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The Effect Of Arm Power, Eye Coordination Through Waist Muscle Flexibility On The Ability To Swim In 50 M Breaststroke For Junior Swimming Athletes

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Abstract
The problem in this study is that the breaststroke swimming ability of junior athletes in the city of Bukittinggi still looks stiff and underpowered. The purpose of this study was to determine the effect of arm muscle power, ankle coordination through flexibility on the breaststroke swimming ability of junior athletes in the city of Bukittinggi. This type of research is quantitative, namely casual comparative using path analysis techniques. This research was conducted from January to February 2021 in the swimming pool in the city of Bukittinggi. The population in this study were all junior swimming athletes in the city of Bukittinggi, totaling 32 people. The sampling technique used total sampling technique, so the number of samples in this study were 32 athletes. The instruments in this study were: 1) Arm muscle endurance test by carrying out the Pull-Up test, 2) Eye Coordination Using the Mitcel Soccer Test, Hip Muscle Flexibility Using the Sit and Reach Test, 4) The Ability to Swim in the Breaststroke 50 M. Technique data analysis using statistical path analysis or path analysis. The results of this study are: 1) Arm muscle power has a direct and significant effect on the 50 M breaststroke swimming ability of 12.96%. 2) Coordination of the ankles has a direct and significant effect on the 50 M Breaststroke swimming ability of 12.18%. 3) Waist muscle flexibility has a direct and significant effect on the 50 M Breaststroke Swimming Ability by 8.82%. 4) Arm Muscle Power has an indirect effect on the Ability to Swim 50 M Breaststroke through Waist Muscle Flexibility by 20.61%. 5) Coordination of the ankles has an indirect effect on the ability to swim 50 m breaststroke through waist muscle flexibility by 15.13%. 6) Arm muscle power, ankle coordination and waist muscle flexibility have a simultaneous effect on the 50 M breaststroke swimming ability by 80.80%.
Keywords: *Arm Muscle Power, Ankle Coordination, Drowsiness, Breaststroke Swimming*

INTRODUCTION

Swimming Swimming is an activity in the water in an effort to move the body from one place to another. Swimming is also an activity that requires complex movements to do it well, the ability to coordinate arm, leg, and breathing movements is needed. Swimming can be done by anyone, regardless of gender differences, age differences, everyone can do it, and swimming is a very economical sport, because with a small cost we can swim to the pool and swim to our heart's content. Practically it can be done in the morning, afternoon, or night, besides that it can also be

done individually. Now what is an obstacle is the desire of oneself. Monitoring swimming talent from an early age, namely from the age of children, is expected to obtain superior and potential swimmers. Further coaching, providing good and correct basic movements and exercises carried out regularly help children achieve maximum results. Swimming is an individual sport that takes place in the water or swimming pool with an international standard size, which has a length of 50 meters and a width of 25 meters and an average depth of 3 meters. (Andri Aritianto, 2015). Movement skills that require coordination skills are a form of complex skill, making it easier to learn complex movements as well.

In addition, because in general the entire swimming distance cannot be covered with all the power (all out), the swimmer must be able to regulate and control his speed at the entire distance of the race. Soejoko, (1992:109). Success to win a race or accelerate the force basically comes from the swimmer's ability to produce thrust while reducing drag, increasing thrust can be done by increasing thrust, namely doing strength and muscle explosive training, especially leg muscle strength and arm muscle explosiveness, while to reduce drag can be done by swimming with the correct style and in accordance with the biomechanics of human movement so that create an efficient movement so that it can reduce water obstacles when swimming. Strength and explosiveness are very important in the speed of swimming. Along with the development of the times, swimming sports developed based on goals. To develop swimming achievements, swimming club clubs appeared, one of which is the Bukittinggi City Junior Swimming Club, the number of athletes who are members of the club is 15 people, in the club the athletes are fostered and trained with programs in the water and on land. The reason for choosing the title in this thesis is that the truth of style in swimming is the main thing in order to be able to swim properly and correctly, in addition to finding out how much direct and indirect influence is between arm muscle power, ankle coordination and hip muscle flexibility in the creation of speed when swimming, which is the ability to swim 50 M breaststroke of Junor Bukittinggi swimmers.

METHODOLOGY

This study is a quantitative research, namely casual comparable, the purpose of this research is to determine the influence of body fat percentage, nutritional status, physical activity on students' physical fitness. This research is classified as a type of quantitative research that uses the Path Analysis technique (Path Anaylysis). According to Riduwan and Engkos Achmad Kuncoro (2012:115), this Path Analysis will be used in testing the magnitude of contribution shown by the path function on each path diagram of the casual relationship between variables. The variables linked in this study are Arm Muscle Power (X1), Ankle Coordination (X2), Horizontal Muscle

Flexibility (X3) on the 50 M Breaststroke Swimming Ability of Bukittinggi City Junior Swimming Athletes (Y). (X1) and (X2), as independent variables, while the dependent variable is the 50 M Breaststroke Swimming Ability of Bukittinggi City Junior Swimmers (Y) and (X3) as intervening variables. According to Tuckman in Sugiono (2012:5) intervening variables are variables that theoretically affect the relationship between independent and dependent variables, but cannot be observed and measured. So in this study, the intervening variable is the flexibility of the Horizontal Muscle (X3), because in achieving the goal of a good 50 M Breaststroke Swimming Ability of Bukittinggi City Junior Swimming Athletes, an athlete is required to have strong arm muscle power and good ankle coordination, and besides that it is influenced by the flexibility of the hip muscles that are flexible in order to achieve the good 50 M Breaststroke Swimming Ability of Bukittinggi City Junior Swimming Athletes.

RESULTS

1. **The results of the study show that there is a direct effect of arm muscle power on the swimming ability of the 50 m breaststroke of junior swimmers in Bukittinggi City.**

   In the results of the path analysis calculation, it was found that there was a direct influence of Arm Muscle Power (X_1) on the 50 M (Y) Breaststroke Swimming Ability of Bukittinggi City Junior Swimmers (pyx1) = 0.360 and the significance value (sig) = 0.013 which was smaller than the probability value (a) = 0.05. It turns out that the direct influence of Arm Muscle Power on the 50 M Breaststroke Swimming Ability of Bukittinggi City Junior Swimmers is proven and acceptable. The results of the test are in accordance with the theoretical study, theoretical framework and hypothesis proposed in this study, the results of this study can be accepted empirically as true. Arm Muscle Power is the ability of muscles to exert maximum strength in a short period of time (Harsono, 2001:24). The Effect of Arm Muscle Power on the 50 M Breaststroke Swimming Ability of Junior Swimmers in Bukittinggi City was 12.96%. While the remaining 87.14% was influenced by other factors. Other factors that can affect the 50 M Breaststroke Swimming Ability can be flexibility, coordination, speed, concentration and so on. The results of this finding confirm the theory and concept that have been explained previously, so it can be said that Arm Muscle Power is very important for an athlete in displaying swimming ability because explosive power has two components, namely strength and speed, so explosive power can be manipulated or increased by increasing muscle strength without improving speed. Or conversely, increasing speed without ignoring power, this way of approaching is usually by manipulating or by training both simultaneously so as to produce good explosive power.

2. **The results of the study show that there is a direct effect of ankle coordination on the swimming ability of the 50 m breaststroke of junior swimmers in Bukittinggi City**

In the results of the path analysis calculation, it was found that there was a direct influence of Ankle Coordination (X2) on the Breaststroke Swimming Ability of 50 M (Y) of Bukittinggi City Junior Swimming athletes (Pyx2) = 0.349 and a significance value (sig) of 0.017 which was smaller than the probability value (a) = 0.05. It turns out that Ankle Coordination has a direct and significant effect on the 50 M Breaststroke Swimming Ability. Based on the results of these findings, the hypothesis proposed in this study is accepted empirically. It can be interpreted that good Ankle Coordination has a relationship and influence in realizing movements in the 50 M Breaststroke Swimming Ability. While the remaining 72.82% was influenced by other factors. Other factors that affect the 50 M. ini Breaststroke Swimming Ability can be influenced by Speed, Flexibility, Flexibility, Lumbar Muscle Flexibility and so on.

3. **The results of the study showed that there was a direct effect of lumbar muscle flexibility on the swimming ability of the 50 m breaststroke of junior swimming athletes in Bukittinggi City.**

In the results of the path analysis calculation, it was found that there was a direct effect of Lumbar Muscle Flexibility (X3) on the 50 M (Y) Breaststroke Swimming Ability of Bukittinggi City Junior Swimmers (Pyx3) = 0.297 and a significance value (sig) of 0.036 which was smaller than the probability value (a) = 0.05. It turns out that the direct influence of Lumbar Muscle Flexibility on 50 M Breaststroke Swimming Ability in Junior Swimmers in Bukittinggi City means proven and acceptable. Based on these findings, it can be interpreted that if Bukittinggi City Junior Swimmers want to further improve their 50 M Breaststroke Swimming Ability, then it is necessary to look at other factors to make it even better. Lumbar Muscle Flexibility affects the appearance of athletes and the performance achieved.

4. **The results of the study showed that there was an indirect effect of arm muscle power on the ability to swim 50 m breaststroke through the flexibility of the waist muscles of junior swimmers in Bukittinggi City.**

In the results of the path analysis calculation, it was found that there was an indirect influence of Arm Muscle Power (X1) on the 50 M Breaststroke Swimming Ability (Y) through the Waist Muscle Flexibility (X3) of Bukittinggi City Junior Swimming Athletes (Pyx31) 0.317 or 10.04% so that Ho was rejected and Ha was accepted, where there was an indirect influence of Arm Muscle Power on the 50 M Breaststroke Swimming Ability through the Waist Muscle Flexibility of Bukittinggi City Junior Swimming Athletes. Based on the previous findings, the

direct effect of Arm Muscle Power on the 50 M Breaststroke Swimming Ability was obtained as - 0.360 or 12.96%, while the effect of Lumbar Muscle Flexibility on the 50 M Breaststroke Swimming Ability was 0.297 or 8.82%. This means that if these two variables are integrated, the influence obtained is quite significant. It can be interpreted that Arm Muscle Power through Waist Muscle Flexibility has a greater influence on the 50 M Breaststroke Swimming Ability in Bukittinggi City Junior Swimmers.

5. **The results of the study showed that there was an indirect effect of ankle coordination on the ability to swim 50 m breaststroke through the flexibility of the waist muscles of junior swimmers in Bukittinggi City**

   In the results of the path analysis calculation, it was found that there was an indirect influence of Ankle Coordination (X2) on the 50 M Breaststroke Swimming Ability (Y) through Lumbar Muscle Flexibility (X3), meaning that there was an indirect influence of Ankle Coordination on the 50 M Breaststroke Swimming Ability through the Lumbar Muscle Flexibility of Bukittinggi City Junior Swimming Athletes. Based on the previous findings, namely the direct influence of Coordination. Ankles on 50 M Breaststroke Swimming Ability were obtained by 0.349 or 12.18%, while the effect of Arm Muscle Power through Lumbar Muscle Flexibility on 50 M Breaststroke Swimming Ability was 0.360 or 12.96%. This means that the influence obtained is quite significant. The results of this finding show a direct influence between the Ankle Coordination variable on the 50 M Breaststroke Swimming Ability.

6. **The Results of the Study Show that there is an Influence of Arm Muscle Power, Ankle Coordination and Lumbar Muscle Flexibility simultaneously on the 50 M Breaststroke Swimming Ability of Junior Swimming Athletes in Bukittinggi City**

   If these three components are owned by the athlete in relation to swimming achievements, it will produce a good 50 M Breaststroke Swimming Ability. From the results of the research that has been carried out on the variables of individual tests carried out by X, X, and X3 on Y, it is obtained from the multiplication of the coefficient of the path pyx21 = 0.368 with tcal = 2.166 pyx32 = 0.351 with tcal = 2.052 and pyx30.297 with tcal = 2.198, compared to ttable (1-0.05)(32-1)=1.697 (at a = 0.05). Since tcal = 2.166, 2.052 and 2.198 > ttable = 1.697, then Ho is rejected, meaning the coefficient of the significant path, in this case Ha is accepted and Ho is rejected which means the coefficient of the significant path analysis. So, Arm Muscle Power, Ankle Coordination and Lumbar Muscle Flexibility have a simultaneous effect on the 50 M Breaststroke Swimming Ability. Based on the previous hypothesis, the direct influence between each variable of this study, namely Arm Muscle Power, Ankle Coordination and Lumbar Muscle Flexibility on the 50 M Breaststroke Swimming Ability of Bukittinggi City

Junior Swimmers, Ankle Coordination Variables, Lumbar Muscle Flexibility which also has a smaller influence on the 50 M Breaststroke Swimming Ability variable, against the Y variable and X2 against the Y variable through X3, a smaller result was also found in the Ankle Coordination variable (X2). This means that all Exogenous variables have an influence on the Endogenous variables. Where the effects produced are different but both have an influence and contribution in the 50 M Breaststroke Swimming Ability.

DISCUSSION

The implementation of this research has been carried out carefully based on procedures appropriate to this type of research, however there are still many limitations encountered during the research process. Even though we have tried our best, this research has limitations, including that athletes are busy with other outside activities. Obstacles are also caused by researchers not being able to control all athlete activities, where athletes also have other activities such as school, tutoring and helping parents. And also because there is a Covid pandemic like now, it is difficult for researchers to gather too many athletes if there are also other clubs training in the pool. There are several other factors that are thought to play a role in influencing the 50 M Breaststroke Swimming Ability of Swimming athletes which have not been discussed in this study. These factors include elements of physical condition and psychological elements which have not been discussed in this research, as well as seriousness in training the 50 M breaststroke swimming ability.

KESIMPULAN

Based on the results of hypothesis testing and discussion, the following conclusions are obtained, arm Muscle Power has a direct and significant effect on 50 M Breaststroke Swimming Ability by 12.96%. This means that the stronger the arm muscle power of a swimming athlete, the better the ability to swim 50 m breaststroke optimally. Ankle Toe Coordination has a direct and significant effect on 50 M Breaststroke Swimming Ability by 12.18%. This means that if the athlete's foot-eye coordination is good in carrying out movements, it will further improve the athlete's skills in 50 M Breaststroke Swimming Ability. Waist Muscle Flexibility has a direct and significant effect on 50 M Breaststroke Swimming Ability by 8.82%. This means that if the athlete's waist muscle flexibility is good in carrying out movements, it will further improve the athlete's skills in 50 M Breaststroke Swimming Ability. Arm Muscle Power has an indirect effect on 50 M Breaststroke Swimming Ability through Waist Muscle Flexibility by 20.61%. This means that the better the Arm Muscle Power, Briefly explain the achievements obtained from the questions you raised in this research and the benefits that can be used by the different parties/stakeholder. In this

case, you have the opportunity to affirm that this research is important and has contributed to various parties/stakeholder. then you will be able to improve motor coordination in performing the 50 M Breaststroke Swimming Skill. Ankle Toe Coordination has an indirect effect on 50 M Breaststroke Swimming Ability through Waist Muscle Flexibility by 15.13%. This means that the athlete's waist muscle flexibility is good in processing movements. Then you will be able to improve eye-foot coordination in performing 50 M Breaststroke Swimming Ability. Arm Muscle Power, Ankle Coordination and Waist Muscle Flexibility simultaneously influence the 50 M Breaststroke Swimming Ability by 80.80%. This means that if the athlete's arm muscle strength, ankle-foot coordination and waist muscle flexibility are good, it will have a simultaneous influence on the 50 M breaststroke swimming ability.

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