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JORPRES (Jurnal Olahraga Prestasi), 19 (1), 2023, 21-31

The effect of leg muscle explosiveness, agility, and flexibility on the Padang Club Athletics 100 sprint

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Abstrak
This study aims to see the direct or indirect influence of leg muscle explosiveness, agility, and flexibility on the 100-meter sprint speed of Padang club (APC) athletic athletes. This type of research is causal associative quantitative research with path analysis techniques. The population in this study was all 35 Padang club (APC) athletic athletes, 20 adolescent athletes (junior high/high school), 15 and child athletes (elementary school). Sampling using purposive sampling techniques, so the sample in this study was 20 adolescent athletes (junior high/high school). Based on the results of data analysis shows that: (1) There is a direct influence of leg muscle explosive power on 100-meter sprint speed, which is 31.5% (2) There is a direct influence of agility on 100-meter sprint speed of 92.1% (3) There is a direct influence of flexibility on 100-meter sprint speed of 52.1% (4) There is an indirect influence of leg muscle explosive power through flexure on 100-meter sprint speed of 17.7% (5) There is an indirect influence of agility through flex to 100-meter sprint speed by 45.3 % (6) Leg muscle explosive power, agility, and flexibility simultaneously affect the speed of 100-meter sprint in Padang Club Athletics (APC) athletes by 89.2%. It was concluded that the low speed of the 100-meter sprint of Padang Club (APC) athletic athletes was influenced by the explosive power of leg muscles, agility, and flexibility.
Keywords: limb muscle explosive power, agility, flexibility, 100-meter sprint

INTRODUCTION

Sport is one of the most important aspects of modern life as it is today. Exercise is a need for every human being because by exercising we can reduce the risk of hypokinetic (lack of movement) so that physical condition and health are well maintained (Sujiono & Marani, 2019; Tisna, 2017). Through sports, people can improve physical and spiritual freshness and the formation of harmonious, balanced and harmonious attitudes and personalities by human development as a whole. In addition to development in the field of sports, it is also directed to the development of sports achievements (Henjilito, 2017; Paturohman et al., 2018).

In fostering sports achievements in the State of Indonesia, the government also participates and fully supports, by issuing Law of the Republic of Indonesia in 2005 No. 3 Article 1 Paragraph 13 which reads "Sports achievement is a sport that fosters and develops sportsmen in a planned, tiered, and sustainable manner through competition to achieve achievements with the support of sports science and technology". Based on these quotes, we can understand that achievements in the field of sports can be improved and developed for the better if coaching is carried out in a planned, tiered, and sustainable manner, to be able to make the name of the region proud and even the name of this country of Indonesia that we love.

Haryanto et al., (2021); Ihsan et al., (2018) To achieve maximum achievement in the field of sports requires specific coaching and special attention. Several opinions discuss the components and also factors that influence the achievement of athletes, including: (Syafruddin, 20the 12),

ISSN 0216-4493 (print), ISSN 2597-6109 (online)

which argues that argumentallyty of an athlete achieves maximum achievement in a competition or competition is determined by four factors, namely; (1) physical condition, (2) technique, (3) tactics, and (4) mental factors (psychic). In line with Ratih's opinion (Ihsan et al, 2022), there are 3 factors that 3 factors influence achievement, namely: (1) physical development factors, (2) technical balance factors, and mental (psychological) coaching factors (Anggara & Al Saudi, 2017; Marisa et al., 2022; Putri et al., 2022).

Baskoro, (2016) Based on the explanation above, the development of physical, technical, and mental conditions is a component that needs to be considered in developing athlete abilities. To train and foster prospective sprint athletes, several elements of physical condition are needed which must be able to be developed by coaches and athletes including speed, strength, flexibility, coordination, agility, speed endurance, leg muscle explosive power, and arm muscle explosive power. All of these conditions are needed in the 100-meter sprint running speed starting from the squatting attitude on the starting beam to crossing the finish line (Argantos & Hidayat, 2017; Putra et al., 2020; Santika & Subekti, 2020)

Bachero-Mena et al., (2017); Maćkała et al., (2015); Putra et al., (2020) When an athlete makes his first explosion when he comes out of the starting beam, a very large force is needed from the athlete's leg muscle chain which is called the explosive power of the leg muscles. Then the movement of moving from position one to position two by pointing forward requires agility from an athlete, this is intended to get the maximum range of motion with a very fast time or a combination of speed and flexibility of a sprinter. Besides that, it will also help a sprint runner to get maximum speed in running 100 meters (Cania & Alnedral, 2019; Nasri et al., 2019)

In running numbers, the goal to be achieved is to reach the finish line in a short time with maximum effort. In biomechanics, things that need to be considered are the right starting position using the starting beam, the position of the body when starting, acceleration after releasing from the starting beam, and the position of the body (hands, feet, and sight) when reaching maximum speed. Running techniques in 100 meters are different from other running numbers because to reach the finish line quickly accompanied a short distance, a runner's movements must be maximum and efficient so that in running athletes do not waste time and effectiveness when running (Čoh et al., 2017; Habibi et al., 2010).

To get the maximum results from the 100-meter sprint, there is still another factor, namely the explosive power of the leg muscles, where the explosive power of leg muscles functions to direct maximum strength in a very short time. Agility is also very influential to produce a good 100-100-metering, agility is the ability to move to change direction and position as quickly as possible without losing balance. Also, flexibility, where flexibility is needed in the 100 100-metering. Although this flexibility does not absorb achievement, it is natural that someone who has good flexibility will be as fast as possible. (Ariani, 2021; Yan & Jin, 2004).

The results of interviews and observations that the decline in the achievement of athletes in the 100-meter sprint is thought to be caused by internal and external factors. Internal factors are factors that originate from the individual athlete himself, such as lack of achievement motivation, immature mentality, nutritional problems, athlete's physical condition (explosiveness, agility, flexibility, and speed), skills, and so on. While external factors are factors that come from outside the athlete, such as the ability of coaches, training programs, spectators, forms of training, facilities, infrastructure, and so on. This study aims to see the direct and indirect effect of leg muscle explosive power, agility, and flexibility on the speed of the 100-meter sprint in Padang Club (APC) athletic athletes.

METHOD

This type of research is quantitative research with a causal sociative correlation approach. This study aims to see the direct and indirect effect of leg muscle explosive power, agility, and flexibility on the 100-meter sprint running speed of Padang club athletes (APC). This research belongs to the type of quantitative research that uses simple regression and multiple regression data analysis techniques, after which it is continued with path analysis.

Kadir, (2017) Path analysis is a statistical technique used to examine the causal relationship between two or more variables. In path analysis, the terms exogenous variables and endogenous variables are known. The variables associated with this study were leg muscle explosiveness (X1), and agility (X2) as an independent variable (exogenous), flexibility (X3) as an intervening variable, and also an endogenous variable. While the dependent variable, namely, the speed of the 100-meter sprint (Y) for more details, the path design for the structural model is illustrated in Figure 3. Direct and indirect causal relationships.

This research was carried out on Padang Koita Padang Club (APC) athletes. This research was carried out on March 16 & 20 2023 at the Lubuk Buaya Brimoib field and the Neigeiri University Padang Athletics field. In this research, the population is all of the Padang Club (APC) athletes, totaling 35 people. The sampling technique in this research is purposive sampling. The sample in this study were male athletes and female athletes totaling 20 Padang Club (APC) athletes. The other considerations in the sample collection were the Padang Club (APC) Athletes, some of whom were still in elementary school, so they had not been able to carry out the thesis optimally.

The research instrument was leg muscle explosive power with a standing board jump test, agility with a 4x10 meter back and forth test, flexibility with a standing trunk flexion test, and 100-meter sprint running speed with a 100-meter sprint test. Data Analysis Techniques Data analysis includes 1) data description, 2) requirements analysis test which consists of normality test and linearity test, and 3) path analysis which includes: structural model testing and hypothesis testing.

The description data described is data obtained from the test for each variable and processed statistically, such as the highest value, lowest value, average value, and standard deviation. Analysis Requirements Test Before the data is analyzed further, it is necessary to test the data analysis requirements. The tests carried out include normality tests and linearity tests for each data variable. Path Analysis After the normality test and regression linearity test is fulfilled, then proceed with testing the path analysis hypothesis (path analysis) by testing the structural model. Conclusions on the proposed hypothesis will be drawn by calculating the path coefficient and significance for each path studied.

RESULTS AND DISCUSSION

Result

a.Testing Prerequisites Analysis

Table 1. Summary of Data Normality Test Results from Research Design

Tests of Normality			
	Shapiro-Wilk		
	Statistic	df	Sig.
Y	0.912	20	0.069
X1	0.947	20	0.320
X2	0.912	20	0.069
X3	0.905	20	0.051

Based on the results of normality test calculations using the Shapiro-Wilk test, the probability valuShapiro-Wilk Thus it can be concluded that all the group data in this research are normally distributed.

Table 2. Summary of Data Homogeneity Test Results from Research Design

No	Variance	F count	F table	Information
1	Y and X_1	0.84	2.07	Homogen
2	Y and X_2	1	2.07	Homogen
3	Y and X_3	1.05	2.07	Homogen
4	X_3 and X_1	0.80	2.07	Homogen
5	X_3 and X_2	0.94	2.07	Homogen
6	X_2 and X_1	0.85	2.07	Homogen

Based on the results of the calculation of the homogeneity test of the research design group above, it was found that F count < F table. Thus it can be concluded that all the heterogeneous data in this study were taken from a homogeneous population.

ISSN 0216-4493 (print), ISSN 2597-6109 (online)

Table 3. Summary of Data Linearity Test Results from the Research Design

No	connection	Probability (sig)	Sig α	Information
1	Y dan X_1	0.219	0.05	linear
2	Y dan X_2	0.471	0.05	linear
3	Y dan X_3	222	0.05	Linear
4	X_3 dan X_1	0.441	0.05	Linear
5	X_3 dan X_2	0.465	0.05	Linear
6	X_2 dan X_1	0.198	0.05	Linear

Based on the results of the calculation of the linearity test for the research design group above, it was found that the price probability value was > 0.05. Thus it can be concluded that all data groups in this study are linear.

b. Hypothesis test

After testing the fulfillment of the analysis requirements as a research study, the researcher then conducts research hypothesis testing which is carried out through the following steps:

1. Conceptual Model Testing

Based on the results of the theoretical study, a framework of thinking can be formulated in the form of a conceptual model, as well as a hypothesis of research studies such as the model paradigm of the relationship between variables. The hypotheses to be tested based on the conceptual model are as follows: a) There is a direct effect between the explosive power of the leg muscle (X1) and the 100-meter sprint (Y). b) There is a direct effect between agility (X2) and the 100-meter sprint (Y). c) There is a dir100-meters between agility (X3) and the 100-meter sprint (Y). d) There is an in100-perfect between leg muscle explosive power (X1) through intelligence (X3) on the 100-meter sprint (Y). e) There is an inin100-perfect between agility (X2) through intelligence (X3) on the 100-meter sprint (Y). f) There is a direct effect of leg muscle explosive power (X1), agility (X2), flexibility (X3) simultaneously on the and 100-meter sprint (Y)

2. Path Analysis Model

The path analysis model is used to determine e the direct effect of each variable, namely the leg muscle explosive power variable (X1) on the 100-meter sprint (Y), agility variable (X2) on the 100-meter sprint (Y), flexibility variable (X3) on the sprint 100 meters (Y), leg muscle explosive power variable (X1) through flexibility (X3) for the 100-meter sprint (Y), agility variable (X2) through flexibility (X3) for the 100-meter sprint (Y) and explosive power variable leg muscles (X1) agility (X2), flexibility (X3) simultaneously against the 100-meter sprint (Y).

Based on this relationship, an analysis model concept specification can be made such as the following path analysis image:

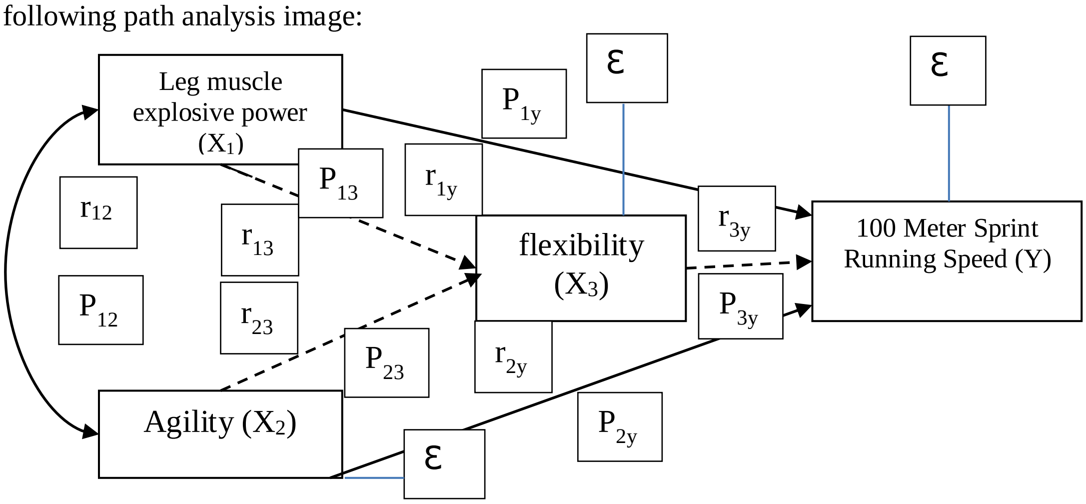

Figure 1. Model analysis on the influence of leg muscle explosive power (X1), agility (X2), flexibility (X3), and 100-meter sprint (Y) variables.

3., Out 100-meter Analysis Model

a. Identify Path Coefficients

Based on the results of the multilevel regression analysis that has been carried out with the help of the SPSS application, each path coefficient can be determined as follows:

1. Stage regression 1 beta $X_{y1} = 0.315$ (t = 1.85) = ρ_{yx1} (coefficient path X_1 with Y)
2. Stage regression 2 beta $X_{y2} = 0.921$ (t = 25.95) = ρ_{yx2} (coefficient path X_2 with Y)
3. Stage regression 3 beta $X_{3y} = 0.521$ (t =1.908) = ρ_{yx3} (coefficient path X_3 with Y)
4. Stage regression 4 beta $X_{13} = 0.340$ (t = 1.983) = ρ_{x1x3} (coefficient path X_1 with X_3)
5. Stage regression 5 beta $X_{23} = 0.870$ (t= 5.536) = ρ_{x2x3} (coefficient path X_2 with X_3)
6. Stage regression 6 beta $X_{12} = 0.92$ (t= 9.94) = ρ_{x1x2} (coefficient path X_1 with X_2).

b. Calculating the path coefficient for the residual

By using the formula $\varepsilon_i = \sqrt{(1 - R^2)}$ then the path coefficient for the residual of each variable can be calculated. The following are the path coefficient values for the residuals:

$_1 = \sqrt{(1 - R^2)}$
$_1 = \sqrt{(1 - 0.846)}$
$\varepsilon_1 = 0.392$
$_2 = \sqrt{(1 - R^2)}$
$_2 = \sqrt{(1 - 0.907)}$
$\varepsilon_2 = 0.304$
$_3 = \sqrt{(1 - R^2)}$
$_3 = \sqrt{(1 - 0.892)}$
$\varepsilon_3 = 0.328$

c. Testing the Significance of Influence

1.) The effect of leg muscle explosive power (X1) on the 100-meter sprint (Y). Based on the resu100-meter analysis, the value of ρyx1 = 0.315, and the t count is 1.85 with p-value = 0.083/2 t count 15. Based on the tp-value, it can be concluded that there is an influence of leg muscle explosive power (X1) on the 100-meter sprint (Y). 2) The effect of 100-meterX2) on the 100-meter sprint (Y). Based on the resu100-meter analysis, the value of ρyx2 = 0.921, and the t count is 25.95 with p-value i = 0.000/count000. Based on these values, it can be concluded that there is an effect of agility (X2) on the 100-meter sprint (Y). 3) The effect of 100-meter (X3) on the 100-meter sprint (Y). Based on the analysis results, the value of ρyx3 = 0.521, and the t count is 1.908 with p-value i = 0.075/2 = 0.0375. Based on these values, it can be concluded that there is an effect of agility (X2) on the 100-meter sprint (Y). 4) Effect of leg muscle explosive power (X1) on flexibility (X3). Based on the results of the analysis, the value of ρx3x1 = 0.340, and the t count is 1.983 with p-value i = 0.050/2 = 0.025. Based on these values, it can be concluded that there is an influence of leg muscle explosive power (X1) on flexibility (X3). 5) Effect of agility (X2) on flexibility (X3). Based on the results of the analysis, the value of ρx3x2 = 0.870, and the count is 5.536 with p-value = 0.000/2 = 0.000. Based on these values, it can be concluded that there is an effect of agility (X2) on flexibility (X3). 6) Effect of leg muscle explosive power (X1) on agility (X2). Based on the results of the analysis, the value of ρx2x1 = 0.920, and the t count is 9.944 with p-value = 0.000/2 = 0.000. Based on these values, it can be concluded that there is an influence of leg muscle explosive power (X1) on agility (X2).

d. Loading Path Coefficients into the Model

on the results of the analysis of each variable and the discussion of the path analysis study model, the path coefficients can be presented as illustrated below:

ISSN 0216-4493 (print), ISSN 2597-6109 (online)

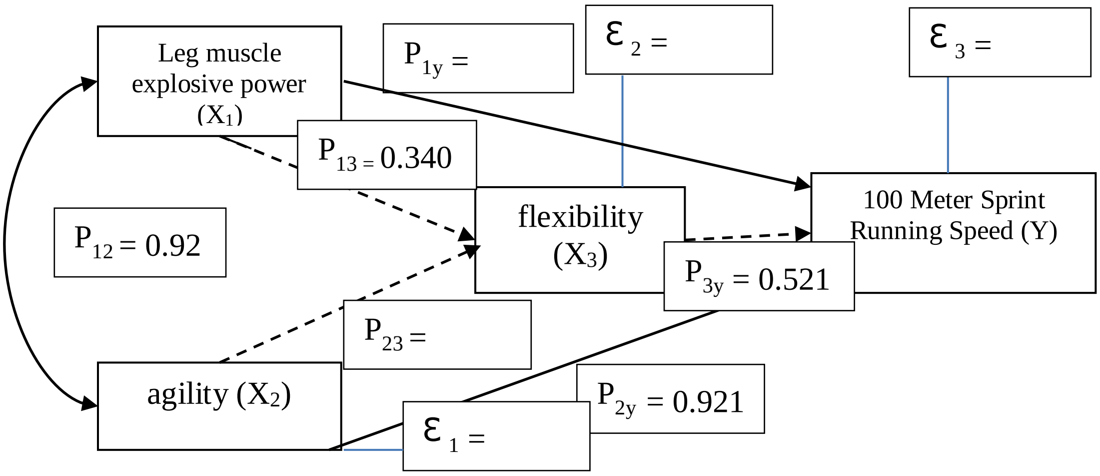

Figure 2. Model analysis on the influence of leg muscle explosive power (X1), agility (X2), flexibility (X3), and 100-meter sprint (Y) variables.

The results of the path coefficient calculations are used to test the proposed hypothesis, namely to measure the direct and indirect effects of exogenous variables on ended variables in the structural model. Concluding the results of statistical calculations t for each coefficient with the condition that t count > t table = then the path coefficient is significant and if t count < t table = then the path coefficient is not significant. The decision results for all hypotheses are as follows:

a) Direct influence between variables

1. There is a direct effect of leg muscle explosive power (X1) on the speed of the 100-meter sprint (Y). To be able to prove the direct effect of leg muscle explosive power (X1) on the 100-meter sprint (Y), the proposed research hypothesis is as follows: Based on the results of the analysis, the value of ρyx1 = 0.315 and the t count is 1.85 with sig. 0.083/2=0.0415 and at α = 0.05 obtained t table = 1.729. Because t count (1.85) > trail (1.729) or sig. 0.0415 < 0.05, then reject H0 and accept H1 which means there is a direct effect of leg muscle explosive power (X1) on the 100-meter sprint (Y).
2. There is a direct effect of agility (X2) on the speed of the 100-meter sprint (Y). To be able to prove the direct effect of agility (X2) on the 100-meter sprint (Y), the proposed research hypothesis is as follows. Based on the results of the analysis, the value of ρyx2 = 0.921, and the t count is 25.96 with sig. 0.000/2 = 0.000 and at α = 0.05 obtained ttable = 1.729. Because t count (25.96) > t table (1.729) or sig. 0.000 < 0.05, then reject H0 and accept H1 which means there is a direct effect of agility (X2) on the speed of the 100-meter sprint (Y).
3. There is a direct effect of flexibility (X3) on the 100-meter sprint (Y). To be able to prove the direct effect of flexibility (X3) on the 100-meter sprint (Y), the proposed research hypothesis is as follows. Based on the results of the analysis, the value of ρyx3 = 0.521, and the t count is 1.908 with sig. 0.075/2=0.0375 and at α = 0.05 obtained ttable = 1.729. Because count (1.908) > table (1.729) or sig. 0.0375 <0.05, then reject H0 and accept H1 which means there is a direct effect of flexibility (X3) on the 100-meter sprint (Y).
4. There is an influence of leg muscle explosive power (X1) on flexibility (X3). To be able to prove the direct effect of leg muscle explosive power (X1) on flexibility (X3), the proposed research hypothesis is as follows. Based on the results of the analysis, the value of ρx3x1 = 0.340, and t count is 1.983 with sig. 0.05/2 = 0.025 and at α = 0.05 obtained ttable = 1.729. Because t count (1.983) > t table (1.729) or sig. 0.025 < 0.05, then reject H0 and accept H1 which means there is a direct effect of leg muscle explosive power (X1) on flexibility (X3).
5. There is an effect of agility (X2) on flexibility (X3). To be able to prove the direct effect of agility (X2) on flexibility (X3). the proposed research hypothesis is as follows: Based on the analysis results, the value of ρx3x2 = 0.870, and t count is 5.536 with sig. 0.000/2 = 0.000 and at α = 0.05 obtained ttable = 1.729. Because t count (5,536) > t table (1,729) or sig. 0.000 < 0.05, then reject H0 and accept H1 which means there is a direct effect of agility (X2) on flexibility (X3).

ISSN 0216-4493 (print), ISSN 2597-6109 (online)

6. There is a direct effect of leg muscle explosive power (X1) on agility (X2). To prove the direct effect of leg muscle explosive power (X1) on agility (X2), the proposed research hypothesis is as follows: Based on the results of the analysis, the value of $\rho x2x1 = 0.92$ and t count is 9.944 with sig. 0.000/2 = 0.000 and at $\alpha = 0.05$ obtained ttable = 1.729. Because count (9,944) > t table(1,729) or sig. 0.000 < 0.05, then reject H0 and accept H1 which means there is a direct effect of leg muscle explosive power (X1) on agility (X2).

Table 4. Summary of the influence between variables

No	hypothesis	Statistic test	Status H_0 or H_1	Information
1	X_1 to Y	$H_{a:} p_{yx1} \leq 0$ $H_{a:} p_{yx1} > 0$	Reject H_0 or accept H_1	Has a direct positive effect
2	X_2 to Y	$H_{a:} p_{yx2} \leq 0$ $H_{a:} p_{yx2} > 0$	Reject H_0 or accept H_1	Has a direct positive effect
3	X_3 to Y	$H_{a:} p_{yx3} \leq 0$ $H_{a:} p_{yx3} > 0$	Reject H_0 or accept H_1	Has a direct positive effect
4	X_1 to X_3	$H_{a:} p_{x1x3} \leq 0$ $H_{a:} p_{x1x3} > 0$	Reject H_0 or accept H_1	Has a direct positive effect
5	X_2 to X_3	$H_{a:} p_{x2x3} \leq 0$ $H_{a:} p_{x2x3} > 0$	Reject H_0 or accept H_1	Has a direct positive effect
6	X_1 to X_2	$H_{a:} p_{x2x1} \leq 0$ $H_{a:} p_{x2x1} > 0$	Reject H_0 or accept H_1	Has a direct positive effect

b) Summarize Indirect Influence Between Variables

1) The indirect effect of the leg muscle explosive power variable (X1) on the 100-meter sprint (Y) through the flexibility variable (X3). From the results of the analysis above, it can be concluded that there is an indirect effect of the leg muscle explosive power variable (X1) on the 100-meter sprint (Y) through the flexibility variable (X3) of 17.7%. 2) The indirect effect of the agility variable (X2) on the 100-meter sprint (Y) is through the flexibility variable (X3). From the results of the analysis above, it can be concluded that there is an indirect effect of the agility variable (X2) on the 100-meter sprint (Y) through the flexibility variable (X3) of 45.3%.

c) Summarizes the direct and indirect effects between variables according to the research hypothesis

Based on the model presented above, where there are path coefficients that have values such as pyx1 = 0.315, pyx2 = 0.921, pyx3 = 0.521, px3x1 = 0.340, px3x2 = 0.870, px2x1 = 0.92. In this way, a recapitulation of the direct and indirect effects of exogenous variables on endogenous variables can be compiled. 1) The direct effect of the leg athlete's explosive power variable (X1) on the 100-meter sprint (Y). Based on the path coefficient value pyx1 = 0.315, it can be concluded that there is a direct effect of the leg muscle explosive power variable (X1) on the 100-meter sprint (Y) of 31.5%. 2) The direct effect of the agility variable (X2) on the 100-meter sprint (Y).

Based on the path coefficient value pyx2 = 0.921 it can be concluded that there is a direct effect of the agility variable (X2) on the 100-meter sprint (Y) of 92.1%. 3) The direct effect of the flexibility variable (X3) on the 100-meter sprint (Y). Based on the path coefficient value pyx3 = 0.521, it can be concluded that there is a direct effect of the flexibility variable (X1) on the 100-meter sprint (Y) of 52.1%. 4) The direct effect of leg muscle explosive power variable (X1) on agility (X2). Based on the path coefficient px2x1 = 0.920, it can be concluded that there is a direct effect of the leg muscle explosive power variable (X1) on agility by 92%. 5) The indirect effect of the leg muscle explosive power variable (X1) on the 100-meter sprint (Y) through the flexibility variable (X3). From the results of the analysis above, it can be concluded that there is an indirect effect of the explosive power variable of the leg muscles (X1) on the 100-meter sprint (Y) through the flexibility variable (X3) of 17.7%. 6) The indirect effect of the agility variable (X2) on the 100-meter sprint (Y) is through the flexibility variable (X3). From the results of the analysis above, it can be concluded that there is an indirect effect of the agility variable (X2) on the 100-meter sprint (Y) through the flexibility variable (X3) of 45.3%.

ISSN 0216-4493 (print), ISSN 2597-6109 (online)

d) The value of leg muscle explosive power, agility, and flexibility simultaneously influence the speed of the 100-meter sprint in Padang Club (APC) Athletic athletes

Based on the R-square value obtained, which is equal to 0.892, it can be concluded that leg exercise, agility, and flexibility simultaneously influence the 100-meter sprint speed in Padang Club Athletic athletes (APC) by 89.2%. The remaining 10.2% is influenced by other factors outside the model.

Discussion

1. The direct effect of leg muscle explosive power (X1) on the speed of the 100-meter sprint (Y)

The explosive power of the leg muscles results from the ability of the leg muscles to contract to overcome a predetermined load that is passed in a very short time because it is influenced by the energy system used by the leg muscles. From the results of research that has been done on the variable leg muscle explosive power on 100-meter sprint speed, it was found that there was a direct effect of leg muscle explosive power on 100-meter sprint speed by 31.5%. Understanding the findings above, we can observe that the explosive power of the leg muscles is an important component of physical condition and has an influence on the speed of the 100-meter sprint.

Not only that, the findings conducted by (Massuaming, 2018) also show that the explosive power of the leg muscles has a positive effect on the results of the 100-meter run. Besides that, strong leg muscle explosive power will also result in a better 100-meter running ability. We can observe this result through research conducted (Kadeik, Deiwi, Sudiana, Luh, & Alit, 2014) on the single-leg speed hop training program model with double leg speed hop which shows the single-leg speed hop training model has a better value for increases the explosive power of the leg muscles with the average difference obtained is 4.667, thus the explosive power of the leg muscles used in the 100-meter run is not significantly affected by the explosive power of the leg muscles, therefore the 100-meter run has a high level of complexity in achieving a run 100 meter better (Gil et al., 2019). Thus we can understand that the explosive power of the leg muscles in theory affects the results of the 100-meter run. Furthermore, from the data that has been collected through research, we find that good leg muscle explosive power will also have a positive effect on the results of the 100-meter run that will be obtained.

2. The direct effect of agility (X2) on the 100-meter sprint (Y)

The findings from the research that has been conducted show that agility has a direct influence on the speed of the 100-meter sprint. This means that agility can explain the speed of the 100-minute sprint will be good if you have good agility in other words if someone has a good level of agility then the 100-minute sprint ability achieved will also be good because of good agility, the 100-minute sprint ability achieved will be It would also be good because agility is a physical conditional ability that is composed of a combination of intelligence and movement speed possessed by someone who will affect the results of the 100-meter run (Rumini, Soieigiyantoi, Lumintuarsoi, & Rahayu, 2012).

In addition, true agility is the body's ability to change direction quickly and precisely so this will certainly increase the speed of the 100-meter sprint because it contributes positively to getting maximum acceleration. (Rodríguez-Rosell et al., 2017).From the results of research that has been carried out on the agility variable on the 100-meter sprint running speed, it was found that there is a direct effect of agility on the 100-meter sprint running speed of 31.5%. In principle, agility will make a positive contribution to the speed of the 100-meter sprint, with these conditions it will be very possible for runners to improve the quality of their agility to produce good acceleration so that these results will have a positive impact on increasing the speed of their 100-meter sprint.

3. The Direct Effect of Flexibility (X3) on 100-Meter Sprint Running Speed (Y)

From the results of the research found on the flexibility variable on the 100-meter sprint running speed, it was found that there was a direct effect of flexibility on the 100-meter sprint running speed so it can be said that the 100-meter sprint running speed will be supported by the flexibility one has. Based on the results of the study it can be concluded that there is a direct effect of intuition on the 100-meter sprint of 52.1%. Flexibility is the limit of the maximum range of motion that can be done in a joint. Flexibility is useful for motion efficiency in carrying out motion activities and preventing possible injuries. This ability is needed by every student, flexibility is the ability of various joints in the body to move as widely as possible. The better the intellect of a student, the better the results of the 100-meter Sprint run. (Loturco, D’Angelo, et al., 2015).

ISSN 0216-4493 (print), ISSN 2597-6109 (online)

4. The Indirect Influence of Limb Muscle Explosive Power Through Flexibility To 100 Meter Sprint Running Speed

The results of the study stated that there was an indirect effect between the explosive power of the limbs on the sprint speed of the 100 meters through flexibility, the magnitude of the effect that occurred was 17.7%, meaning that the influence between the explosive power of the leg muscles on the sprint speed of the 100 meters through skill had a positive effect, thus proving that the achievement of running 100 meters will be supported by good physical abilities as well as a good flexibility. With the meaning that someone who has good leg muscle explosive power accompanied by intelligence will achieve a good 100-meter running ability. (Loturco, Pereira, et al., 2015).

5. Indirect Effect of Agility Through Flexibility on 100-Meter Sprint Running Speed

Based on the research results, it can be concluded that there is an indirect effect of the agility variable on the speed of the 100-meter sprint through the flexibility variable of 45.3%. This shows that agility has an indirect effect on the results of the 100-meter run-through flexibility. Thus good flexibility shows that there is an influence on the good and bad of the 100-meter running speed one has. So it is necessary to have a programmatic training pattern for physical improvement in every exercise that will be carried out to achieve the goals that have been set. (Čoh et al., 2017; Putra et al., 2020).

6. The Effect of Limb Muscle Explosive Power, Agility, and Flexibility Simultaneously on 100-Meter Sprint Running Speed

Based on the R-square value obtained, which is equal to 0.892, it can be concluded that leg muscle explosiveness, agility, and flexibility have a simultaneous effect on the speed of the 100-meter sprint in Padang Club (APC) athletes of 89.2%. The remaining 10.2% is influenced by other factors outside of the model. It is also in line with previous research that the explosive power of the leg muscles, agility, and flexibility simultaneously affect the speed of the 100-meter sprint. (Haryanto et al., 2021; Henjilito, 2017; Ihsan et al., 2018).

CONCLUSION

It was concluded based on the results of the research that had been stated previously that it was known that the explosive power of the leg muscles, agility, and flexibility had a positive effect on the speed of the 100-meter sprint.

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