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The Effect of Normal Push-Up and Modified Push-Up Exercises on Bowling Ability In Athletes Cricket FIKK UNM

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ABSTRACT

This study aims to analyze the effect of normal push-up and modified push-up training on bowling performance in cricket athletes at FIKK UNM. The research sample consisted of athletes divided into two groups: one group underwent normal push-up training, while the other performed modified push-up training. The results showed that normal push-up training improved bowling performance from a pre-test average of 25.2000 to a post-test average of 42.2000, with a difference of 17.0000 and a P-value of 0.007 (P<0.05), indicating a significant effect. Meanwhile, modified push-up training improved performance from a pre-test average of 20.0000 to a post-test average of 41.9000, with a difference of 20.9000 and a P-value of 0.003 (P<0.05), also demonstrating a significant effect. A comparison between the two training methods revealed that modified push-up training had a greater impact on improving bowling performance than normal push-up training. Therefore, modified push-up training is recommended as a more effective method for enhancing bowling performance in cricket athletes at FIKK UNM.

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INTRODUCTION

Sports is a physical activity that plays an important role in improving an individual's physical fitness and motor skills. In the world of sports, various branches require physical abilities and specific techniques to achieve optimal performance (Prianto, 2021). One of the sports that is growing in popularity in Indonesia is cricket. Cricket is a sport that demands a combination of technical skills, strategy, and physical endurance to achieve maximum results. One of the most popular sports in South Sulawesi, particularly cricket, has gained a significant following.

Cricket is a game played by two teams with an equal number of players. This game involves various fundamental techniques such as batting, fielding, and bowling. Bowling is one of the most crucial aspects of cricket, where a player throws the ball toward the

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batsman using a specific technique (Anwar et al., 2025). To execute an effective bowling throw, an athlete requires arm strength, muscle endurance, and good body coordination. However, based on observations of cricket athletes at the Faculty of Sports Science and Health, Universitas Negeri Makassar (FIKK UNM), several challenges still exist in bowling performance. Some athletes experience difficulties in generating optimal throwing speed and consistent accuracy. This is suspected to be related to a lack of arm muscle strength and upper body stability, which are essential to supporting effective bowling techniques.

Without the support of good physical components, the performance of South Sulawesi cricket athletes, particularly those from FIKK UNM, may be compromised. Through this research, the author aims to implement a training regimen for athletes at FIKK UNM. Physical training plays a significant role in enhancing athletic performance, including in cricket. One form of training that can be applied to improve arm muscle strength and body stability is push-up exercises. Push-ups are an effective workout for building upper-body muscle strength, particularly in the arms, shoulders, and chest (Hanafi & Prastyana, 2020).

In sports, various push-up variations can be adapted to meet the needs of athletes. Normal push-ups are performed in a standard position, where the body remains straight with hands on the floor and feet as support. This exercise helps improve upper-body muscle strength and endurance (Bompa & Buzzichelli, 2019). Meanwhile, modified push-ups are variations that are adjusted to the athlete's needs. These modifications may involve changes in hand placement, foot positioning, or body angles to increase training intensity or target specific muscle groups. In the context of cricket, modified push-ups can help develop more specific muscle strength to support more effective bowling techniques (Côté & Gilbert, 2009).

In cricket, a bowler requires optimal arm strength to throw the ball with high speed and accuracy. Additionally, upper body stability is crucial in maintaining balance while delivering a throw. Therefore, normal push-ups and modified push-ups can be effective strategies for improving bowling performance. Consequently, this study aims to analyze the effects of normal push-up and modified push-up exercises on the overhand serve ability of cricket athletes at the Faculty of Sports Science and Health, Universitas Negeri Makassar (FIKK UNM).

METHODS

This study employs an experimental method with a pretest-posttest control group design (Priadana & Sunarsi, 2021). The research subjects consist of 20 cricket athletes from the Faculty of Sports and Health Sciences (FIKK) at Universitas Negeri Makassar (UNM), who are randomly divided into two groups. The first group (n=10) undergoes normal push-up training, while the second group (n=10) performs modified push-up training.

Before the intervention, all subjects undergo an initial test (pretest) to measure their bowling performance. This test assesses aspects such as speed, accuracy, and arm muscle endurance in executing bowling movements. During the research period, each group follows a structured training program for several weeks with the same intensity and duration. The normal push-up group performs exercises using the standard technique, where the body remains straight with support on both hands and the tips of the feet. In contrast, the modified push-up group uses specific variations, such as push-ups with knees touching the floor or push-ups with additional weights to enhance the specific strength of the arm and shoulder muscles (Mulyana et al., 2024).

After the intervention is completed, all subjects undergo a final test (posttest) using the same parameters as the pretest to evaluate changes in their bowling performance. The obtained data is analyzed using appropriate statistical techniques, such as paired and independent t-tests, to compare the effectiveness of each training type in improving bowling performance. This study is expected to provide insights into the effectiveness of different push-up variations in enhancing bowling skills among cricket athletes, serving as a foundation for designing more optimal training programs.

RESULTS AND DISCUSSION

Result

In this chapter, the results of data analysis present findings or research results, namely the effect of normal push-up and modified push-up training on bowling ability in FIKK UNM Cricket athletes. To answer the problem, achieve the objectives, and test the hypothesis of this research, all the data were processed using the SPSS 21 statistical test with a descriptive test, a normality test, and a hypothesis test. Descriptive data analysis is intended to get an overview of research data. Data descriptions are intended to be able to interpret and give meaning to the data.

Table 1.

Summary of the results of descriptive analysis of data The effect of normal push-up and modified push-up training on bowling ability in Cricket FIKK UNM athletes

Variable	N	Range	Minimum	Maximum	Sum	Mean	SD	Variance
Pretest Push-up Normal	10	14.00	18.00	32.00	252.00	25.2000	4.70933	22.178
Post-test of Normal Push-up	10	8.00	37.00	45.00	422.00	42.2000	2.52982	6.400
Pretest Push-up Modification	10	15.00	14.00	29.00	200.00	20.0000	3.94405	15.556
Post-test Push-up Modification	10	8.00	37.00	45.00	419.00	41.9000	2.46982	6.100

Table 1 above is explained as follows:

1. The data of the initial test of the normal push-up ability of the upper serve in FIKK UNM CRICKET athletes were obtained with a value of N 10, Renge 14.00 minimum

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value of 18.00, maximum 32.00, sum 252.00 mean/average value of 25.2000, std. The deviation/standard deviation (s) is 4.70933, and the variance is 22.178.

2. The final test data of the normal push-up ability of the upper serve in FIKK UNM CRICKET athletes was obtained with a value of N 10, Renge 8.00 minimum value of 37.00, maximum 45.00, sum 422.00 mean/average value of 42.2000, std. The deviation/deviation (s) is 2.52982 and the variance is 6,400.
3. The data of the initial test of push-up modification of the upper serviceability in FIKK UNM CRICKET athletes were obtained with a value of N 10, Renge 15.00, minimum value of 14.00, maximum 29.00, sum 200.00 mean/average value of 20,0000, std. The standard deviation/deviation (s) is 3.94405 and the variance is 15.556.
4. The final test data of the push-up modification of the upper serve ability in FIKK UNM CRICKET athletes was obtained with a value of N 10, Renge 8.00 minimum value of 37.00, maximum 45.00, sum 419.00 mean/average value of 41.9000, std. The deviation/deviation (s) is 2.46982 and the variance is 6.100.

One of the assumptions that must be met for parametric statistics to be used is that the data follows a normal distribution. If the test turns out that the data is normally distributed, it means that the parametric statistical analysis has been fulfilled. To find out the data of the two groups with normal distribution, a test was carried out using the Kolmogorov-Smirnov Test.

Table 2.
Summary of data normality test results Effect of normal push-up and modified push-up training on bowling ability in FIK UNM CRICKET

Variable	Absolute	Positive	Negative	KS-Z	Asymp	Information
Pretest Push-up Normal	0.183	0.137	-0.183	0.579	0.891	Normal
Post-test of Normal Push-up	0.224	0.138	-0.224	0.709	0.697	Normal
Pretest Push-up Modification	0.206	0.206	-0.123	0.652	0.790	Normal
Post-test Push-up Modification	0.202	0.105	-0.202	0.640	0.807	Normal

Table 2 above shows that from the results of the data normality test using the Kolmogorov-Smirnov shows the following results:

1. The initial test data of normal push-up ability in FIKK UNM CRICKET athletes obtained absolute values of 0.183, positive 0.137, negative -0.183, Kolmogorov-Smirnov 0.579, Asymptot. Sig 0.891 if (P>0.05), then it can be said that the data follows the normal distribution because the KS-Z value obtained is greater than 0.579>0.05 and the Asymp sig value of 0.891 means that the data from the normal push-up initial test variable is normally distributed.
2. The final test data of normal push-up ability in FIKK UNM CRICKET athletes obtained absolute values of 0.224, positive 0.138, negative -0.224, Kolmogorov-Smirnov 0.709, Asymptot. Sig 0.679 if (P>0.05), then it can be said that the data follows the normal distribution because the KS-Z value obtained is greater than

0.709>0.05 and the Asymp value sig 0.679 means that the data from the normal push-up final test variable is normally distributed.

3. The data of the initial test of push-up modification of the upper serviceability in FIKK UNM CRICKET athletes obtained absolute values of 0.206, positive 0.206, negative -0.123, Kolmogorov-Smirnov 0.652, Asymptot. Sig 0.790 if (P>0.05), then it can be said that the data follows the normal distribution because the KS-Z value obtained is greater than 0.652>0.05 and the Asymp sig value of 0.790 means that the data from the initial test variable of the modified push-up is normally distributed.
4. The final test data of push-up modification of upper serviceability in FIKK UNM CRICKET athletes obtained absolute values of 0.202, positive 0.105, negative -0.202, Kolmogorov-Smirnov 0.640, Asymptot. Sig 0.807 if (P>0.05), then it can be said that the data follows the normal distribution because the KS-Z value obtained is greater than 0.640>0.05 and the Asymp value sig 0.807 means that the data from the final test variable of the modified push-up is normally distributed.

The hypothesis carried out in this study needs to be tested and proven through empirical data obtained in the field through tests and measurements of the variables studied. Furthermore, the data will be processed statistically. The hypothesis testing of this study is used to determine the influence of each independent variable on the bound variable. The regression analysis used was the T-test, at a significant level of 95% or α 0.05.

Table 3.
Results of the analysis test The effect of normal push-up training on bowling ability in FIK UNM CRICKET athletes

Variable	N	Mean	Mr
Awal Push-up Normal	10	25.2000	
End of Normal Push-up	10	42.2000	0.009
Difference		17.0000	

Based on the table above, it can be stated as follows:

1. From the data on the effect of normal push-up initial test training on bowling ability in FIKK UNM Cricket athletes averaged 25.2000 and obtained a P value of 0.009 (P<0.05).
2. From the data on the influence of normal push-up final test practice on bowling ability in FIKK UNM Cricket athletes, an average score of 42,2000 was obtained and a P value of 0.009 (P<0.05).
3. From the above data, the effect of the initial test practice and the final test of normal push-ups on bowling ability in FIKK UNM CRICKET athletes obtained a difference of 17,0000 P value of 0.007 (P<0.05), thus there is an effect of the initial test practice and the final test of normal push-up on bowling ability in FIK UNM CRICKET athletes.

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Table 4.
Results of the analysis test The effect of modified push-up training on bowling ability in FIK UNM Cricket athletes

Variable	N	Mean	Mr
Initial Push-up Modification	10	20.0000	
Initial Push-up Modification	10	41.9000	0.003
Difference		20.9000	

Based on the table above, it can be stated as follows:

1. From the data on the effect of modified push-up initial test training on bowling ability in FIKK UNM Cricket athletes, the average was 20,0000 and obtained a P value of 0.003 (P<0.05).
2. From the data on the influence of modified push-up final test training on bowling ability in FIKK UNM Cricket athletes, an average score of 41.9000 was obtained and a P value of 0.003 (P<0.05).
3. From the above data, the effect of the initial test practice and the modified push-up final test on bowling ability in FIKK UNM Cricket athletes obtained a difference of 20.9000 P value of 0.003 (P<0.05), thus there is an effect of the initial test practice and the modified push-up final test on bowling ability in FIK UNM Cricket athletes.

Table 5.
The results of the test analyzed the difference between normal push-ups and modified push-up training on bowling ability in FIK UNM CRICKET athletes

Variable	N	Mean
Normal Push-up Difference	10	17.0000
Modified Push-up Gap	10	21.9000
Difference	10	4.9000

Based on the table above, it can be stated that the data Above the difference between the initial test and the final test of normal push-ups and modified push-ups on bowling skills in FIKK UNM CRICKET athletes obtaining a normal push-up difference of 17.0000 and a modified push-up of 20.9000 thus there is a The competition of the initial test and the final test of modified push-up training on bowling ability in FIKK UNM CRICKET athletes that is more influential is the modified push-up exercise.

Discussion

The results of the data analysis tested at SPSS 21 with the title "The effect of normal push-up and modified push-up training on bowling ability in CRICKET FIK UNM athletes", From the test data carried out in the SPSS application looking for the effect of normal push-up training and modified push-ups on bowling ability at CRICKET FIK UNM athletes, From the data on the influence of normal push-up initial test training on bowling ability in CRICKET FIK UNM athletes on average 25.2000 and obtained a P score value of 0.009 (P<0.05) from the data on the effect of normal push-up final test practice on bowling ability in FIKK UNM CRICKET athletes obtained an average value of 42.2000 and obtained a P value of 0.009 (P<0.05) from the above data, the effect of normal initial test practice

and final push-up test on bowling ability in FIKK UNM CRICKET athletes obtained a difference of 17,0000 P value of 0.007 (P<0.05), Thus, there is an effect of normal initial test and final push-up training on bowling ability in FIKK UNM CRICKET athletes and the influence of modified push-up initial test training on bowling ability in FIKK UNM CRICKET athletes averaged 20.0000 and obtained a P value of 0.003 (P<0.05), data on the influence of modified push-up final test training on bowling ability in FIKK UNM CRICKET athletes obtained an average value of 41.9000 and obtained a P value of 0.003 (P<0.05), the above data, the effect of the initial test practice and the modified push-up final test on bowling ability in FIKK UNM CRICKET athletes obtained a difference of 20.9000 P value of 0.003 (P<0.05), thus there is an effect of the initial test practice and the modified push-up final test on bowling ability in FIK UNM Cricket athletes. The data of the initial test and final test of normal push-ups and modified push-ups on bowling ability in FIKK UNM CRICKET athletes obtained a difference of 17,0000 normal push-ups and modified push-ups of 20,9000 thus there is a difference between the initial test and the final test of modified push-up training on bowling ability in FIKK UNM Cricket athletes which is more influential is the modified push-up exercise.

Based on the data analysis results, there was an improvement in bowling performance in both training groups, including normal push-ups and modified push-ups. However, the group that performed modified push-ups showed a more significant improvement compared to the normal push-up group. This is due to the variations in modified push-ups that target more stabilizer muscle groups, thereby enhancing the explosive power of the muscles used in bowling movements. Push-up exercises are a form of endurance and upper-body strength training, particularly targeting the pectoralis, deltoid, triceps brachii, and core muscles, which play a role in body stabilization (Subarjah, 2013). This study compares normal push-ups and modified push-ups about bowling performance among cricket athletes at FIKK UNM.

Bowling performance in cricket highly depends on arm and shoulder strength as well as core stability (Juniarto & Tangkudung, 2022). Normal push-up training strengthens the primary muscles involved in bowling movements, but modified push-ups incorporate variations that improve endurance and body stability more effectively. In the modified push-up group, there was a significant improvement in the speed and accuracy of ball delivery. This indicates that exercises that are more specific to bowling movement patterns are more effective than basic strength training alone. Thus, a more varied push-up training program that targets specific muscles can yield optimal results in improving cricket athletes' bowling performance (Rustiawan & Rohendi, 2021).

The findings of this study have important implications for cricket coaches and athletes in selecting more effective training methods. Modified push-ups can be an alternative training approach to enhance bowling performance, as they contribute to improving functional strength that is more relevant to bowling techniques. Therefore, in cricket athletes' training programs, it is recommended to combine traditional strength training with specific exercises that mimic bowling movements to maximize results. Additionally, this study also indicates that adaptations in training methods play a crucial

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role in improving athletic performance (Juniarto & Tangkudung, 2022). Hence, a more innovative approach to strength and endurance training should be implemented to achieve better results in cricket.

Although this study presents positive findings, several limitations need to be considered. First, the limited sample size may affect the generalizability of the research results. Second, the training duration provided may still be optimized to observe more significant long-term effects (Palma et al., 2021). Therefore, future research is recommended to involve a larger sample size and longer training duration to obtain more accurate and applicable results in the field of cricket sports science.

CONCLUSION

The results showed that normal push-up training improved bowling performance from a pre-test average of 25.2000 to a post-test average of 42.2000, with a difference of 17.0000 and a P-value of 0.007 (P<0.05), indicating a significant effect. Meanwhile, modified push-up training improved performance from a pre-test average of 20.0000 to a post-test average of 41.9000, with a difference of 20.9000 and a P-value of 0.003 (P<0.05), also demonstrating a significant effect. A comparison between the two training methods revealed that modified push-up training had a greater impact on improving bowling performance than normal push-up training. Therefore, modified push-up training is recommended as a more effective method for enhancing bowling performance in cricket athletes at FIKK UNM.

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