by two items, namely (sit ups) and a Russian twist).

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