

The Contributing Factors to Athletes' Achievement in Archery

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Abstract: This study aims to determine how much of the existing factors in archery sport can affect athletes' performance in a competition. This was done in Ganesha Open 2017 Archery Competition. The method used in this study was survey study using correlational technique. The sample in this study was 20 people (male athletes who rank 1-20 of the entire population in the archery national round competition). The data in this research was obtained by conducting survey on several factors that exist in archery sport to the samples. Data analysis techniques to answer the hypothesis of this study was correlation and regression techniques. To find out the relationship between two variables X and Y, simple regression and correlation analysis were utilized, while multiple regression and correlation analysis were employed to identify the relationship between variables X1, X2, and X3 to Y. From the results of hypothesis testing, it was obtained that there is a positive correlation between the factors that exist in the archery sport on athletes achievement, it is shown by the correlation coefficient of 0.93. The contribution of such factors were seen from the determination coefficient $(0.93)^2 = 0.86$ implying that the factors in the archery competition contributed as much as 86% to the archers' achievement. As a result, there should be some efforts in improving the athletes achievement as for example improving arm muscle endurance, kinesthetic perception and anxiety level.

1 INTRODUCTION

Archery is a sport that focuses on accuracy, because the ultimate goal of archery is to shoot arrows to the target face as accurately as possible, so one of the necessary factors in archery movement is consistency that must be done continuously during practice and during competition. This is said by Mc Kinney that the movement in the archery is simple, there is no difficult movement in doing so, you will be able to get a score of 1440 if you are able to repeat the same and true moves as many as 144 times. (Mc Kinney, 1977).

The performance of an athlete in an archery competition is influenced by physical, technical, and mental factors. Those important factors include the coordination of visual motion (accuracy), feeling / sense of kinesthetics, arm strength (endurance strength), length of attraction, concentration, and emotional balance. (Daniel M. Landers, 2013).

By having the ability to sense motion (kinesthetic), one can distinguish the right movement feels and the wrong movement so that he can always try to do the right movement and not to make the wrong movement in exercising. (E. Shibata, 2013).

The kinesthetic perception ability between one archer and the other is different, depending on the ability the athletes. In addition, an archer is also required to always be able to perform a series of movement techniques with a correct and stable in every repetition of arrow shots, so that the accuracy level of arrows to the target can be achieved well. (Koon Teck Koh, 2016). This is especially important in view of the fall of arrow targets on the target depending on the consistency of the technique performed by an archer, which if performed correctly continuously (consistent) then the score obtained will also be good and stable from the first arrow fired up to the child the last arrow. Therefore, it is important for an archer to feel the technique of archery so that the archer can distinguish between the right movement and the wrong motion, so as to minimize the errors of archery technique.

A series of archery skills involving several types of motion requires efficient energy deployment, the coordination between the muscle groups involved in the required movement is needed. The coordination of archery skills is closely related to the physical component, in the form of strength, muscle endurance, and flexibility that is closely linked in the refinement of the technique. (Gary A. Knutson, 2005)

In archery sport, the muscle endurance element of the arm is very necessary considering the magnitude of the thrust and pull that must be done continuously by the arm muscle. The endurance will greatly affect the rhythm of the shooting. With good endurance, the performance of the athlete will remain optimal over time as it is less likely to get fatigue. This means that athletes are able to perform quality movements that remain high from the beginning to the end of the game. (Jae-Woo Park, 2016).

An archer must be able to concentrate and keep his focus for a long period of time and put aside the disturbances of the environment as well as the fatigue he experiences. (Tsong-Min Hung, 2011). With the increase of time to play then there is a tendency to accumulate anxiety in the athlete himself which can negatively affect his achievement. Therefore an archery athlete must be able to control both his emotional and physical anxiety in a match so that he can show his optimum performance.

During the game, it is natural that the athlete becomes nervous, tense, hesitant, afraid, anxious, especially if facing a stronger and more balanced opponent, coupled with a tense situation. If this happens, then there are some techniques that can be done by athletes or coaches in order to mitigate the athlete's tension during the match, such as by doing relaxation. (George Mamassis, 2010).

Anxiety as one of the unstable psychological conditions can arise in any archery sporting event, especially in the qualifying round, because of the element of competition between an athlete and other athletes. Every athlete is trying to achieve the best performance, surpassing his other fellows. In every competition, there is always a winner and a loser. Victory or success on the athlete tends to make the athlete try to maintain the achievement to remain the champion.

Conversely, defeat or repeated failure tends to make the athlete discouraged and demotivated. The athlete's experience of this failure will usually continue to imprint and cause anxiety in the athlete's himself. When an athlete is confronted with a match whose level is not much different from previous failures, his achievement motivation is defeated by anxiety fear of failure even if he is capable of playing well.

Archery achievement is measured from the number of scores collected. The higher the number of scores an athlete achieved, the higher the achievement he has (A.R. Soylu, 2006). Things that need to be considered in order to achieve high achievement of which is a prime physical condition

and master the basic techniques of archery. In addition, an archer must also have a good psychic condition in order to achieve his optimal performance. Archery is an activity that demands smooth motorized visual co-ordination, and demands the ability to shoot at small targets and great distances.

The results of archery skills are determined by several important factors, three of which are the endurance of arm muscle, kinesthetic perception and anxiety. All three factors have an effective contribution with different contributions to the archery achievement (Andrew J Callaway, 2017).

An archer is said to have excellent physical condition, if the archer has good arm muscle endurance, which is used directly in archery. The endurance of the arm muscle greatly determines the consistency of the archer in firing the arrow to the target with the same pull from the beginning of the game until the end of the game. the endurance level of the arm muscle will maintain the consistency of the technique from the beginning to the end of the competition.

Kinesthetic perception is a benchmark for athletes to feel a technique that feels right or wrong. In archery, repetition of basic techniques is necessary, so the movements are stable and unchanging. Archery requires the same technique of movement from the first shot of arrows and the next arrow.

Kinesthetic perception plays a role when an archer performs a series of movements ranging from standing, darting, lifting an arc followed by pulling a bowstring, aiming, releasing arrows, continuing motion and arriving at the feedback control position. So that factors such as kinesthetic perception is helpful in a process of achievement based on the characteristics of archery sport.

Archery sports also require subtle touch of soul, patience, tenacity, concentration, and high mental endurance. An archer must be able to concentrate and keep his focus for a long period of time and put aside the disturbances of the environment as well as the fatigue he experiences. With the increase of time to play then there is a tendency to accumulate anxiety in the athlete himself which can negatively affect his achievement. Therefore an archery athlete must be able to control both his emotional and physical anxiety in a match so that he can show his optimum performance.

2 METHODS

In accordance with the problems and objectives to be achieved, then the method used in this study was a survey method using correlational techniques. The relationship between the independent variables and the dependent variables in this study is described in constellation form (see figure 2.1).

The research procedures were done as follows:

- Testing the instruments
- Analyzing the instruments data
- Conducting research by conducting tests and measurements on these four variables, namely endurance arm muscle, kinesthetic perceptions, anxiety and archery achievement.

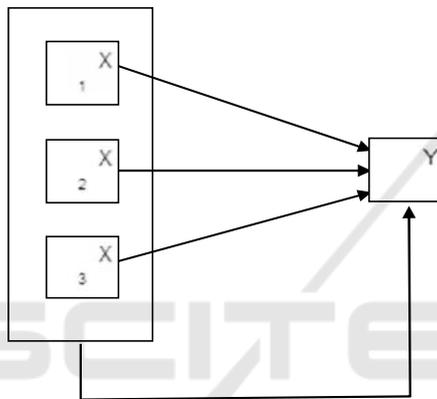


Figure 2.1. Research Constellation

Descriptions

X₁ = Arm Muscle Endurance

X₂ = Kinesthetic Perception

X₃ = Anxiety

Y = Archery Achievement

2.1 Participants

The population in this study is all archery athletes who follow the National Archery Championship Ganesha Open in 2017 in Bandung, West Java, which was followed by as many as 149 athletes.

The sampling technique in this research is purposive sampling technique, Samples were 20 people, with the following criteria:

- Participants of the Ganesha Open Archery National Championship in 2017 in Bandung, West Java.
- Male athletes
- Shooting at National round
- Ranking 1-20, from the total score earned after the 18-meter indoor archery competition.

2.2 Instrument

The instrument used to collect data in this study is to make measurements of the observed variables.

- Measurement of arm muscle endurance with arc hold test.
- The instrument used in the measurement of kinesthetic perception was the hand kinesthetic motion test on a horizontal straight plane (George H Sage, 1977).
- Data on anxiety was obtained by using an athlete's anxiety scale during a match. This scale was prepared by following the ways of preparing personality assessment by using Likert scale.
- Measurement of archery scores at the Ganesha Open national championship in 2017 in Bandung.

Data analysis techniques to answer the hypothesis of this study was correlation and regression techniques. To find out the relationship between two variables X and Y, simple regression and correlation analysis were utilized, while multiple regression and correlation analysis were employed to identify the relationship between variables X₁, X₂, and X₃ to Y.

3 RESULTS AND DISCUSSION

The first hypothesis testing has showed that there is a correlation between arm muscle endurance (X₁) and national round archery achievement (Y), it was seen from the correlation coefficient (r_{xy1}) 0.84 with the Y = 7.88 + 0.84 X₁ linear regression equation. (0.84)² = 0.71 determination coefficient. This means that the arm muscle endurance contributes 71% to the National Archery round achievements.

The first hypothesis testing has showed that there is a correlation between Kinesthetic Perception (X₂) and national round archery achievement (Y), it was seen from the correlation coefficient (r_{xy2}) 0.66 with the Y = 16.86 + 0.66 X₂ linear regression equation. (0.66)² = 0.43 determination coefficient. This means that the arm muscle endurance contributes 43% to the National Archery round achievements.

The first hypothesis testing has showed that there is a correlation between anxiety (X₃) and national round archery achievement (Y), it was seen from the correlation coefficient (r_{xy3}) 0.55 with the Y = 16.86 + 0.66 X₂ linear regression equation. (0.55)² = 0.30 determination coefficient. This means that anxiety contributes 30% to the National Archery round achievements.

Fourth, there is a correlation between arm muscle endurance (X_1), Kinesthetic perception (X_2) and anxiety and the National Round Archery Achievement (Y). It was seen from the correlation coefficient of 0.93 with the multiple regression equation $Y = -9.27 + 0.605X_1 + 0.307X_2 + 0.273X_3$. The contribution of the three variables were shown by the determination coefficient $(0.93)^2 = 0.86$. Thus, arm muscle endurance, kinesthetic perceptions, and anxiety account for 86% of the National Round Archery achievements.

4 CONCLUSIONS

The physical and psychological condition of an athlete is related to his achievement. The large and small effective contribution provided by the athlete's physical and psychological condition to achievement depends greatly on the characteristics of the sport. Some components of physical and psychological conditions are dominantly required by certain sports, but for other sports are less necessary. In archery sport, physical and psychological components, such as muscular arm endurance, kinesthetic perceptions and anxiety, have a significant role for athletes' performance, especially in terms of improving his archery performance. Based on the results of this study, several implications can be drawn, especially in relation to efforts to improve the archery performance of the National Round, among others: the method of developing arm muscle endurance, kinesthetic perception, and anxiety level to improve athlete performance in the archery competition.

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