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Analysis of Flexibility and Balance on Acceleration of Racehorse Jockeys in Jeneponto Regency

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ABSTRACT

This study aims to analyze the relationship between jockeys' physical conditions, namely flexibility and balance, to the acceleration of racehorse jockeys in Jeneponto Regency. The method used is Ex Post Facto with a Descriptive Correlational Path Analysis approach. The study population includes all racehorse jockeys in Jeneponto Regency, with a sample of 30 jockeys taken using the total sampling method. The research instruments consist of a flexibility test, a dynamic balance test, and a track travel time test to measure acceleration. Data were analyzed through correlation tests and path analysis. The results of the analysis show: (1) There is a significant relationship between jockeys' flexibility and acceleration (r = 0.714), which explains 71.4% of the variance in acceleration. (2) Balance also shows a significant relationship with acceleration (r = 0.751), explaining 75.1% of the variance in acceleration. (3) Simultaneously, flexibility and balance have a significant relationship (r = 0.754), with $R^2 = 0.568$, meaning that 56.8% of jockey acceleration can be explained by these two variables. The conclusion is that 56.8% of a racehorse jockey's acceleration is explained by the contribution of flexibility and balance. Physical conditions in the form of flexibility and balance are dominant and important factors that support each other in determining a jockey's ability to produce optimal acceleration on a racehorse.

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INTRODUCTION

Sports activities encompass various forms of physical activity that can be conducted in a structured manner with standard rules or informally without binding regulations. Sports play a fundamental role in human life because they can develop positive character traits, such as physical strength, sportsmanship, and team collaboration. Sporting achievements can even enhance a nation's prestige internationally, as seen in Brazil, synonymous with soccer, Russia's excellence in gymnastics, and the United States' dominance in boxing and basketball. Furthermore, sports also prepare individuals for increasingly fierce global competition (Arga et al., 2025; Asri et al., 2025).

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Achievement in sports is strongly influenced by both physical and non-physical factors, although physical components such as balance, flexibility, acceleration, strength, and speed are more dominant in developing athletes towards peak performance. Identifying physical potential helps direct early development to higher levels according to the characteristics of the sport being pursued (Arga, 2025). This research focuses on the local wisdom of Jeneponto Regency, specifically the tradition of horse racing, which has become a distinct cultural tradition in the region. Jeneponto Regency is known not only for its culinary specialities such as coto kuda (horse coto), gantala langka (rarely called horse confection), and konro kuda (horse confection), but also as a center for traditional horse racing. This research focuses on the physical abilities of jockeys in accelerating with their racehorses, from the start to crossing the finish line, which determines victory. Horse racing not only demands riding skills but also provides physical, mental, and emotional benefits (Arga et al., 2025; Arga, S.P., 2023).

Horse racing is a sport that demands skill in riding, controlling, running, and jumping alongside a horse. In addition to requiring a well-trained horse, the jockey must also be able to guide the horse through obstacles without becoming a burden on the rider. When riding, the rider must sit upright and hold the reins securely, while the rider's body must actively follow the horse's movement patterns so that the muscles, joints, and bones respond automatically and become strong (Arga et al., 2025). Horse racing formats vary widely, and different countries have developed variations tailored to their specific regions, from restrictions on horse breeds, distance differences, track surfaces, and even different gaits. Horse racing traditions in Indonesia have been rooted in various regions since before independence, such as pacu kude (horse racing) in Aceh, maen jaran (horse racing) and pacoa jara (horse racing) in Sumbawa and Bima, and pacu kudo (horse racing) in West Sumatra and Jeneponto (Mappaompo et al., 2024). In Jeneponto, horse races are held regularly every Wednesday, Saturday, and Sunday, involving traditional leaders who bring horses to represent their region. These races are synonymous with cash wagers, and victory is determined by a combination of horse and jockey performance according to strict rules—horses must remain on the track, jockeys must not leave their horses until the finish, and they are prohibited from disturbing other participants.

The role of the jockey in Jeneponto horse racing is crucial to the outcome of the race. A jockey's balance helps maintain an efficient center of gravity, minimizing the risk of losing control during acceleration. Meanwhile, flexibility allows the jockey to respond dynamically and quickly to the horse's movements without muscle stiffness. High flexibility allows for postural adjustments to maintain momentum throughout the race. A combination of good balance and flexibility has been shown to improve movement efficiency, explosive power, and reaction time during the acceleration phase (Badaru, 2022; Arga, 2025). Acceleration is a crucial skill, requiring quick reactions and optimal body control, particularly in traditional horse racing. Acceleration refers to the capacity to increase speed quickly, particularly at the start and at key moments during the race. This ability relies on the jockey's muscular strength, balance, and flexibility; balance

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maintains body stability, and flexibility allows for postural flexibility during sudden changes in speed and direction (Sufitriyono et al., 2025; Arga, 2025).

However, jockeys' physical training programs rarely systematically emphasize the relationship between flexibility and balance and acceleration. Many horse owners are less selective in selecting jockeys without proper assessment, resulting in underachieving horses. Training often focuses solely on strength and speed, neglecting the equally important aspects of balance and flexibility. A deeper understanding of the influence of balance and flexibility on acceleration can form the basis for developing more comprehensive training programs (Arga & Riskal Fitri, 2025; Presidential Instruction, 2023). Given the importance of optimal fitness through effective acceleration training, research into the analysis of flexibility and balance in jockey acceleration in Jeneponto is highly relevant. The findings of this study are expected to broaden the understanding of horse racing practitioners regarding the importance of good physical flexibility and balance in jockeys. The public also needs to understand that jockeys require specific physical training that differs from other sports (Arga et al., 2025).

This study aims to analyze the influence of jockeys' balance and flexibility on acceleration ability in horse racing, thereby contributing to the development of jockey physical training methods and improving the performance of traditional Jeneponto horse racing. The focus of this study is to examine the jockey's ability to accelerate the horse to its maximum sprint towards the finish, a key skill that differentiates champions from other competitors. The ability to optimize flexibility and balance is believed to maximize the horse's speed at crucial points, particularly at the start and finish, which are the prerequisites for victory. This study specifically examines the relationship between the jockey's flexibility and balance and acceleration ability, as horse handlers generally recruit jockeys well in advance of the race, and their selection significantly influences the outcome. With this background, the research theme is: "Analysis of Flexibility and Balance Against Jockey Acceleration in Racehorses in Jeneponto Regency."

METHODS

This study used a descriptive correlational method to identify and analyze the relationship between flexibility and balance on jockey acceleration in horse racing. This method was chosen because it is suitable for systematically exploring the relationship between variables without experimental manipulation (Sugiyono, 2011: 1). This scientific approach allows researchers to obtain objective data regarding the magnitude of the influence of jockeys' physical condition on acceleration performance in the context of actual racing.

The research location was the Jeneponto Regency horse racing arena, South Sulawesi, chosen based on the consideration that horse racing traditions are deeply rooted and routinely practiced. This study is classified as quantitative with a descriptive correlational design aimed at measuring the level of closeness of the relationship between the independent variables (flexibility and balance) and the dependent variable (jockey acceleration). The study population was all active jockeys registered and regularly competing at the Jeneponto Regency horse racing arena. The sampling

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technique used was purposive sampling with the following inclusion criteria: (1) active jockeys with at least one year of experience; (2) aged 12-25 years; (3) regularly participating in competitions; and (4) willing to participate as research respondents.

Measurement of research variables using validated standard instruments:

1. Flexibility: Measured using the Sit and Reach Test with a flexibility testing box. The subject sits with their legs straight and touching the measuring box, then bends forward as far as possible while pushing a slide rule. Results are recorded in centimetres to assess hamstring and lower back flexibility.
2. Balance: Measured using the Stork Balance Stand Test. The subject stands with one foot on a balance beam, the other foot resting on the knee of the supporting leg, with their eyes closed. The duration of maintaining the balance position is recorded in seconds. The test is performed on both legs, and the average value is taken.
3. Acceleration: Measured using a 20-meter sprint test with a digital stopwatch with a precision of 0.01 seconds or a timing gate system. The time from the start to crossing the 20-meter finish line is recorded as an indicator of acceleration ability. Measurements are conducted under conditions simulating riding a racehorse on a real track.

Data collection was carried out through systematic stages: (1) coordination with arena managers and horse handlers for scheduling; (2) informed consent from research subjects; (3) basic anthropometric measurements (height and weight); (4) implementation of flexibility, balance, and acceleration tests according to standard protocols; (5) recording results on structured observation sheets; (6) verification and validation of field data. The collected data were analyzed using descriptive and inferential statistics with SPSS software version 25.0. These include Descriptive Analysis, Normality Test, Linearity Test, Correlation Analysis Using Pearson Product-Moment, and Multiple Regression Analysis. All hypothesis tests used a 5% significance level with the decision to reject H_0 if the p-value <0.05, which indicates a statistically significant relationship or influence.

RESULTS AND DISCUSSION

Result

The data analysis used in this study utilized descriptive and inferential statistical techniques.

Table 1.
Summary of descriptive analysis results of data on forward torso flexibility, balance, and acceleration of racehorse jockeys in Jeneponto Regency

Statistical Value	Forward Flexibility of the Togok (X1)	Balance (X2)	Jockey Acceleration (Y)
N	30	30	30
Mean	0,68263889	78.90	75.37.00
Median	16.00	80.50.00	75.00.00
Std. Dev.	03.37	08.13	0,31388889
Varians	11.39	66.19.00	47,9

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Statistical Value	Forward Flexibility of the Togok (X1)	Balance (X2)	Jockey Acceleration (Y)
Range	12.00	27.00.00	27.00.00
Min.	10.00	65.00.00	65.00.00
Mak.	22.00	92.00.00	92.00.00
Sum	475.00.00	2367.00.00	2261.00.00

Based on the summary of the descriptive data analysis results in Table 1 above, the following can be explained:

1. The forward torso flexibility of the 30 racehorse jockeys sampled was found to have a mean of 15.83, a median of 16.00, a standard deviation of 3.37, a variance of 11.39, a range of 12.00, a minimum value of 10.00, a maximum value of 22.00, and a sum value of 475.00.
2. The dynamic balance of the 30 racehorse jockeys sampled was found to have a mean of 78.90, a median of 80.50, a standard deviation of 8.13, a variance of 66.16, a range of 27.00, a minimum value of 66.00, a maximum value of 92.00, and a sum value of 2367.00.
3. The acceleration of racehorse jockeys from a sample of 30 racehorse jockeys yielded a mean of 75.37, a median of 75.00, a standard deviation of 6.92, a variance of 47.90, a range of 27.00, a minimum of 65.00, a maximum of 92.00, and a sum of 2261.00.

Table 2.
Summary of normality test results for forward torso flexibility, balance, and acceleration data of racehorse jockeys in Jeneponto Regency.

Statistical Value	Forward Flexibility of the Togok (X1)	Balance (X2)	Jockey Acceleration (Y)
N	30	30	30
Absolute	0.086	0.133	0.12
Positive	0.072	0.133	0.12
Negative	-0.086	-0.12	-0.71
Kolmo-Smirnov Z	0.086	0.133	00.12
Asymp. Sig.	0,200	0,189	0,200

Based on the table above, which summarizes the results of the data normality test for each research variable, the Kolmogorov-Smirnov values, with probability (P) = all greater than 0.05, are all greater than 0.05. Therefore, the obtained flexibility, balance, and acceleration of racehorse jockeys are normally distributed.

Table 3.
Summary of the results of the correlation analysis of forward trunk flexibility and acceleration of racehorse jockeys in Jeneponto Regency.

Variabel	N	r	P	Sig.
Forward Torso Flexibility (XI) Jockey Acceleration (Y)	30	0.714	0.000	Significant

The table above shows that the correlation calculation yields an r value of 0.714 (P < 0.05), indicating a significant correlation between forward trunk flexibility and acceleration of racehorse jockeys in Jeneponto Regency. Therefore, if a racehorse jockey has good forward trunk flexibility, it will also result in good acceleration.

Table 4.
Summary of Results of the Correlation Analysis of Dynamic Balance and Acceleration of Racehorse Jockeys in Jeneponto Regency.

Variabel	N	r	P	Sig.
Dynamic Balance (X2) Runhorse Jockey Acceleration (Y)	30	0.751	0.000	Significant

Based on the table above, it can be seen that the results of the correlation calculation obtained a calculated r value of 0.751 (P < 0.05), meaning there is a significant relationship between dynamic balance and acceleration of racehorse jockeys in Jeneponto Regency. Thus, if a racehorse jockey has good dynamic balance, it will be followed by good jockey acceleration as well.

Table 5.
Results of the Regression Analysis of Forward Focusing on Flexibility and Dynamic Balance on the Acceleration of Racehorse Jockeys in Jeneponto Regency.

Variabel	N	R Square	P	Sig.
Forward Torso Flexibility (X1) Balance (X2) Jockey Acceleration (Y)	30	0.568	0.000	Significant

Based on Table 5 above, it can be seen that the results of the regression calculation using the R regression test are presented as follows: Significant test. or significance of regression using the F regression test obtained Fcount = 17.77 (P <0.05), then H0 is rejected H1 is accepted. Thus, there is a significant relationship between forward togok flexibility and dynamic balance on the acceleration of racehorse jockeys in Jeneponto Regency, with a coefficient of determination (R Square) of 0.568, which means that 56.8% of racehorse jockey acceleration is explained by flexibility and balance, while the remaining 43.2% is explained by other variables not observed in this study.

Discussion

Each finding requires discussion as a result of the research. Therefore, this study can be concluded as follows:

The Relationship between Flexibility and Acceleration of Racehorse Jockeys in Jeneponto Regency

The results of the study indicate a significant relationship between flexibility and acceleration of racehorse jockeys in Jeneponto Regency, with a correlation value of 0.714, equivalent to 71.4%. This finding confirms that forward trunk flexibility is essential for a racehorse jockey, particularly to help accelerate the horse and reduce wind resistance, both on the horse and the jockey, during maximum gallop.

This research aligns with the findings of Anderson et al. (2004), which demonstrated that trunk flexibility plays a crucial role in optimizing kinetic energy transfer during galloping, and the biomechanical study by Schils et al. (2001), which confirmed that jockey back flexibility affects movement efficiency and reduces aerodynamic resistance in racehorses.

This flexibility also helps the jockey follow the horse's galloping movements efficiently. It's important to note that if a jockey falls off a horse, even if the horse reaches the finish line

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first, the jockey is disqualified. Therefore, synchronizing movements between the horse and jockey, known as acceleration, is crucial from the moment the horse mounts, at the start, until reaching the finish line at the end of the race. All of the above can only be achieved optimally if the jockey can flex his torso forward while controlling the reins, which serve as a rudder to determine the trajectory to be followed.

The Relationship Between Balance and Acceleration of Racehorse Jockeys in Jeneponto Regency

The results of this study also show a significant relationship between dynamic balance and acceleration of racehorse jockeys in Jeneponto Regency, with a value of 0.751, equivalent to 75.1%. Therefore, balance plays a crucial role in the acceleration of jockeys on horses sprinting towards the finish line. This finding is supported by research by Pfau et al. (2009), which demonstrated that a jockey's postural stability significantly influences a horse's locomotor performance, and by a study by Clayton & Hobbs (2017), which showed that a jockey's dynamic balance is positively correlated with a racehorse's speed and stride efficiency.

Balance allows jockeys to optimize their performance on horseback, similar to flexibility, but differing in the dynamic use of the body. Therefore, both physical conditions are essential for jockeys to achieve optimal results. However, the horse's riding condition should not be overlooked, as poor horse condition can significantly impact race results. Therefore, both horse and jockey must be optimally prepared and become a complementary unit. In terms of care, horses must receive special treatment, from food and drink to bathing and training. For example, a racehorse is given dark beer mixed with chicken or duck eggs once a week, and its feed consists of yellow corn or factory-made rice bran mixed with certain ingredients. Jockeys must also be prepared well in advance of the race and should receive recognition like athletes in other sports. Therefore, harmony between horse and jockey is essential for optimal performance in the race.

The Relationship Between Flexibility and Balance and Acceleration of Racehorse Jockeys in Jeneponto Regency

Data analysis shows that both physical conditions—flexibility and balance—are essential for racehorse jockeys to enhance acceleration and the horse they ride in a race. This research emphasizes the importance of flexibility, both independently and in conjunction with balance and other physical aspects. Flexibility and balance unite and integrate the movements of the jockey and horse, enabling them to reach the finish line more quickly together. These results are consistent with the findings of Terada (2000), who stated that the combination of flexibility and balance in jockeys is a strong predictor of horse racing performance, and recent research by Wolframm et al. (2013), which confirmed that the jockey's holistic physical capacity—including flexibility and balance—contributes significantly to the acceleration and final speed of a racehorse.

Therefore, jockeys and horses must be an inseparable unit in racing events, as it is a crucial requirement for determining the winner. Horse care includes feeding, watering, bathing, and training, while the jockey's physical condition must support maximum

acceleration during the race. Therefore, the success of both jockey and horse in a race depends on mutual support, with the horse leading the jockey and the jockey guiding to achieve the best possible results.

CONCLUSION

Based on the data analysis conducted, the following conclusions can be drawn:

1. There is a significant relationship between flexibility and acceleration of racehorse jockeys in Jeneponto Regency. There is a significant relationship between balance and acceleration of racehorse jockeys in Jeneponto Regency.
2. There is a significant relationship between flexibility and balance simultaneously and acceleration of racehorse jockeys in Jeneponto Regency.
3. There is a significant relationship between flexibility and balance simultaneously and acceleration of racehorse jockeys in Jeneponto Regency.

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