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The Effect Of Balance, Arm Muscle Strength, And Coordination Of Batting Skills Cricket

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Abstract This study aims to determine direct and indirect effects, and also the simultaneous effect of exogenous variables with endogenous variables. The research method is an associative quantitative approach, with test and measurement techniques. The data analysis technique uses a path analysis approach. In this study, The population is 60 athletes from the DKI Jakarta and Java cricket plate athletes. The sampling technique is total sampling. So, the number of samples in this study is 60 people consisting of 30 male athletes and 30 female athletes. Batting skills using the batting tee test. Balance using a balance test. Arm muscle strength using Pull and Push Dynamometer test, Coordination Instrument using Coordination test. The results of this study is the direct effect of variable X1 on Y = 0.271. The direct effect of variable X2 on Y = 0.478. The direct effect of variable X3 on Y = 0.216. The direct effect of variable X1 on X3 = 0.121. The direct effect of the X2 variable on X3 = 0.665. The indirect effect of variable X1 on Y through X3 = 0.121 x 0.216 = 0.026. The indirect effect of variable X2 on Y through X3 = 0.665 x 0.290 = 0.075.

Keywords: balance; strength; coordination; batting skills cricket

INTRODUCTION

Cricket is one of the most popular sports in the world, cricket is a sport that has developed for 40 years in the world community (James, Curtis, Allen, & Rippin, 2012). This sport is much loved by everyone from children to adults. Cricket populeh because it has been played in many countries. Menurut (Amin & Sharma, 2014) cricket is widely played in England, India, Pakistan, Sri Lanka, Australia, New Zealand, South Africa and Zimbabwe.

Cricket is played between two teams of 11 players on a pitch 22 yards long in the middle of oval-shaped grounds of various sizes (Norman & Clarke, 2010). (Perera, 2015) Cricket is a game played between two teams of 11 players each, where the two teams alternate scoring (batting) and defending (fielding). A player (bowler) from the fielding team delivers a ball to a player (batsman) from the batting team, who should strike it with a bat in order to score while the rest of the fielding team (fielders) defend the scoring.

The person who performs the batting is called the batsman. (Norman & Clarke, 2010) Batsmen play in pairs, one on strike facing the bowler and one at the bowler's end, and after hitting the ball can score a run each time both of them traverse the length of the pitch, thus changing ends. Batman plays in pairs with one batsman facing the bowler and the other standing next to the bowler. Both scored by hitting the ball and running around the area. The batsman hits the ball using a bat, and is protected with gloves, a genital protective pad, and a helmet. The main goal of any batsman is to make the numbers constantly. (Wichitaksorn, Choy, & Gerlach, 2014) "batting team attempts to score.". The numbers earned by the batsman are usually in matches listed in the cricket application.

Research in the sport of cricket so far has been mostly done to analyze the basic techniques of playing cricket without looking at the initial motion sequence, implementation attitude and final attitude, physiological aspects, strength and conditioning, tests and measurements as well as biomechanics related to strategy or playing success.

The research done by (A. K. Sarkar, James, Busch, & Thiel, 2012) about Cricket bat acceleration profile from sweet-spot impacts. Then research from (Peploe, King, & Harland, 2014) about The effects of different delivery methods on the movement kinematics of

elite cricket batsmen in repeated front foot drives. Similarly, research conducted by (Amin & Sharma, 2014) about Measuring batting parameters in cricket: A two-stage regression-OWA method. Next, (Preston & Thomas, 2000), about Batting strategy in limited overs cricket. (S. Sarkar & Banerjee, 2016) research about Measuring batting consistency and comparing batting greats in test cricket: innovative applications of statistical tools. (Norman & Clarke, 2010) about Optimal batting orders in cricket. (James et al., 2012) about The validity of a rigid body model of a cricket ball-bat impact. (Curtis, Hurt, & Heller, 2014) about The reliability of a tapping test as an indicator of cricket bat performance.

Next, (Sifa, 2018) research about "The Influence of Global and Elementary Learning Methods on Batting Technique Skills (Striking the Ball) of Cricket Athletes, Padang State University". Further, research conducted by (Scarf, Shi, & Akhtar, 2011) "On the distribution of runs scored and batting strategy in test cricket". Unlike (Town, Africa, & Africa, 2010) "Upper Body Muscle Strength And Batting Performance In Cricket Batsmen". And the evaluation done by (Press, Noorbhai, Noorbhai, & Noakes, 2018) in his research "An evaluation of the coaching methods of the batting backlift technique in cricket"

The previous research shows that there is no comprehensive research on cricket which concerns the study of the effect of balance, arm muscle strength and coordination on cricket batting skills. Thus, this research has an update.

Cricket Batting Skills

A cricket player is required to master the basic techniques of the game of cricket well, in order to be able to continue basic technical skills to advanced techniques so that they can master complex or advanced techniques. Mastery of the correct basic technique will greatly help a player and is a must that must be mastered by cricket players (Ramdhan & Sunaryadi, 2019).

In playing cricket, players take on certain roles, one of which is batting. In the game of cricket, players take on specific roles which include batting" (Olivier, Stewart, Olorunju, & McKinon, 2015) Cricket is played between two teams of 11 players on a pitch 22 yards long in the middle of oval-shaped grounds of various sizes. Batsmen play in pairs, one on strike facing the bowler and one at the bowler's end, and after

hitting the ball can score a run each time both of them traverse the length of the pitch, thus changing ends. Batsmen are not obliged to run, and may score from 0 to 6 for each ball bowled. (leaving one batsman not out). (Norman, J., 2010). Batsman plays in pairs, one facing the bowler and the other being stunned by the bowler, and after hitting the ball runs for a score every time they both run. The bat can score from 0-6 for every ball thrown.

The sport of cricket has a straight drive, a straight drive is a shot that is played attacking, vertical or straight bat style with a movement to hit the ball straight full or over the pitch. The ball can be hit from anywhere between the midon and the cover, depending on the direction of the ball. A straight drive is often done when the ball falls close to the batsman's feet, then the front foot goes forward with the body weight forward and the bat is swung in the direction of the arrival of the ball/forward then attacks the ball, hitting the ball to get a run.

To improve your batting skills there is something to note. According to (Jolimont & Victoria, 2005) How to hold the bat (The Grip); The Stance, and Backlift; Eyes level (looking straight ahead); Elbow position (rotate the shoulders); Hit the ball (attack the ball); Follow through (continued movement).

From the explanation above, it can be concluded that the batting skill is one of the basic techniques in cricket where the technique aims to collect as many scores as possible by hitting the ball and running as much as possible.

Balance

Balance has a very important role in sports performance. In the game of cricket, balance is needed when batting (hitting) where balance is needed at rest (static) or moving (dynamic). Balance is the ability to maintain posture and body position quickly when standing (static balance) or when performing movements (dynamic balance) (Dan et al., 2016).

Balance is the ability to maintain proper posture and body position when standing (static balance) or when performing movements (dynamic balance) (Widiastuti, 2011). Balance is a person's ability to maintain his body position or the ability to control the muscle nerve organs to withstand loads or resistance which is carried out both dynamically and statically (Muhammad Adam et al., n.d 2012.)

Balance is the ability to maintain a projection of the center of the body on a supporting platform while standing, sitting, transiting and walking (Howe, Rochester, Neil, Skelton, & Ballinger, 2011). "*Balance is defined as the process that maintains the center of gravity within the body's support bases*" (Alonso, Greve, & Camanho, 2009). *Balance is the process of maintaining the position of the body's centre of gravity vertically over the base of support and relies on rapid, continuous feedback from visual, vestibular and somatosensory structures and then executing smooth and coordinated neuromuscular actions* (Hrysomallis, 2011).

Arm Muscle Strength

Sports activities require a biomotor component of strength. Strength is the ability to exert maximum power in one muscle contraction in humans (Chan, 2012). Strength is a component of a person's physical condition regarding his ability to use muscles to accept loads while working optimally (Supriyanto & Martiani, 2019). Muscular strength is the ability of a muscle or group of muscles to perform one maximal contraction against resistance or load (Pelana, 2015).

Arm muscle strength is the ability of the muscles to generate tension in a resistance and lift weights (Fakhi & Barlian,2019). "*arm power is the ability of the muscles to exert maximum power in a very fast time"* (Bujang, Desy Tya Maya, & Yafi Velyan, 2019). *Muscle power depends on the amount of nerve stimulation and the number of active motor units"* (Rezaimanesh, Amiri-Farsani, & Saidian, 2011). Muscle strength depends on the amount of nerve stimulation and the number of active motor units. In batting cricket, players really need strength when batting, will automatically use the arm with hitting power so that with that power the ball can roll quickly.

Strength can be divided into general strength, special strength, maximum strength, endurance strength, absolute strength, and relative strength (Gazali, 2016). Strength can be broken down into three, namely; 1) maximum strength is the power / great power produced by a contracting muscle without determining how long the movement can be continued. 2) Elastic strength is a type of strength that is indispensable where the muscle can move quickly against a resistance. 3) Endurance is the ability of muscles to

continuously use power in the face of fatigue. Strength endurance is a combination of strength and duration of movement itself (Tangkudung, 2012).

Coordination

Coordination is a person's ability to integrate different movements into a single movement pattern effectively (Iswoyo, 2015). Coordination is the ability to control body movements (Yusuf, 2015). Coordination is a person's ability to integrate different movements into a single movement pattern effectively (Junaidi, 2015).

Good coordination will be able to carry out various movements with various levels of difficulty quickly, fully targeted and of course efficient in their movements (Hermansyah, Imanudin, & Badruzaman, 2017). Coordination involves moving the eyes, hands, and feet together. eye-hand-foot coordination is another factor that forms the basis of execution, especially more complex movements (Nugraheni & Widodo, 2017). Eye-hand-foot coordination is the result of a combination of performance from the quality of muscles, bones and joints in carrying out an effective and efficient movement (Sridadi, 2019)

Eye-hand-foot coordination is the ability to perform movements with varying degrees of difficulty quickly and efficiently with full accuracy (Tangkudung, 2012). Eye-hand-eye-foot coordination itself is a skill of the leg muscles to display the harmony of every foot and eye movement properly and correctly so that they display good movements (Sakti, 2017).

Coordination is the ability to overcome the harmony of motion of body parts, the ability to develop with body control (Mappaompo & Silatulrahmi, 2015). Coordination is the execution ability to integrate types of movements into more specific forms (Decaprio, 2013).

Players must possess the necessary skills (hitting the ball, control and coordination) to carry out a pattern of activities that will produce the desired consequences. This statement is reinforced by (Nurhidayah & Sukoco, 2015) coordination indicates the player's ability to control and move all parts of the body correctly when performing movement tasks.

METHOD

The purpose of this study is to determine whether or not there is a direct influence between balance (X_1), arm

muscle strength (X_2), coordination (X_3) to batting skills (Y). The method used in this study is an associative quantitative approach, with test and measurement techniques, while the survey method uses path analysis techniques.

In this study, the population is all athletes from the regional government who still joined the cricket team of DKI Jakarta and Central Java with a total of 60 athletes. The sampling technique used is total sampling. The total number of samples was 60, consisting of 2 women's teams with 30 athletes, and 2 men's teams with 30 athletes. In accordance with the types of variables in this study, to obtain data, the instruments used are 1) The batting skill instrument where the researcher prepares and makes tests based on the results of the participants' success, 2) Balance instrument (X_1), Arm muscle strength instrument (X_2), Coordination instrument (X_3). To answer the formulation of the problem raised in this study, the path analysis method is used. The data analysis technique was carried out through two stages of analysis, namely descriptive and inferential data analysis. Descriptive data analysis, this is done to analyze the data that has been collected in order to obtain descriptive analysis, Data Normality Test, Homogeneity Test, Linearity Test, and Path Analysis Hypothesis Testing.

RESULTS AND DISCUSSION

Results

Data Description

1. Balance

Statistical results for the balance variable obtained the lowest balance value of 10, the highest balance value of 25, the average value of the balance of 16.6, and the standard deviation of the balance of 4.7. The following is an interval table from the results of the balance of cricket athletes.

Table 1.

Balance Frequency Distribution

Category	Interval class	Fr	%
Excellent	>25	5	8%
Good	20-24	18	30%
Enough	15-19	25	42%
Less	11--14	0	0%
Very Less	<10	12	20%
	Sum	60	100%

2. Arm Muscle Strength

The statistical results for the balance variable obtained the lowest value of arm muscle strength of 32, the highest value of arm muscle strength of 68, the average value of arm muscle

strength of 43.2, and the standard deviation of arm muscle strength of 9. The following is an interval table of the results of muscle strength cricket athlete arm.

Table 2.

Arm Muscle Strength Frequency Distribution

Category	**Interval class**	**Fr**	**%**
Excellent	>58	7	12%
Good	49-57	10	17%
Enough	40-48	21	35%
Less	31-39	25	42%
Very Less	<30	0	0%
	Sum		100%

3. Coordination

Statistical results for the coordination variable obtained the lowest value of coordination is 22, the highest value of coordination is 37, the average value of coordination is 28.6, and the standard deviation of coordination is 3.6. The following is an interval table from the results of cricket athlete coordination.

Table 3.

Coordination Frequency Distribution

Category	**Interval class**	**Fr**	**%**
Excellent	>35	3	5%
Good	31-34	15	25%
Enough	28-30	18	30%
Less	24-27	20	33%
Very Less	<23	4	7%
	Sum	60	100%

4. Batting Skills

The statistical results for the batting skill variable obtained the lowest score for batting skills of 11, the highest value of batting skills of 24, the average value of batting skills of 17.2, and the standard deviation of batting skills of 3.4. The following is an interval table of the results of the batting skills of cricket athletes.

Table 4.

Batting Skills Frequency Distribution

Kategori	**Kelas Interval**	**Fr**	**%**
Sangat Baik	>23	6	10%
Baik	20-22	8	13%
Cukup	17-19	19	32%
Kurang	14--16	19	32%
Sangat Kurang	<13	8	13%
	Jumlah	60	100%

Normality Data

1. Normality Test of Estimated Error X_3-X_1

The data were obtained using the normality test with Kolmogrov-Smirnov with SPSS 26. The statistical test results obtained were 0.078 and the Asymp line. Sig. (2-tailed) of 0.200 or can be written as a probability value (p-value) = 0.200 > 0.05 or Ho is accepted. Thus, it can be concluded that the coordination data on the balance is normally distributed.

2. Normality Test of Estimated Error X_3-X_2

The data were obtained using the normality test with Kolmogrov-Smirnov with SPSS 26. The statistical test results obtained were 0.072 and the Asymp line. Sig. (2-tailed) of 0.200 or can be written as a probability value (p-value) = 0.200 > 0.05 or Ho is accepted. Thus, it can be concluded that the data on the coordination of arm muscle strength is normally distributed.

3. Normality Test of Estimated Error X_2-X_1

The data were obtained using the normality test with Kolmogrov-Smirnov with SPSS 26. The statistical test results obtained were 0.072 and the Asymp line. Sig. (2-tailed) of 0.200 or can be written as a probability value (p-value) = 0.200 > 0.05 or Ho is accepted. Thus, it can be concluded that the balance upper arm muscle strength data is normally distributed.

4. Normality Test of Estimated Error Y-X_1

The data were obtained using the normality test with Kolmogrov-Smirnov with SPSS 26. The statistical test results obtained were 0.094 and the Asymp line. Sig. (2-tailed) of 0.200 or can be written as a probability value (p-value) = 0.200 > 0.05 or Ho is accepted. Thus, it can be concluded that the batting skill data on balance is normally distributed.

5. Normality Test of Estimated Error Y-X_2

The data were obtained using the normality test with Kolmogrov-Smirnov with SPSS 26. The statistical test results obtained were 0.088 and the Asymp line. Sig. (2-tailed) of 0.200 or can be written as a probability value (p-value) = 0.200 > 0.05 or Ho is accepted. Thus, it can be concluded that the batting skill data on arm muscle strength is normally distributed.

6. Normality Test of Estimated Error Y-X_3

The data was obtained using the normality test with Kolmogrov-Smirnov with SPSS 26. The statistical test results obtained were 0.059 and the Asymp line. Sig. (2-tailed) of 0.200 or can be written

as a probability value (p-value) = 0.200 > 0.05 or Ho is accepted. Thus, it can be concluded that the data on batting skills on coordination are normally distributed.

Homogeneity Test

Table 5.

Homogeneity Test Results

Homogeneity test	**Sig.**	**Table Norms (α)**
X_3 atas X_1	0,158	0,05
X_3 atas X_2	0,155	
X_2 atas X_1	0,160	
Y atas X_1	0,058	
Y atas X_2	0,188	
Y atas X_3	0,528	

Based on the results of the analysis in table 5. the results of the homogeneity test of X_3 over X_1 obtained p-value = 0.158> 0.05, Ho is accepted. Thus, it can be concluded that the coordination of X_3 over the balance of X_1 comes from a homogeneous variance.

The results of the homogeneity test of X_3 over X_2 obtained p-value = 0.155 > 0.05, Ho is accepted. Thus, it can be concluded that the X_3 coordination of X_2 arm muscle strength comes from a homogeneous variance.

The results of the homogeneity test of X_2 over X_1 obtained p-value = 0.160 > 0.05, Ho is accepted. Thus, it can be concluded that the X_3 coordination of X_2 arm muscle strength comes from a homogeneous variance.

The results of the homogeneity test of Y over X_1 obtained p-value = 0.058 > 0.05, Ho is accepted. Thus, it can be concluded that the batting skill Y on balance X_1 comes from a homogeneous variance.

The results of the homogeneity test of Y over X_2 obtained p-value = 0.188 > 0.05, Ho is accepted. Thus, it can be concluded that Y batting skill on X_2 arm muscle strength comes from homogeneous variance.

The results of the homogeneity test of Y over X_3 obtained p-value = 0.528 > 0.05, Ho is accepted. Thus, it can be concluded that Y batting skill on X_3 coordination comes from homogeneous variance.

Hypothesis test

Substructural Testing 1

From the results of substructural test 1 using SPSS 26, the coefficient of determination (R2) of 0.551 means that 55.1 % of the variability of X_2 variable can be explained by X_1. So the error (ε_1) = 1- R2 = 1- 0.551 = 0.449. The path coefficient in the beta column (standardized coeficiens), namely the path coefficient X_1 to X2 (p21) = 0.742.

obtained the value of t0 = 8.438 and p-value = 0.000/2 = 0.000 <0.05 or Ho is rejected. Thus the balance variable (X_1) has a direct positive effect on arm muscle strength (X_2).

Substructural Testing 2

From the results of substructural test 2 using SPSS 26, it is obtained that the number of R square (R2) for model 1 is 0.576 and for model 2 (R2) is 0.569. This figure shows the effect of balance and arm muscle strength on coordination by 56.9% then the rest (43.1%) is influenced by other factors. Sehingga error model 2, = $1 – R^2 = 1 – 0,569$. So the error model 2, = 1 – R2 = 1 – 0,569. Path coefficient (X1) against (X3) or (p31) = 0.121; t0 = 1.939, p-value = 0.051/2 = 0.0255 < 0.005, or Ho is rejected, which means that there is an effect of balance (X_1) on coordination (X_3). The next test, (X_2) against (X_3) or (p_{32}) = 0.665; t0 = 5,160; p-value = 0.000//2 = 0.000, or H0 is rejected, thus, arm muscle strength (X_2) has a positive direct effect on coordination (X_3). From the results of testing the structural model 2 is significant.

Substructural Testing 3

From the results of substructural test 2 using SPSS 26, it is obtained that the number of R square (R2) is 0.768. Means that 76.8% of the variability of the Y variable can be explained by the variables X_1, X_2, X_3. So the error (Ɛ2) = 1-R2 = 1 – 0.768 = 0.232. Based on the ANOVA table data, the Fo value is 61,873; db1 = 3; db2 = 56, p-value 0.000 < 0.005, Ho is rejected. Thus the balance variable (X_1), arm muscle strength (X_2), coordination variable (X_3) simultaneously affect batting skills.Data coefficients secara berturut-turut:

1) Py_1 = 0.271; to = 2.799, p-value = 0.007/2 = 0.004 <0.05, Ho is rejected, which means that balance has a positive direct effect on batting skills.

2) Py_2 = 0.478; to = 4.110, p-value = 0.000/2 = 0.000 <0.05, Ho is rejected, then arm muscle strength has a direct positive effect on batting skills.

3) Py_3 = 0, 216; to = 2.187, p-value = 0.033/2 = 0.017 <0.05, Ho is rejected, then coordination has a direct positive effect on batting skills.

Hypothesis Summary

Direct Effect Hypothesis

Tabel 6.

Pengaruh Langsung antar Variabel (Indonesian)

Direct effect between variables	Path coefficient (p)	P-value	Conclusion

X_1 - Y (P_{y1})	0,271	0,004	Sig.
X_2 - Y (P_{y2})	0,216	0,000	Sig.
X_3 - Y (P_{y3})	0,478	0,017	Sig.
X_1 - X_3 (P_{31})	0,121	0,000	Sig.
X_2 - X_3 (P_{32})	0,665	0,000	Sig.
X_1 - X_2 (P_{21})	0,742	0,000	Sig.

Indirect Effect Hypothesis

Based on the research path diagram on the effect of balance, arm muscle strength, and coordination on batting skills, it is also obtained a value to see the indirect effect of research, namely the effect of balance and arm muscle strength through coordination on batting skills..

Effect of Balance through Coordination on Batting Skills

Based on the results of the path analysis, for the first indirect effect, challenge the influence of balance (X_1) through coordination (X_3) on batting skills (Y). It can be calculated using the formula X1 to Y through X3 = IE1+ρYx1 so that based on the results of the calculation data path analysis, substructural test 2 and substructural test 3. IE1= ($\rho x_3 x_1$) X(ρ_{YX3}) = (0,121) X (0,216) = 0,026. Then, the first indirect effect is obtained from 0.026 + 0.271 = 0.297. Therefore 0.297 > 0 then there is an indirect effect of balance through coordination on batting skills.

The Effect of Arm Muscle Strength through Coordination on Batting Skills

Based on the results of the path analysis, the second indirect effect is on the effect of arm muscle strength (X_2) through coordination (X_3) on batting skills (Y*)*. It can be calculated using the formula X2 to Y through X3 = IE1+ρYx2 so that based on the results of the path analysis data, substructural test 2 and substructural test 3. IE2 = ($\rho x_3 x_2$) X (ρ_{YX3}) = (0,665) X (0,216) = 0,143. Then the first indirect effect is obtained from 0.413 + 0.478 = 0.621. Therefore 0.621 > 0 then there is an indirect effect of arm muscle strength through coordination on batting skills.

Discussion

In the discussion of the results will be presented regarding the results of research that has been carried out related to each variable as well as support from several theories and previous research. Based on the test results of all hypotheses that have been carried out in the hypothesis testing section, it can be stated that:

1. There is a direct effect of balance on coordination.

Coordination requires good balance to produce batting skills. From the results of research data analysis, it was found that the significance value of balance on coordination was 0.004 < 0.05, so balance had a significant direct effect on coordination with a direct effect of 0.121 or 12.1% and 87.9% of other variables.

Balance relates to coordination in several skills. Thus, to maintain balance in carrying out physical activities, the movements performed need to be well coordinated in an effort to control all movements (Mappaompo & Silatulrahmi, 2015).

2. There is a direct influence of arm muscle strength on coordination.

Moving the arm muscles optimally and coordinating to produce the right batting movement is an absolute unity for a batsman in the game of cricket, but no athlete can do it all without training. From the results of research data analysis, it was found that the significance value of arm muscle strength on coordination was 0.000 <0.05, so balance had a significant direct effect on coordination with a direct effect of 0.665 or 66.5% and 33.5% of other variables.

It takes a strong-arm muscle strength when doing the movement, so that the arm muscle strength can contract with coordination simultaneously to get the right results (Agustini et al., 2018).

3. There is a direct effect of balance on batting skills.

The ability of a batsman to obtain maximum batting cannot be separated from the player's biomotor in making movements that are in accordance with the desired goals such as the balance needed for batting prefixes so as to produce maximum movements. From the results of research data analysis, it was found that the significance value of arm muscle strength on coordination was 0.004 < 0.05, so balance had a significant direct effect on coordination with a direct effect of 0.271 or 27.1% and 72.9% of other variables.

Balance is a unity of coordination when going to do batting movements (hitting) the ball. Balance in hitting is the most important thing where (Jolimont and Victoria, 2005) the hitter is in a position to quickly move both forward and backward according to the

direction of the ball and allow it to be in a stable position.

4. There is a direct influence of arm muscle strength on batting skills.

From the results of the analysis of research data, it was found that the significance value of arm muscle strength on coordination was 0.000 <0.05, so balance had a significant direct effect on coordination with a direct effect of 0.478 or 47.8% and 52.2% of other variables.

To perform the batting technique, the cricket athlete must use the arm muscles to be able to swing and lift the stick in the batting technique, and must also use strength to swing the stick well. As stated (Yusuf, 2015) Arm muscle strength is needed as a driving force when hitting. The greater the strength of the arm muscles produced, the harder the blows produced.

5. There is a direct effect of coordination on batting skills.

To perform batting skill movements, cricket athletes must have good coordination. At the time of batting coordination is needed to achieve success until it reaches the batting skill. From the results of the analysis of research data, it was found that the significance value of arm muscle strength on coordination was 0.017 <0.05, so balance had a significant direct effect on coordination with a direct effect of 0.216 or 21.6% and 78.4% of other variables.

"Coordination also plays a role in cricket technical skills, coordination is theresult of combining reaction from eye speed and continued by precise and strong hand stroke so that the ball thrown tightly can be hit properly and strongly" (Wolteret al., 2020).

6. There is an indirect effect of balance through coordination on batting skills.

Physical factors are very decisive in a sport, because this factor is a factor that plays an important role to support other factors. Balance when batting is important in determining the initial position of batting. Batting skills must also have good coordination so as to make good movements. From the results of the research data analysis, it was found that the significance value of the indirect influence of balance through coordination on batting skills was 0.297 or 29.7% and 70.3% of other variables.

To do a quick arm stroke by stepping, it will trigger the leg movement first to maintain balance and

stabilize the body position before starting the arm movement to hit. Furthermore, two important things are coordination and increased perception of the temporal to observe the direction of the ball to be hit.

"*The simultaneous initiation of foot and knee for the three great height couldbe explain by the fact that, when subjects execute rapid arm movements with stepping, they trigger in first the lower limb in order to maintain balance and stabilize posture before initiating arm movements. Furthermore, the two patterns of coordination and ascending temporal organization were observed whether the ball was hit from above or below"* (Rosey et al., 2007).

7. There is an indirect effect of arm muscle strength through coordination on batting skills.

The strength of the arm muscles in cricket is one of the factors that is very much needed and even determines the victory in the match. Besides that, it is supported by mastery skills of basic techniques such as doing batting skills and requires good coordination. From the results of the analysis of research data, it was found that the significance value of the direct influence of arm muscle strength through coordination on batting skills was 0.621 or 62.1% and 37.9% of other variables.

Athletes who have good coordination will be able to control movement, harmonious coordination is influenced between muscle groups during work. This coordination is needed in an effort to hit, because at the time of batting where players are required to move forward or backward quickly depending on the falling ball that is thrown.

"movements do batting or hitting the ball as far as possible and ran toward milestones back to the base to create a point. Strength of arm muscle is the ability bio motoric which is one aspect of capability that is. coordination also plays a role in cricket technical skills, coordination is the result of combining reaction from eyespeed and continued by precise and strong hand stroke so that the ball thrown tightlycan be hit properly and strongly (Wolter et al., 2020).

CONCLUSION

Conclusions were drawn based on research findings with exogenous variables consisting of balance (X1) and arm muscle strength (X2) as well as intermediate variables, namely coordination (X3), and the endogenous

variable was batting skills (Y) as follows:

1. There is an effect of balance (X1) on coordination (X3).
2. There is an influence of arm muscle strength (X2) on coordination (X3).
3. There is a balance effect (X1) on cricket batting skills (Y).
4. There is an influence of arm muscle strength (X2) on cricket batting skills (Y).
5. There is an effect of balance (X1) on arm muscle strength (X2).
6. There is an indirect effect of balance (X1) through coordination (X3) on cricket batting skills (Y).
7. There is an indirect effect of arm muscle strength (X2) through coordination (X3) on cricket batting skills (Y).

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