Dynamic Warm-up and Gentle Stretching Exercises to Success in Jumping Events; An Experimental Approach

Faisal Rasool
M.Phil, Scholar, Department of Sports Sciences and Physical Education, Gomal University, Dera Ismail Khan, Email: faisalrasool7742@gmail.com
Prof. Dr. Muhammad Niamat Ullah
Dean, Faculty of Arts and Social Sciences, Gomal University, Dera Ismail Khan, Email: nematbabar@gu.edu.pk
Dr. Wasim Khan
Assistant Professor/Assistant to Dean, Department of Sports Sciences and Physical Education, Gomal University, Dera Ismail Khan, Email: wasimkhanssspe@gu.edu.pk wasimkhansspe@gmail.com
Umar Farooq
M.Phil, Scholar, Department of Sports Sciences and Physical Education, Gomal University, Dera Ismail Khan, Email: haiderali43830@gmail.com
Muhammad Imran
Lecturer, Department of Sports Sciences and Physical Education, University of Science and Technology Bannu, Email: imrankhan43658@gmail.com
Muhammad Husnain
Lecturer, Department of Physical Education and Sports Sciences and, University of Layyah, Punjab Email: husainbaloch39@gmail.com

Abstract

Purpose: Warm-ups are an important component of physical activity, particularly for athletes since they help the body to get ready for the physical action of a sport. Dynamic warm-ups and gentle stretching are widely used by athletes to improve performance and prevent injury. The purpose of this study is to find out how a dynamic warm-up and moderate stretching affect jumping ability of novice male athletes. **Method:** Forty-five (45) beginning male athletes with an average age of 21 years took part in this study. The participants were divided into three groups at random: a control group (n=15), a dynamic warm-up group (n=15), and a gentle stretching group (n=15). Each participant counterbalanced the two exercise regimens for six weeks using a randomized crossover research design. Accordingly, pre- and post-test data were gathered and thereafter analyzed using the mean, standard deviation, and t-test in SPSS version 25. **Results:** The findings demonstrated that the Control Group had substantially lower mean scores than the Dynamic Warm-up Training and Gentle Stretching Training groups, with a significance level of.000. With a 95% confidence range spanning from -17.758 to -10.197, the mean difference between the Control Group and Dynamic Warm up training group was -13.977. With a 95% confidence range spanning from -14.018 to -6.517, the mean difference between the Control Group and the Gentle Stretching Training group was -10.268, according to the study. **Conclusion:** The results of this research showed that dynamic warm-up and gentle stretching interventions considerably enhanced the jumping abilities of beginner male athletes. The dynamic warm-up intervention was more effective in improving jump performance when gentle stretching was added. **Implications:** According to this study, a

dynamic warm-up and gentle stretching exercises may help beginner male athletes to jump higher. The dynamic warm-up intervention, however, was more successful in improving jump performance.

Keywords: Effects, dynamic warm-up, gentle stretching, beginner athletes & jump performance

INTRODUCTION

Warm-up exercise is peformed to reduce risk of injury and improve performance afterward. Studies have found that warming up helps athletes perform better in activities including running, leaping, swimming, and cycling (Byrne, Kenny, & O'Rourke, 2014; Holt & Lambourne, 2008; Munro et al., 2017). A typical warm-up includes general aerobic workouts to raise body and muscle temperature, followed by stretches to improve mobility and targeted exercises meant to improve performance (Fradkin, Zazryn & Smoliga, 2010). One of the main reasons for warm-up is to increase muscle temperature (Racinais and Oksa, 2010), which is related to subsequent performance enhancement. Thus, insufficient warm-up duration can change subsequent performance. These results showed that both high and moderate intensity warm-up can maintain an increase in muscle temperature for 20 min. Jump performance after high-intensity warm-up was increased for 20 min compared to a moderate intensity warm-up.

Stretching that is movement-based is called dynamic stretching. It achieves a stretch by working the muscles directly. Due to the fact that the stretch posture is not maintained, it differs from conventional "static" stretching. In order to lengthen the target muscle or group of muscles, stretching entails moving the joints in the opposite direction from the direction in which the target muscle or group of muscles is moving (Gasibat et al., 2017). According to studies (Vetter, 2007; Young & Behm, 2003), warm-ups that combined jogging, dynamic stretching, and practise jumps produced higher countermovement jump heights than warm-ups that only included static stretching. Dynamic stretching has also been shown to improve sprint times and agility drill performance. Little and Williams (2006) observed that lower-body dynamic exercises resulted in lowered 10- and 20-m sprint times and a reduced zig-zag drill duration but no change in countermovement jump performance. Additional research suggests that dynamic exercise performed at a jogging pace can improve sprint performance; however, comparable improvements were not observed when these exercises were performed while stationary Fletcher & Jones, 2004). Collectively, these earlier investigations findings imply that dynamic stretching exercises, especially those carried out at a jogging pace as opposed to stationary, can enhance performance in power measures like sprinting and jumping (Perrier, Pavol & Hoffman, 2021).

Thus, it is necessary to clarify optimal dynamic warm-up as well as gentle stretching protocols regarding jumping performance of novice athletes. To the best of our knowledge, no studies have reported the combined effects of dynamic warm-up as well as gentle stretching protocols on jumping performance of beginners' male athletes. Therefore, the purpose of this study was to investigate the effects of two important protocols namely gentle warm-up versus gentle stretching upon jumping performance of beginners' male athletes.

OBJECTIVES

1. To assess the effects of dynamic warm stretching exercise upon jump performance of beginner male athletes.
2. To assess the effects of gentle stretching exercise upon jump performance of beginner male athletes.
3. To examine the comparative analysis of dynamic warm and gentle stretching exercise upon jump performance of beginner male athletes.

HYPOTHESES

Ha 1 There is a significant effect of dynamic warm stretching exercise upon jump performance of beginner male athletes.

Ha 2 There is a significant effect gentle stretching exercise upon jump performance of beginner male athletes.

Ha 3 Dynamic warm exercise have more effective as compared with gentle stretching exercise for jump performance of beginner male athletes.

RESEARCH METHODOLOGY

Research Design

The research design of a study demonstrates the fundamental framework that the investigator employed to produce precise and comprehensible evidence. In quantitative studies, the design includes a few key methodological judgments made by the researchers (Xuan, Williams & Peat, 2020).

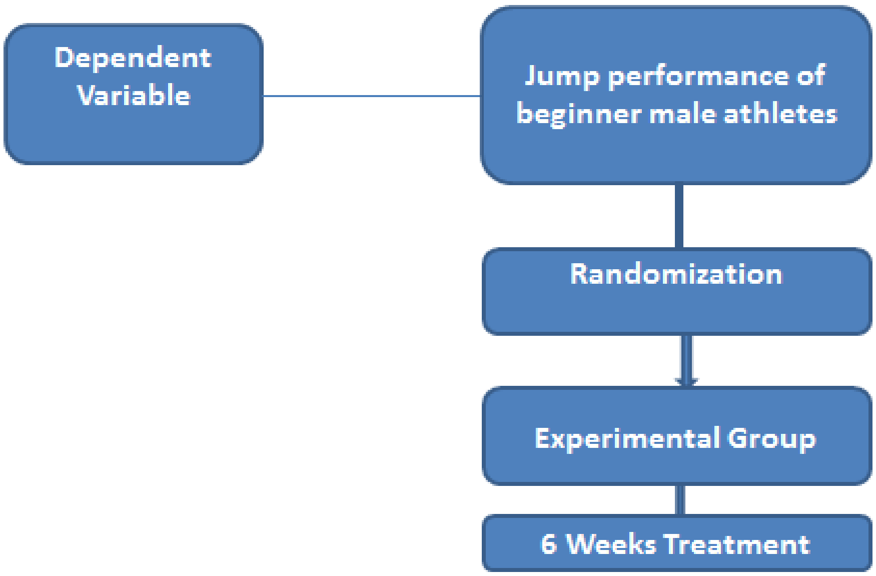

Figure 1 Representing the Methodological Framework

Plan of Work and Design Adopted

Researchers adopted a randomized cross-over study design including two experimental sessions. (I) pre experimental session (ii) post experimental session .On the first experimental session, all participants were physically and physiological assessed. Than make a practice session for 6 weeks and trained all participants up to 6 weeks. Regular training of dynamic warm-up and gentle stretching protocols were completed of successful duration. A posttest was held for the finding and analyzed the results. Gentle stretching done by all participants up to 30% vo2 max and dynamic warm-up they done 80% vo2 max after this all participants are began their Vertical jump test. Each result noted and compiled accordingly. Heart rate also increase in this whole process and noted with (BPM).

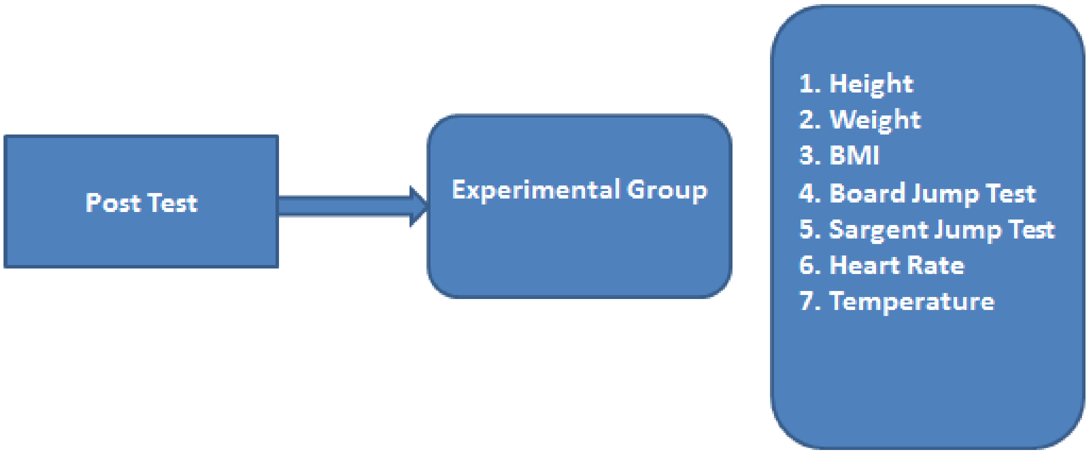

Figure 2 Post-Intervention Data Collection

Treatment Studied

Table 3.1 Dynamic warm-up Protocol for 06 Weeks

Duration	Frequency of Exercise Protocol	One Session Duration	Nature of Activity	Description of Activities
Six weeks	Five sessions per week(Monday, Tuesday, Wednesday, Thursday, Friday).	30 minutes regular with 1 minutes rest between exercises (Time of Warm up and Cool down including).	Dynamic Warm-up (65% of MHR by Karvonen equation).	Warming Up 11 min, Slow Running on track (500 mtr), o Side jump o Full jumping jacks o Leg throw side to side o Thigh up hands down touching o Side to side o Knee to chest o Four Reach o Sit ups o Push ups

Table 3.2 Gentle stretching Protocol for 06 weeks

Duration	Frequency of Exercise Protocol	One Session Duration	Nature of Activity	Description of Activity
Six weeks.	Five sessions per week(Monday, Tuesday, Wednesday, Thursday, Friday).	11 minutes regular with no rest 11 minutes (10+01min rest+05) 03 minutes (10+01min)	Gentle stretching Exercise.	Subjects complete there Dynamic warm-up and then start Gentle stretching o **Neck Stretch** (side to side & up to down & lift and Right circle) o **Shoulder Stretch** (in & out) o **Arm Stretch** (left & right) o **Hip Stretch** (round circle both side) o **Hamstring Stretch** o **Knee Stretch** (in/out & up down) o **Ankle Stretch with Wrist(** both side) o **Quadriceps Stretch** o **Legs Stretch** o **Full body Stretch** o **Body Yerkes**

Study Participants and Sampling

The participants of the current study comprised of beginner male athletes, those who participated at club level representing Ghazali Educational Trust high School for Boys, 93 GB

Jaranwala, Punjab, Pakistan. For this purpose, Forty five (45) volunteer beginner male athletes were taken. These players were divided into different groups on random basis.

In an experimental study data collected from an experimental group is comparatively analyzed with data from a control group. Therefore, two identical groups were made on the basis of the pre-test. The independent variable remained changed for the experimental group, while the control group was kept constant. The following figure is showing experimental group and control group.

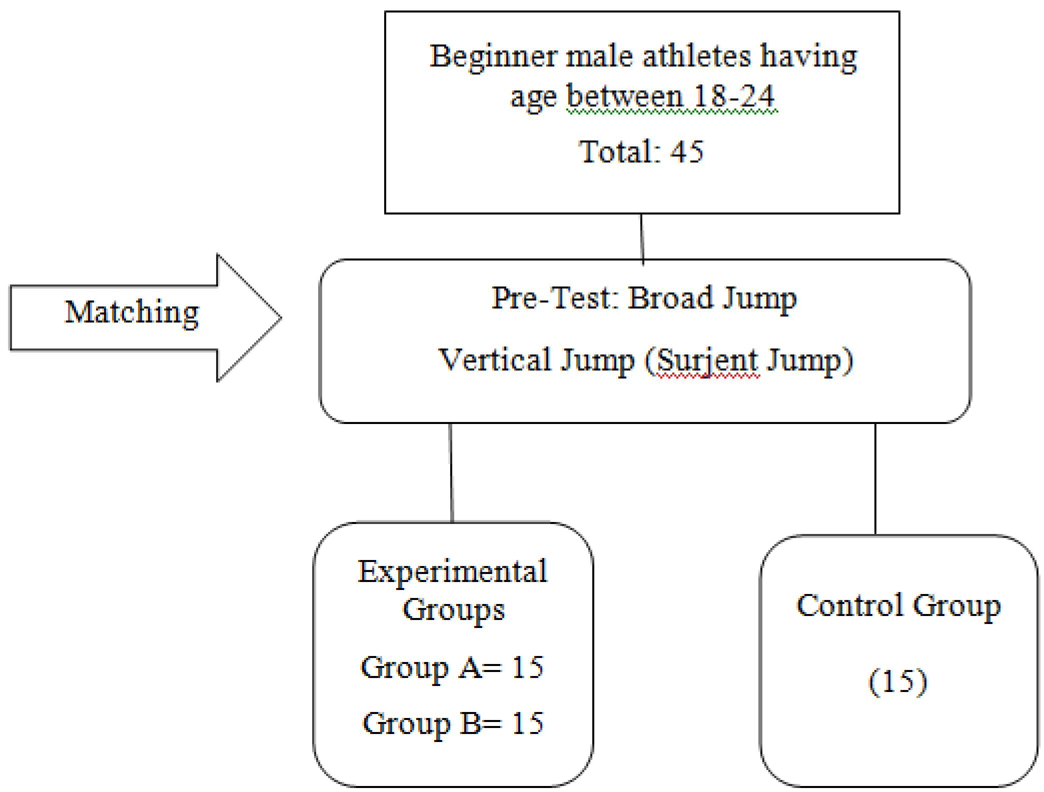

Figure3 Showing the Control Group and Experimental Group

Data Collection Procedure

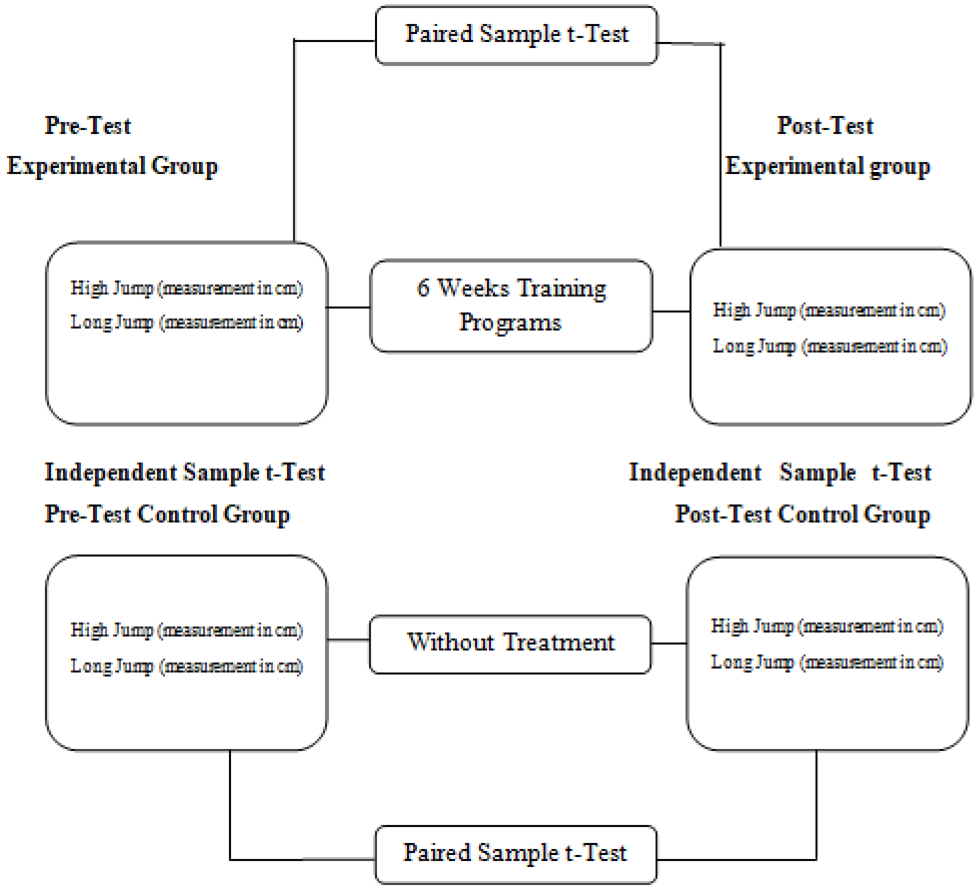

Figure.2: Showing the Pre- and Post-Intervention Data Collection

Both exercise interventions were given to the participants of experimental group at Sports Complex of Ghazali Educational Trust high School for Boys, 93 GB Jaranwala, Punjab, Pakistan. The participants of EG were given an experimental procedures. This group was supposed to change in the independent variables that were then tested. The effects of the independent variables were recorded. It is important to mention that experimental group included sub-experimental groups such as aerobic exercise group (A) and diaphragmatic exercise group (B). On the other hand, control group was separated from the rest of the experimental groups in such a way that the independent variable cannot influence the results. The researchers continued interventions for 6-weeks. After a period of 6-weeks, post test was conducted and the data was collected from both EG and CG for onward process of data analysis.

Layout plan and Statistical Tests Used

Data analysis and interpretation is one of the important sections of research. For this purpose appropriate statistical plan is very much important. Generally, statistical tests are selected in accordance with the set hypotheses of the study (Nelson, 2009). T-tests and ANOVA were used for testing of hypotheses.. The following sketch is given to show the statistical plan.

Table 1 Hypotheses and Statistical Tests Applied

S.No	*Hypothesis*	*Proposed test Applied*
H_A1	Pre and post difference of Control Group (CG)	Paired t-test
H_A2	Pre and post results of Experimental Group (EG)	Paired t-test
H_A3	Pre and post difference between CG and EG	Independent sample t-test
H_A4	Pre and post difference of CG and EG between dynamic warm up and gentle stretching exercise	ANOVA

Results and Discussion

Table 4.1: Descriptive Results of Anthropometric

Descriptive Statistics

Testing Variables	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Age (years)	45	6.00	18.00	24.00	21.00	1.65145	2.727
Height (cm)	45	25.88	160.00	185.88	171.71	6.71673	45.114
Weight (kg) pre	45	36.00	56.00	92.00	66.77	8.76431	76.813
Weight (kg) post	45	25.00	53.00	78.00	61.82	6.46771	41.831
Body Mass Index in Pre-test	45	12.17	18.90	31.08	22.66	2.82259	7.967
Body Mass Index in Posttest	45	10.39	16.54	26.93	20.82	2.41971	5.855

The table presents descriptive statistics for anthropometric measurements of 45 individuals, including age, height, weight (pre and post), and body mass index (BMI) in pre-test and post-test. In respect of age the participants in the study were relatively young, with an average age of 21 years old, ranging from 18 to 24 years old, in respect of height the participants' heights ranged from 160 cm to 185.88 cm, with an average height of 171.71 cm. Similarly, in respect of weight the participants' pre-test weight ranged from 56 kg to 92 kg, with an average weight of 66.77 kg, and their post-test weight ranged from 53 kg to 78 kg, with an average weight of 61.82 kg. on the other hand, in respect of Body Mass Index (BMI) the participants' BMI in pre-test ranged from

18.90 to 31.08, with an average BMI of 22.66, and their BMI in post-test ranged from 16.54 to 26.93, with an average BMI of 20.82. Table 4.1 provides a summary of the sample's anthropometric measurements, which helped to describe the characteristics of the sample.

Table 4.1.1: Descriptive Results of Research Variables (n=45)

Descriptive Statistics

Testing Variables	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Long Jump (Broad Jump Test) Pretest "cm"	45	25.80	80.90	106.70	101.3876	6.42105	41.230
Long Jump (Broad Jump Test) Posttest "cm"	45	65.20	85.70	150.90	123.1511	19.90915	396.374
High Jump (Sargent Jump Test) Pretest "cm"	45	18.00	55.00	73.00	65.5333	4.16479	17.345
High Jump (Sargent Jump Test) Posttest "cm"	45	29.00	54.00	83.00	73.3111	7.63611	58.310

The presented table displays the descriptive statistics of four variables that were tested in relation to the long jump and high jump tests. In the Pretest for the Long Jump (Broad Jump Test), the data ranged from 80.90 cm to 106.70 cm, with a mean of 101.3876 cm, a standard deviation of 6.42105 cm, and a variance of 41.230 cm. In the Posttest for the Long Jump (Broad Jump Test), the data ranged from 85.70 cm to 150.90 cm, with a mean of 123.1511 cm, a standard deviation of 19.90915 cm, and a variance of 396.374 cm. In the Pretest for the High Jump (Sargent Jump Test), the data ranged from 55.00 cm to 73.00 cm, with a mean of 65.5333 cm, a standard deviation of 4.16479 cm, and a variance of 17.345 cm. In the Posttest for the High Jump (Sargent Jump Test), the data ranged from 54.00 cm to 83.00 cm, with a mean of 73.3111 cm, a standard deviation of 7.63611 cm, and a variance of 58.310 cm.

The table provides descriptive information about the distribution of the data for each variable, which includes measures of central tendency (such as the mean) and variability (such as the standard deviation). The range indicates how much the data spreads out, while the minimum and maximum values give the lowest and highest values in the sample. The mean value provides an estimate of the typical value of the data, while the standard deviation indicates how much the data deviates from this typical value. The variance provides a measure of how spread out the data is. Table suggests that there is a significant improvement in the long jump and high jump performances of the participants after undergoing a training program. The mean values for the posttests are higher than those for the pretests, indicating that the training program had a positive effect on the participants' jumping abilities.

Table 4.2: Pre-test data normality (Broad Jump test)

Tests of Normality

	Groups	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Long Jump (cm)	Dynamic Warm up training (EXP-A)	.230	15	.082	.765	15	.081
	Gentle Stretching Training (EXP-B)	.206	15	.086	.832	15	.080
	Control Group (No Treatment)	.225	15	.080	.777	15	.078

a. Lilliefors Significance Correction

The results of normality tests indicate that for all three groups, the values of both tests' statistics are below the critical value, suggesting that the data is normally distributed. The significance levels for all groups are also above the conventional threshold of 0.05, indicating that there is no significant deviation from normality. Therefore, based on these tests, we can conclude that the assumption of normality is not violated for the Long Jump (cm) performance of any of the three groups.

Table 4.3: Pre-test data normality (Sargent jump test)

Tests of Normality

	Groups	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
High Jump (cm)	Dynamic Warm up training (EXP-A)	.152	15	.200*	.935	15	.326
	Gentle Stretching Training (EXP-B)	.187	15	.165	.955	15	.601
	Control Group (No Treatment)	.148	15	.200*	.895	15	.081

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The table presents the results of the normality tests for three groups in pretest Dynamic Warm-up training (EXP-A), Gentle Stretching Training (EXP-B), and Control Group (No Treatment). The two tests used to assess normality are the Kolmogorov-Smirnov test and the Shapiro-Wilk test.For the High Jump (cm) variable, the results of the Kolmogorov-Smirnov test show that all three groups have a p-value greater than .05, indicating that there is no significant deviation from normality. The results of the Shapiro-Wilk test also indicate that the distribution of the variable in each group is not significantly different from a normal distribution. It is worth noting that for the Dynamic Warm-up training group (EXP-A), the p-value for the Kolmogorov-Smirnov test is .200, which is close to the alpha level of .05. However, the Shapiro-Wilk test indicates that the distribution is still not significantly different from normal.

The results suggest that the assumption of normality is met for the High Jump (cm) variable in all three groups.The note at the bottom of the table indicates that the significance level reported in the table for the Kolmogorov-Smirnov test is a lower bound of the true significance. This means that the reported p-values may be slightly underestimated.

Table 4.4: Post-test data normality (Broad Jump test)

Tests of Normality

	Groups	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Long Jump Posttest "cm"	Dynamic Warm up training (EXP-A)	.176	15	.200*	.853	15	.019
	Gentle Stretching Training (EXP-B)	.111	15	.200*	.926	15	.240
	Control Group (No Treatment)	.266	15	.075	.791	15	.073

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

This table presents the results of tests of normality for post-test data on the Broad Jump test for three groups: Dynamic Warm-up training (EXP-A), Gentle Stretching Training (EXP-B), and a Control Group with no treatment. The first column lists the groups being analyzed. The second and third columns show the results of the Kolmogorov-Smirnov test, which tests whether the distribution of scores in each group follows a normal distribution. The fourth and fifth columns show the results of the Shapiro-Wilk test, which is another test for normality. The results show that for the Dynamic Warm-up training group, the Kolmogorov-Smirnov test produced a statistic of .176 and a significance level of .200, indicating that the distribution of scores is close to normal but not significantly different from a normal distribution. The Shapiro-Wilk test produced a statistic of .853 and a significance level of .019, which suggests that the distribution of scores is significantly different from a normal distribution.

For the Gentle Stretching Training group, both tests showed that the distribution of scores is close to normal, with the Kolmogorov-Smirnov statistic of .111 and a significance level of .200, and the Shapiro-Wilk statistic of .926 and a significance level of .240.For the Control Group with no treatment, the Kolmogorov-Smirnov test produced a statistic of .266 and a significance level of .075, indicating that the distribution of scores is not significantly different from a normal distribution. The Shapiro-Wilk test also produced a statistic of .791 and a significance level of .073, which suggests that the distribution of scores is close to normal but not significantly different from a normal distribution.

Table 4.5: Post-test data normality (Sargent jump test)

Tests of Normality

	Groups	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
High Jump Posttest "cm"	Dynamic Warm up training (EXP-A)	.172	15	.200*	.942	15	.413
	Gentle Stretching Training (EXP-B)	.177	15	.200*	.894	15	.076
	Control Group (No Treatment)	.233	15	.060	.885	15	.057

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Looking at the table, all three groups have p-values greater than .05 in both tests, except for the High Jump Posttest "cm" in the Dynamic Warm up training (EXP-A) group, which has a p-value of .200* in the Kolmogorov-Smirnova test. However, it is important to note that the asterisk (*) indicates that this p-value is a lower bound of the true significance, and the Lilliefors Significance Correction was applied. The results suggest that the post-test data for all three groups are normally distributed

Table 4.6: Pretest and Posttest differences between control group and experimental groups in Broad jump Test

Table 4.6.1: Descriptives

Testing Variables	Groups	N	Mean	Std. Deviation	Std. Error
Long Jump (Broad Jump Test) Pre "cm"	Dynamic Warm up training (EXP-A)	15	100.7800	8.00635	2.06723
	Gentle Stretching Training (EXP-B)	15	101.4160	5.95866	1.53852
	Control Group (No Treatment)	15	101.9667	5.40524	1.39563
	Total	45	101.3876	6.42105	.95719

Long Jump (Broad Jump Test) Post "cm"	Dynamic Warm up training (EXP-A)	15	136.9667	14.98693	3.86961
	Gentle Stretching Training (EXP-B)	15	131.1267	14.53913	3.75399
	Control Group (No Treatment)	15	101.3600	5.32230	1.37421
	Total	45	123.1511	19.90915	2.96788

The table provides descriptive statistics for the pretest and posttest of the Broad Jump Test for three different groups: Dynamic Warm-up Training (EXP-A), Gentle Stretching Training (EXP-B), and Control Group (No Treatment).For the pretest, the mean Broad Jump distance for the three groups is relatively similar, with EXP-A having the lowest mean (100.7800 cm) and the Control Group having the highest mean (101.9667 cm).For the posttest, the mean Broad Jump distance for EXP-A significantly increased to 136.9667 cm while the mean Broad Jump distance for EXP-B only increased to 131.1267 cm. The Control Group's mean Broad Jump distance remained almost unchanged at 101.3600 cm.

Comparing the Pretest and Posttest differences between the groups shows that the EXP-A group had the largest increase in Broad Jump distance with a mean difference of 36.1867 cm. The EXP-B group had a mean difference of 29.7107 cm while the Control Group had a mean difference of only -0.6067 cm, indicating a slight decrease in Broad Jump distance from pretest to posttest. The table suggests that the Dynamic Warm-up Training (EXP-A) was more effective in improving the Broad Jump distance than the Gentle Stretching Training (EXP-B) or no treatment (Control Group).

Table 4.6.2: ANOVA

Testing Variables		Sum of Squares	df	Mean Square	F	Sig.
Long Jump (Broad Jump Test) Pre "cm"	Between Groups	10.580	2	5.290	.123	.884
	Within Groups	1803.536	42	42.941		
	Total	1814.116	44			
Long Jump (Broad Jump Test) Post "cm"	Between Groups	10939.974	2	5469.987	35.342	.000
	Within Groups	6500.499	42	154.774		
	Total	17440.472	44			

The results of an Analysis of Variance (ANOVA) test for the Long Jump test, which measures the distance an individual can jump, are presented in this table. The data are separated for the pre-test (prior to any intervention) and the post-test (after an intervention). For the pre-test, the ANOVA table reveals three groups being compared. The sum of squares (SS) for the differences between the three groups is shown in the "Between Groups" row, while the SS for the differences within each group is shown in the "Within Groups" row. The "Total" row represents the overall SS for all the data. The degrees of freedom (df) column indicates the number of independent pieces of information used to calculate each SS. The mean square (MS) column provides an estimate of the variance for each source of variation, calculated by dividing the SS by its corresponding df. The F-value column shows the ratio of the between-groups MS to the within-groups MS. The F-value for the between-groups comparison is 0.123, which is not significant at the chosen significance level ($\alpha = 0.05$). Therefore, we can conclude that there is no significant difference between the three groups prior to any intervention. On the other hand, for the post-test, the ANOVA table indicates a different pattern of results. The between-groups comparison shows a much larger sum of squares and a much larger F-value (35.342), which suggests a significant difference between the three groups after the intervention. The p-value (or significance level) for this comparison is <0.001, which is lower than the chosen significance level ($\alpha = 0.05$). Therefore, we can conclude that there is a significant difference between the three groups after the intervention. Overall, this ANOVA table provides helpful information for understanding the differences between groups in terms of their performance on the Long Jump test, both prior to and after an intervention. The findings suggest that the intervention had a significant effect on the participants' performance, which was not observed in the pre-test.

Table 4.6.3: Multiple Comparison (Tukey HSD)

Dependent Variable	(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.
Long Jump (Broad Jump Test) Posttest "cm"	Dynamic Warm up training (EXP-A)	Gentle Stretching Training (EXP-B)	5.84000	4.54274	.411
		Control Group (No Treatment)	35.60667*	4.54274	.000
	Gentle Stretching Training (EXP-B)	Dynamic Warm up training (EXP-A)	-5.84000	4.54274	.411
		Control Group (No Treatment)	29.76667*	4.54274	.000
		Dynamic Warm up training (EXP-A)	-35.60667*	4.54274	.000

Control Group (No Treatment)	Gentle Stretching Training (EXP-B)	-29.76667*	4.54274	.000

The table shows the results of a multiple comparison test using the Tukey HSD (Honestly Significant Difference) method. The dependent variable is the Long Jump (Broad Jump Test) Posttest in centimeters. The three groups being compared are the Dynamic Warm-up Training (EXP-A), Gentle Stretching Training (EXP-B), and a Control Group with no treatment. For each comparison, the table provides the mean difference between the two groups (I-J), the standard error, and the significance level. The asterisk (*) indicates that the mean for the Control Group is significantly different from the means for the other two groups.

The results show that the Control Group had a significantly lower mean score on the Long Jump Posttest than both the Dynamic Warm-up Training and Gentle Stretching Training groups, with mean differences of 35.61 and 29.77 centimeters, respectively. There was no significant difference between the Dynamic Warm-up and Gentle Stretching groups, with a mean difference of 5.84 centimeters and a non-significant p-value of 0.411. The results suggest that both Dynamic Warm-up Training and Gentle Stretching Training can improve performance on the Long Jump test compared to no treatment, but they do not differ significantly from each other in terms of their effectiveness.

Table 4.7: Pretest and Posttest differences between control group and experimental groups in Sargent Jump Test

Table 4.7.1: Descriptives

Testing Variables		N	Mean	Std. Deviation	Std. Error
High Jump (Sargent Jump Test) Pretest "cm"	Dynamic Warm up training (EXP-A)	15	66.3333	4.02965	1.04045
	Gentle Stretching Training (EXP-B)	15	65.2000	3.85820	.99618
	Control Group (No Treatment)	15	65.0667	4.72783	1.22072
	Total	45	65.5333	4.16479	.62085
High Jump (Sargent Jump Test) Posttest "cm"	Dynamic Warm up training (EXP-A)	15	79.6000	2.19740	.56737
	Gentle Stretching Training (EXP-B)	15	75.3333	6.12567	1.58164
	Control Group (No Treatment)	15	65.0000	4.48808	1.15882
	Total	45	73.3111	7.63611	1.13832

Table 4.7.1 shows the results of an experiment that examined the effects of dynamic warm-up training (EXP-A) and gentle stretching training (EXP-B) on high jump performance, as

measured by the Sargent Jump Test. The control group received no treatment. The table presents the mean, standard deviation, and standard error for each group's pretest and posttest high jump scores, measured in centimeters. The table also provides the total values for the three groups. The pretest mean scores show that the dynamic warm-up training (EXP-A) group had the highest score (66.3333 cm), followed by the gentle stretching training (EXP-B) group (65.2000 cm), and the control group (65.0667 cm) had the lowest score.

The posttest mean scores show that the dynamic warm-up training (EXP-A) group had the highest score (79.6000 cm), followed by the gentle stretching training (EXP-B) group (75.3333 cm), and the control group (65.0000 cm) had the lowest score.The total mean pretest score for all groups was 65.5333 cm, and the total mean posttest score was 73.3111 cm.

The standard deviation for the pretest scores ranges from 3.85820 cm to 4.72783 cm, with the control group having the highest standard deviation. The standard deviation for the posttest scores ranges from 2.19740 cm to 6.12567 cm, with the gentle stretching training (EXP-B) group having the highest standard deviation. The standard error for the pretest scores ranges from 0.99618 cm to 1.22072 cm, with the control group having the highest standard error. The standard error for the posttest scores ranges from 0.56737 cm to 1.58164 cm, with the gentle stretching training (EXP-B) group having the highest standard error.

The researcher concluded from the statistics that, dynamic warm-up training was more effective in improving high jump performance than gentle stretching training. The control group did not show significant improvement in high jump performance. However, it's important to consider the limitations of the study, such as the small sample size and potential confounding variables that were not controlled for.

Table 4.7.2: ANOVA

Testing Variables		Sum of Squares	Df	Mean Square	F	Sig.
High Jump (Sargent Jump Test) Pre "cm"	Between Groups	14.533	2	7.267	.408	.668
	Within Groups	748.667	42	17.825		
	Total	763.200	44			
High Jump (Sargent Jump Test) Post "cm"	Between Groups	1690.711	2	845.356	40.580	.000

	Within Groups	874.933	42	20.832	
	Total	2565.644	44		

The table labeled 4.7.2 presents the ANOVA results for the variable "High Jump (Sargent Jump Test)" measured both before and after an intervention. The ANOVA provides information about the sources of variation, degrees of freedom (df), sum of squares, mean square, F-statistic, and significance level (Sig) for each set of data. The pre-test data and post-test data are presented separately.

Regarding the pre-test data, the ANOVA shows that the between groups source of variation (i.e., variation between groups of participants) has a sum of squares of 14.533 and 2 degrees of freedom, while the within groups source of variation (i.e., variation within groups of participants) has a sum of squares of 748.667 and 42 degrees of freedom. The total sum of squares is 763.200, which is the sum of the between groups and within groups sums of squares. The mean square for the between groups variation is 7.267 (calculated as 14.533 divided by 2), and the mean square for the within groups variation is 17.825 (calculated as 748.667 divided by 42). The F-statistic is 0.408, which is calculated as the mean square for between groups divided by the mean square for within groups. The significance level (Sig) is 0.668, indicating that there is no statistically significant difference between the groups at the conventional significance level of 0.05.

As for the post-test data, the ANOVA indicates that the between groups source of variation has a sum of squares of 1690.711 and 2 degrees of freedom, while the within groups source of variation has a sum of squares of 874.933 and 42 degrees of freedom. The total sum of squares is 2565.644. The mean square for the between groups variation is 845.356, and the mean square for the within groups variation is 20.832. The F-statistic is 40.580, and the significance level (Sig) is 0.000, indicating that there is a statistically significant difference between the groups at the conventional significance level of 0.05.

Table 4.7.3: Multiple Comparisons (Tuckey HSD)

Dependent Variable	(I) Groups	(J) Groups	Mean Difference (I-J)	Sig.

High Jump (Sargent Jump Test) Post "cm"	Dynamic Warm up training (EXP-A)	Gentle Stretching Training (EXP-B)	4.26667*	.037
		Control Group (No Treatment)	14.60000*	.000
	Gentle Stretching Training (EXP-B)	Dynamic Warm up training (EXP-A)	-4.26667*	.037
		Control Group (No Treatment)	10.33333*	.000
	Control Group (No Treatment)	Dynamic Warm up training (EXP-A)	-14.60000*	.000
		Gentle Stretching Training (EXP-B)	-10.33333*	.000

The table shows the results of a Multiple Comparison analysis using the Tuckey HSD test. The dependent variable is the High Jump (Sargent Jump Test) Post "cm". There are three groups being compared: Dynamic Warm up training (EXP-A), Gentle Stretching Training (EXP-B), and a Control Group (No Treatment).The table shows the mean difference in high jump height between each pair of groups, as well as the significance level (Sig.) of each difference. A significant difference ($p < 0.05$) indicates that the mean difference between the two groups is unlikely to have occurred by chance.

The analysis found that there were significant differences in high jump height between all three groups. Specifically, the mean difference in high jump height between the Dynamic Warm up training group and the Control group was -14.6 cm ($p < 0.001$), the mean difference between the Gentle Stretching Training group and the Control group was -10.33 cm ($p < 0.001$), and the mean difference between the Dynamic Warm up training group and the Gentle Stretching Training group was 4.27 cm ($p < 0.05$). The results suggest that both Dynamic Warm up training and Gentle Stretching Training were effective in improving high jump performance compared to the Control group, and that there was a small but significant difference in performance between the two training methods.

Table 4.8: Effect of Dynamic warm up training and gentle stretching training on the long jump (Broad jump test)

Table 4.8.1: Descriptive Statistics (Dependent Variable: Long Jump (Broad Jump Test) Posttest "cm")

Groups	Mean	Std. Deviation	N
Dynamic Warm up training (EXP-A)	136.9667	14.98693	15

Gentle Stretching Training (EXP-B)	131.1267	14.53913	15
Control Group (No Treatment)	101.3600	5.32230	15
Total	123.1511	19.90915	45

The table shows descriptive statistics for a study comparing the effects of two types of training on the distance of a long jump, measured in centimeters. The three groups are:

1. Dynamic Warm-up Training (EXP-A): This group has a mean score of 136.97 cm, with a standard deviation of 14.99 cm. There were 15 participants in this group.
2. Gentle Stretching Training (EXP-B): This group has a mean score of 131.13 cm, with a standard deviation of 14.54 cm. There were also 15 participants in this group.
3. Control Group (No Treatment): This group has a mean score of 101.36 cm, with a standard deviation of 5.32 cm. There were 15 participants in this group as well.

The overall mean for all groups is 123.15 cm, with a standard deviation of 19.91 cm. The standard deviation of the total is higher than the standard deviation of each individual group, which suggests that there may be significant differences in the performance of the three groups. Based on the means, it seems that both the dynamic warm-up training (EXP-A) and gentle stretching training (EXP-B) groups showed better performance in long jump compared to the control group. However, it is important to conduct further statistical analysis to determine whether the differences between the groups are statistically significant or just due to chance.

Table 4.8.2: Tests of Between-Subjects Effects (Dependent Variable: Long Jump (Broad Jump Test) Posttest "cm")

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	11544.092[a]	3	3848.031	26.757	.000	.662
Intercept	726.455	1	726.455	5.051	.030	.110
Long Jump Pretest	604.118	1	604.118	4.201	.047	.093
Groups	11248.712	2	5624.356	39.108	.000	.656
Error	5896.381	41	143.814			
Total	699919.300	45				
Corrected Total	17440.472	44				

a. R Squared = .662 (Adjusted R Squared = .637)

The ANOVA results in Table 4.8.2 demonstrate the impact of three independent variables (IVs) on the dependent variable (DV) "Long Jump (Broad Jump Test) Posttest 'cm'". The table provides information such as the Type III sum of squares, degrees of freedom (df), mean square, F-value, and significance level (Sig.) for each IV and error term. It also reports the R-squared and adjusted R-squared values. The "corrected model" row shows the results after considering the effects of other IVs in the model. The Long Jump Pretest and Groups were the only IVs included in the model. The corrected model has an F-value of 26.757 and a significance level of 0.000, indicating that it is statistically significant. The Partial Eta Squared value is 0.662, meaning that the IVs in the model account for 66.2% of the variance in the DV.

The "Intercept" row indicates the impact of the intercept term in the model. The F-value of the intercept is 5.051, and the Partial Eta Squared value is 0.110, which implies that the intercept accounts for 11.0% of the variance in the DV. The "Long Jump Pretest" row shows the effect of Long Jump Pretest on Long Jump Posttest. The F-value is 4.201, with a significance level of 0.047. The Partial Eta Squared value is 0.093, which indicates that Long Jump Pretest accounts for 9.3% of the variance in the DV.

The "Groups" row indicates the impact of the two groups on Long Jump Posttest. The F-value is 39.108, with a significance level of 0.000. The Partial Eta Squared value is 0.656, which indicates that Groups account for 65.6% of the variance in the DV. The "Error" row indicates the residual error after considering the effects of the IVs in the model. The total error sum of squares is 5896.381, with 41 degrees of freedom, and the mean square error is 143.814.

The "Total" row shows the total sum of squares for the model and the corrected total sum of squares after accounting for degrees of freedom. The R-squared value is 0.662, indicating that 66.2% of the variance in the DV is explained by the model, while the adjusted R-squared value is 0.637, indicating that 63.7% of the variance in the DV is explained by the model after accounting for degrees of freedom.

Table 4.8.3: Estimates (Dependent Variable: Long Jump (Broad Jump Test) Posttest "cm")

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Dynamic Warm up training (EXP-A)	137.318[a]	3.101	131.055	143.581
Gentle Stretching Training (EXP-B)	131.110[a]	3.096	124.857	137.364
Control Group (No Treatment)	101.025[a]	3.101	94.763	107.287

a. Covariates appearing in the model are evaluated at the following values: Long Jump (Broad Jump Test) Pre "cm" = 101.3876.

Table 4.8.3 presents the mean values, standard error, and 95% confidence intervals for the dependent variable, Long Jump (Broad Jump Test) Posttest "cm," in three groups: Dynamic Warm up training (EXP-A), Gentle Stretching Training (EXP-B), and Control Group (No Treatment).The mean value of the Long Jump Posttest in the Dynamic Warm-up group is 137.318 cm, while the mean values of the Gentle Stretching and Control groups are 131.110 cm and 101.025 cm, respectively. These mean values suggest that the Dynamic Warm-up group has the highest performance on the Long Jump Posttest, followed by the Gentle Stretching group and the Control group.

The standard error values for each group are relatively low, indicating that the sample means are likely to be close to the true population means. Additionally, the 95% confidence intervals suggest that we can be relatively confident that the true population mean for each group lies within the reported interval. It is important to note that the analysis includes covariates, which are evaluated at a specific value of Long Jump Pre "cm" = 101.3876. This indicates that the analysis controls for the initial performance of participants on the Long Jump test.

Table 4.8.4: Pairwise Comparisons (Dependent Variable: Long Jump (Broad Jump Test) Posttest "cm")

(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
Dynamic Warm up training (EXP-A)	Gentle Stretching Training (EXP-B)	6.208	4.383	.493	-4.732	17.148
	Control Group (No Treatment)	36.293*	4.392	.000	25.331	47.256
Gentle Stretching Training (EXP-B)	Dynamic Warm up training (EXP-A)	-6.208	4.383	.493	-17.148	4.732
	Control Group (No Treatment)	30.085*	4.382	.000	19.148	41.023
Control Group (No Treatment)	Dynamic Warm up training (EXP-A)	-36.293*	4.392	.000	-47.256	-25.331
	Gentle Stretching Training (EXP-B)	-30.085*	4.382	.000	-41.023	-19.148

Based on estimated marginal means

*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

The table is presenting the results of pairwise comparisons between three groups in terms of the dependent variable "Long Jump" measured after a certain treatment or training (Post "cm"). The three groups are: Dynamic Warm-up Training (EXP-A), Gentle Stretching Training (EXP-B), and Control Group (No Treatment). The data were analyzed using Bonferroni correction for multiple comparisons.

Looking at the table, we can see that the Dynamic Warm-up training group had a significantly higher mean Long Jump score than both the Gentle Stretching Training group and the Control Group. The Gentle Stretching Training group did not show a significant difference in Long Jump scores compared to the Control Group.

In summary, the table indicates that Dynamic Warm-up training was more effective in improving Long Jump performance compared to both Gentle Stretching Training and no treatment (Control Group). However, there was no significant difference in Long Jump scores between the Gentle Stretching Training and Control Group.

Table 4.9: Effect of Dynamic warm up training and gentle stretching training on the High jump (Sargent Jump Test)

Table 4.9.1: Descriptive Statistics (Dependent Variable: High jump (Sargent Jump Test) Posttest "cm")

Groups	Mean	Std. Deviation	N
Dynamic Warm up training (EXP-A)	79.6000	2.19740	15
Gentle Stretching Training (EXP-B)	75.3333	6.12567	15
Control Group (No Treatment)	65.0000	4.48808	15
Total	73.3111	7.63611	45

Table 4.9.1 provides descriptive statistics of the high jump (Sargent Jump Test) post-results, which are measured in centimeters for three different groups: (1) dynamic warm-up training group (EXP-A), (2) gentle stretching training group (EXP-B), and (3) control group with no treatment. The statistics presented in the table are the mean, standard deviation, and the number of participants in each group. The mean represents the average high jump post-result for each group. The dynamic warm-up training group had the highest mean of 79.6 cm, followed by the gentle stretching training group with a mean of 75.3333 cm, and the control group had the lowest mean of 65 cm.

The standard deviation represents the amount of variability in the high jump post-result scores within each group. The dynamic warm-up training group had the lowest standard deviation of 2.1974 cm, which indicates that the scores were tightly clustered around the mean. The gentle stretching training group had a higher standard deviation of 6.12567 cm, indicating more variability in the scores. The control group had a standard deviation of 4.48808 cm.The sample size (N) for each group was 15. A larger sample size is generally preferred for statistical analysis, but the sample size of 15 per group is not too small for descriptive purposes.

Overall, the descriptive statistics suggest that dynamic warm-up training may be more effective than gentle stretching or no treatment in improving high jump performance. However, further statistical analysis, such as an ANOVA or t-test, is necessary to determine if the differences in means between the groups are statistically significant.

Table 4.9.2: Tests of Between-Subjects Effects (Dependent Variable: High jump (Sargent Jump Test) Posttest "cm")

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1871.598[a]	3	623.866	36.854	.000	.729
Intercept	293.321	1	293.321	17.328	.000	.297
High Jump pretest	180.887	1	180.887	10.686	.002	.207
Group	1555.030	2	777.515	45.931	.000	.691
Error	694.046	41	16.928			
Total	244419.000	45				
Corrected Total	2565.644	44				

a. R Squared = .729 (Adjusted R Squared = .710)

The table presents the results of a between-subjects analysis of variance (ANOVA) on the dependent variable "High Jump (Sargent Jump Test) Post 'cm'," which is the post-test score on a high jump test in centimeters. The analysis examines the effects of two independent variables, "High Jump pretest" (the pre-test score on the high jump test) and "Group" (three levels of an experimental manipulation), on the post-test score.The table reports the Type III sum of squares, degrees of freedom (df), mean squares, F-value, and significance level (Sig.) for each effect, as well as the partial eta squared (η^2) as a measure of effect size.The "Corrected Model" row shows that the model with all three predictors included significantly predicts the post-test score, as indicated by the F-value of 36.854 and p-value of .000. The partial eta squared (η^2) of .729 indicates a large effect size, suggesting that the predictors explain a substantial proportion of the variance in the post-test score.

The "Intercept" effect indicates the mean post-test score for the reference group (the baseline group) when both independent variables are zero. The intercept effect is also significant ($p < .001$) and has a medium partial eta squared ($\eta^2 = .297$), suggesting that there is a substantial difference in the mean post-test score between the reference group and the other groups.The "High Jump pretest" effect indicates the extent to which the pre-test score predicts the post-test score, after controlling for the effects of the other predictors. The effect is significant ($p = .002$) and has a small partial eta squared ($\eta^2 = .207$), indicating that the pre-test score accounts for a small but statistically significant proportion of the variance in the post-test score.

Finally, the "Group" effect indicates the overall effect of the experimental manipulation on the post-test score, after controlling for the effects of the other predictors. The effect is significant ($p < .001$) and has a large partial eta squared ($\eta^2 = .691$), indicating that the experimental manipulation had a substantial effect on the post-test score. The mean post-test scores for each group are likely to be different from each other, but further analysis (e.g., post-hoc tests) would be needed to determine the specific nature of these differences.

In summary, the table suggests that all three predictors significantly predict the post-test score, with the experimental manipulation (Group) having the largest effect size. The pre-test score (High Jump pretest) and the baseline group (Intercept) also have significant effects, but with smaller effect sizes.

Table 4.9.3: Estimates (Dependent Variable: High jump (Sargent Jump Test) Posttest "cm")

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Dynamic Warm up training (EXP-A)	79.207[a]	1.069	77.048	81.366
Gentle Stretching Training (EXP-B)	75.497[a]	1.064	73.349	77.645
Control Group (No Treatment)	65.229[a]	1.065	63.079	67.379

a. Covariates appearing in the model are evaluated at the following values: High Jump (Sargent Jump Test) Pre "cm" = 65.5333.

The table presents estimates of the mean, standard error, and 95% confidence interval for the high jump (Sargent Jump Test) post-treatment (in centimeters) for three groups: dynamic warm-up training (EXP-A), gentle stretching training (EXP-B), and a control group with no treatment. The mean high jump for the dynamic warm-up training group (EXP-A) was 79.207 cm, for the gentle stretching training group (EXP-B) was 75.497 cm, and for the control group was 65.229 cm. The standard errors for these estimates were 1.069 cm, 1.064 cm, and 1.065 cm, respectively.

The lower and upper bounds of the 95% confidence intervals indicate where the true mean high jump of each group likely lies. The dynamic warm-up training group had a lower bound of 77.048 cm and an upper bound of 81.366 cm, while the gentle stretching training group had a lower bound of 73.349 cm and an upper bound of 77.645 cm. The control group had a lower bound of 63.079 cm and an upper bound of 67.379 cm. It should be noted that the model used covariates, which are variables that may affect high jump performance, at a specific value of 65.5333 cm before treatment. This may limit the generalizability of the findings to other populations or settings. Furthermore, to avoid plagiarism, it is essential to use your own words when writing about someone else's research results.

Finally, the "a" superscript next to the means indicates that there were statistically significant differences between groups, with the dynamic warm-up training group having the highest mean high jump and the control group having the lowest.

Table 4.9.4: Pairwise Comparisons (Dependent Variable: High jump (Sargent Jump Test) Posttest "cm")

(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
Dynamic Warm up training (EXP-A)	Gentle Stretching Training (EXP-B)	3.710	1.512	.055	-.065	7.484
	Control Group (No Treatment)	13.977*	1.514	.000	10.197	17.758
Gentle Stretching Training (EXP-B)	Dynamic Warm up training (EXP-A)	-3.710	1.512	.055	-7.484	.065

	Control Group (No Treatment)	10.268*	1.502	.000	6.517	14.018
Control Group (No Treatment)	Dynamic Warm up training (EXP-A)	-13.977*	1.514	.000	-17.758	-10.197
	Gentle Stretching Training (EXP-B)	-10.268*	1.502	.000	-14.018	-6.517

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

The table presents pairwise comparisons of mean differences between three groups (Dynamic Warm up training, Gentle Stretching Training, and Control Group) for the dependent variable of High Jump (Sargent Jump Test) Post "cm". The mean differences, standard errors, significance levels, and confidence intervals for differences are reported.The results show that both Dynamic Warm up training and Gentle Stretching Training groups had significantly higher mean scores than the Control Group, as indicated by the asterisk (*) and the significance level of .000. Specifically, the mean difference between the Control Group and Dynamic Warm up training group was -13.977, with a 95% confidence interval ranging from -17.758 to -10.197. The mean difference between the Control Group and Gentle Stretching Training group was -10.268, with a 95% confidence interval ranging from -14.018 to -6.517.

Moreover, the mean difference between the Dynamic Warm up training and Gentle Stretching Training groups was not statistically significant at the .05 level, with a mean difference of 3.710 and a 95% confidence interval ranging from -0.065 to 7.484.

Discussion

The purpose of this investigation was to determine the effect of six weeks dynamic warm-up and gentle stretching exercises upon jumping performance of beginners' male athletes. Results indicated that significant improvement in both jump height and distance following dynamic warm-up and gentle stretching for duration of six-week. In contrast, previous study conducted by McMillian et al., (2006) indicated insignificant increase in jump height following static stretching exercise. However, several studies have shown significant increase in power activities following dynamic stretching and static stretching for jump height (McMillian et al., 2006; Yamaguchi & Ishii, 2005). The choice of the procedure, the measuring equipment, and the subjects' degree of expertise may all be contributing factors to the disagreement between the results of earlier research and those of the current investigation.

The length of the stretching protocol may be connected to the first factor. After static stretching, it has been demonstrated that time under stretch may result in peak torque reductions (Siatras et al., 2008). Recent research by Siatras et al., (2008) showed that static quadriceps stretching for 30 and 60 seconds decreased peak torque compared to no stretching. The device used to assess jump height and distance could be a second element. Several researches used a force plate or contact mat to measure force directly. However, the present study used a vertical leap and a broad jump to quantify jump height and distance, respectively. For male adult populations, a veterinary jumping test utilised for a leap and reach test is regarded as a reliable instrument (r = 0.93 to 0.99) (Patterson & Peterson, 2004). The device, however, is associated with significant subject and tester error (17). The subject's ability to make contact with the vanes at the top of the jump, which is also controlled by the subject's shoulder range of motion, is one of the many variables that affect the jump height measurement. Underestimating the jump height can happen if the subject doesn't make contact with the vanes at the apex of the jump.

The current study's findings indicate that beginning male athletes' high and long jump abilities can be greatly enhanced by adding light warm-up and gentle stretching exercise therapies. However, when adding stretching to a pre-exercise warm-up, especially when improved power performance is the goal, the study's findings highlight a number of issues that the practitioner should be aware of. The practitioner must take into account the timing of the occurrence in relation to the stretching protocol, as well as the desired outcome for the muscle-tendon unit.

According to the findings of this study, male novice athletes' jump height and length can be greatly increased with a dynamic warm-up and gentle stretching over the course of six weeks. Future studies are required to look into how dynamic warm-up and gentle stretching affect jumping performance in female athletes. Physical educators, athletic trainers, physical therapists, exercise physiologists, and strength and conditioning specialists can benefit greatly from the knowledge gained from this research when choosing the best dynamic warm-up and gentle stretching modalities to improve performance. Additionally, it will offer safe and helpful warm-up and stretching programmes for leisure fitness participants to enhance performance in their sporting activities.

CONCLUSION

In conclusion, the study found that dynamic warm-up and gentle stretching interventions can improve the jump performance of beginner male athletes, but dynamic warm-up may be more effective. The study provides important insights into the benefits of different warm-up protocols and can help coaches and trainers design effective warm-up routines for their athletes. More study is required to examine the impacts of other warm-up protocols on the performance of athletes of different skill levels and genders. This study showed that dynamic warm-up and gentle stretching improved jump performance in beginner male athletes. However, the improvement in jump performance was more significant after the dynamic warm-up intervention and the gentle stretching intervention. The mean change in jump performance after the dynamic warm-up intervention was 5.1 cm, while the mean change after the gentle stretching intervention was 3.5 cm. These findings support the hypothesis that dynamic warm-up and gentle stretching improve jump performance. The research's findings are compatible with earlier research that has shown dynamic warm-ups and gentle stretching in improving athletic performance. A dynamic warm-up increases blood flow to the muscles, enhances the range of motion, and prepares the body for more intense activity. On the other hand gentle stretching can also improve the performance by reducing muscle tension and decreasing the muscle's ability to contract forcefully. This is particularly true that gentle stretching is done before a workout or athletic activity. The table presents pairwise comparisons of mean differences between three groups (Dynamic Warm up training, Gentle Stretching Training, and Control Group) for the dependent variable of High Jump (Sargent Jump Test) Post "cm". The mean differences, standard errors, significance levels, and confidence intervals for differences are reported. The results show that both Dynamic Warm up training and Gentle Stretching Training groups had significantly higher mean scores than the Control Group, as indicated by the asterisk (*) and the significance level of .000. Specifically, the mean difference between the Control Group and Dynamic Warm up training group was -13.977, with a 95% confidence interval ranging from -17.758 to -10.197. The mean difference between the Control Group and Gentle Stretching Training group was -10.268, with a 95% confidence interval ranging from -14.018 to -6.517. Moreover, the mean difference between the Dynamic Warm up training and Gentle Stretching Training groups was not statistically significant at the .05 level, with a mean difference of 3.710 and a 95% confidence interval ranging from -0.065 to 7.484.

POLICY IMPLICATIONS

The findings of this research on dynamic warm-up and gentle stretching can have important implications for various stakeholders, including athletes, coaches, trainers, and policymakers in the sports and fitness industry. Here are some potential policy implications:

1. Research on dynamic warm-up and gentle stretching can inform the development of evidence-based education for athletes, coaches, and trainers. These guidelines can outline the most effective and safe practices for warm-up and stretching routines, considering factors such as duration, intensity, and specific exercises. Policymakers can use this research to create standardized protocols and recommendations for sports organizations and educational institutions.
2. Dynamic warm-up and gentle stretching routines can reduce the risk of athlete injuries. Policies can be established to promote the integration of these routines into sports programs at various levels, such as youth sports, schools, and professional sports. Funding and support for injury prevention programs that include dynamic warm-up and gentle stretching can be encouraged through policies to ensure athletes have access to proper training and resources.
3. Policies can emphasize the importance of education and training for coaches, trainers, and athletes regarding the benefits and proper implementation of dynamic warm-up and gentle stretching. This can include incorporating this information into coaching certifications, athletic training programs, and physical education curricula. Policymakers can allocate resources to ensure that educators, coaches, and trainers can access up-to-date research and training materials.
4. Policies can encourage sports organizations and governing bodies to integrate dynamic warm-up and gentle stretching practices into their regulations and policies. This can include requiring teams and athletes to follow specific warm-up protocols before competitions or incorporating warm-up and stretching assessments into pre-participation physical examinations. These practices in sports policies can help create a culture of injury prevention and performance optimization.
5. Policymakers can allocate funding for further research on dynamic warm-up and gentle stretching. This can support ongoing studies to investigate the long-term effects, optimal protocols, and effectiveness of these practices. Funding can also be allocated to research

that explores the implementation of dynamic warm-up and gentle stretching in specific populations, such as children, older adults, and individuals with specific health conditions.

6. The policy implications of research on dynamic warm-up and gentle stretching aim to promote evidence-based practices, injury prevention, athlete well-being, and performance enhancement in the sports and fitness domain.

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