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A Study on Effect of Circuit Training and aerobic training on Leg Explosive Strength of Tribal and Non Tribal School Girls Students

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Abstract :-
The study aimed to investigate the effect of circuit Training and Aerobic dance training on motor fitness components . Under report considers a sample size of 180 high school girls in the age group of 12 to 14 years of Khammam district in the state of Telangana. The subjects chosen were not seriously involved in any type of serious practice of sports &games prior to this study. with no serious sports background were picked up randomly from Kasturba Gandhi BalikaVidyalaya (KGBV) Palvancha (Tribal Girl High School) and Telangana Social Welfare Residential School for Girls Palvancha (Non-Tribal Girl High School).To conduct the present study 90 girl students from Telangana Social Welfare Residential School, palvancha (Non-Tribal) were selected at random and were assigned to three equated groups i.e., Circuit Training Group (CTG) 30, Aerobic Dance Group (ADG) 30, and Control Group (CG) 30. Similarly 90 girl students from Kasturiba Gandhi BalikaVidyalaya School, palvancha (Tribal) were selected at random and were assigned to three equated groups i.e., Circuit Training Group(CTG) 30, Aerobic Dance Group (ADG) 30, Control Group (CG) 30. They were tested before and after training period to measure the Leg Explosive Strength applying th**e** Standing Broad Jump Test.Key Words; - Circuit Training, Aerobic Dance Training and Leg Explosive Strength ,Standing Broad Jump.

Introduction : The physical activity level of young children has received increasing attention nationally because of the rapid rise in childhood obesity. Research tells us that the percentage of obese children aged 2 to 5 has doubled in the past three years. This alarming rate of increase can be attributed to two main factors: "eating too much and moving too little". Physical activities in early childhood settings are critically important in helping reduce the increased health risks associated with obese and overweight children.

Circuit Training: Circuit training is a superb way to improve mobility, strength, and stamina. The circuit training comprises 6 to 10 strength exercises that are completed one after another. Each exercise is performed for a specified number of repetitions or for a specific time before moving on to subsequent exercises

Aerobic Dance: Aerobic means "using air". It develops the circulation to the heart and muscles so that more of the oxygen that is essential to keep going gets to tissues. Aerobic dance is fun and easy to practice and it improves cardiovascular capacity by increasing the overall use of oxygen in the body with less effort and thus improves efficiency of cardio-vascular system. It is vigorous large muscular activity which stimulates heart and lungs for a longer period of time.

Statement Of The Problem:
The Purpose of the study is to find ou the Effect of Circuit Training and aerobic training on Leg Explosive strength of Tribal and Non Tribal School Girls Students

Method: The study under report considers a sample size of 180 high school girls in the age group of 12 to 14 years of Khammam district in the state of Telangana. The subjects chosen were not seriously involved in any type of serious practice of sports &games prior to this study. with no serious sports background were picked up randomly from Kasturba Gandhi BalikaVidyalaya (KGBV) Palvancha (Tribal Girl High School) and Telangana Social Welfare Residential School for Girls Palvancha (Non-Tribal Girl High School).To conduct the present study 90 girl students from Telangana Social Welfare Residential School, palvancha (Non-Tribal) were selected at random and were assigned to three equated groups i.e., Circuit Training Group (CTG) 30, Aerobic Dance Group (ADG) 30, and Control Group (CG) 30. Similarly 90 girl students from Kasturiba Gandhi BalikaVidyalaya School, palvancha (Tribal) were selected at random and were assigned to three equated groups i.e., Circuit Training Group(CTG) 30, Aerobic Dance Group (ADG) 30, Control Group (CG) 30.
They were tested before and after training period to measure the Leg Strength applying the **Standing Broad Jump** test To measure Leg Explosive Strength.

Result and Discussion:

4.1 DESCRIPTIVE ANALYSIS OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF TRIBAL GIRLSIN CONTROL GROUP

Results and Discussion: The Mean, Standard Deviation, Mean difference of leg explosive strength between pre and post-test of Tribal subjects in Control group through standing broad jump test. The mean and standard deviations are 1.511±0.10, 1.511± 0.90 respectively. In the group the leg explosive strength minimum and maximum values were found to be 1.32, 1.74 and 1.32, 1.73respectively. It is clear that the mean difference of leg explosive strength between pre and post-test of Tribal subjects is 0.002 in control group.

4.1.2.DESCRIPTIVE ANALYSIS OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF TRIBAL GIRLSIN CIRCUIT TRAINING GROUP

Results and Discussion: The Mean, Standard Deviation, Mean difference of leg explosive strength between pre and post-test of Tribal subjects in Circuit training group through standing broad jump test. The mean, standard deviations are 1.67±0.12, 1.78± 0.11 respectively. In the group the leg explosive strength minimum and maximum values were found to be 1.41, 1.89 and 1.58, 1.97respectively. It is clear that the mean difference of leg explosive strength between pre and post-test of Tribal subjects is 0.11 in Circuit training group.

4.1.3.DESCRIPTIVE ANALYSIS OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF TRIBALGIRLS IN AEROBIC DANCE TRAINING GROUP

Results and Discussion: The Mean, Standard Deviation, Mean difference of leg explosive strength between pre and post-test of Tribal subjects in Aerobic dance training group through standing broad jump test. The mean and standard deviations are 1.62±0.12, 1.68± 0.13 respectively. In the group the leg explosive strength minimum and maximum values were found to be 1.40, 1.80 and 1.44, 1.89respectively. It is clear that the mean difference of leg explosive strength between pre and tost-Test of Tribal subjects is 0.6 in Aerobic dance training group.

4.1.4.DESCRIPTIVE ANALYSIS OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF NON-TRIBAL GIRLS IN CONTROL GROUP

Results and Discussion: The Mean, Standard Deviation, Mean difference of leg explosive strength between pre and post-test of Non-tribal subjects in Control group through standing broad jump test. The mean and standard deviations are 1.463±0.098, 1.466± 0.096 respectively. In the group the leg explosive strength minimum and maximum values were found to be 1.30, 1.66 and 1.31, 1.65respectively. It is clear that the mean difference of leg explosive strength between pre and post-test of Non-Tribal subjects is 0.003 in Control group.

4.1.5.DESCRIPTIVE ANALYSIS OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF NON-TRIBAL GIRLS IN CIRCUIT TRAINING GROUP

Results and Discussion: The Mean, Standard Deviation, Mean difference of leg explosive strength between pre and post-test of Non-tribal subjects in Circuit training group through standing broad jump test. The mean and standard deviations are 1.626±0.143, 1.734±0.141 respectively. In the group the leg explosive strength minimum and maximum values were found to be 1.32, 1.86 and 1.42, 1.98respectively. It is apparent that the mean difference of leg explosive strength between pre and post-test of Non-tribal subjects is 0.088 in Circuit training group.

4.1.6.DESCRIPTIVE ANALYSIS OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF NON-TRIBAL GIRLS IN AEROBIC DANCE TRAINING GROUP

Results and Discussion: The Mean, Standard Deviation, Mean difference of leg explosive strength between pre and post-test of Non-tribal subjects in Aerobic dance training group through standing broad jump test. The mean and standard deviations are 1.57±0.106, 1.637± 0.115 respectively. In the group the leg explosive strength minimum and maximum values were found to be 1.36, 1.76 and 1.41, 1.88 respectively. It is obvious that the mean difference of leg explosive strength between pre and post-test of Non-tribal subjects is 0.067 in Aerobic dance training group.

4.2.1.HYPOTHESIS TEST ONPAIRED MEAN DIFFERENCE OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF TRIBAL GIRLS IN CONTROL GROUP

Results and Discussion on Hypothesis: Results pertaining to the Hypothesis, the null hypothesis is "there is no significant difference of leg explosive strength in pre-test and post-test of Tribal school girls in Control Group.

Results and Discussion: Lreveal the Mean, Standard Deviation, paired differences of Mean, Standard Deviation, CI, 't' value, d.f and p-values between pre and post-test of Tribal school girls Control group in relation to their leg explosive strength through Standing Broad Jump test. The leg explosive strength was measured using the data of Standing Broad Jump test pre and post training for the control group. The data was analyzed and the results are presented.

The observed *t- test* value for Standing Broad Jump test in control group on leg explosive strength between pre and post-test was 1.86 which is less than the required statistical *tablevalue2.093* at 0.05 levels (*P = 0.073*). Thus the result indicates that there is no significant improvement in standing broad jump of pre-test and post-test of control group. Therefore, the hypothesis is accepted.

4.2.2.HYPOTHESIS TEST ONPAIRED MEAN DIFFERENCE OFLEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF TRIBAL GIRLS IN CIRCUIT TRAINING GROUP

Results and Discussion on Hypothesis: Results pertaining to the Hypothesis, the hypothesis is "there may be significant difference of leg explosive strength in pre-test and post-test of Tribal school girls in Circuit training Group.

Results and Discussion: The Mean, Standard Deviation, paired differences of Mean, Standard Deviation, CI, 't' value, d.f and p-value between pre and post-test of Tribal school girls Circuit training Group in relation to their leg explosive strength through Standing Broad Jump test. The data was analyzed and the results are presented.The observed *t- test* value for Standing Broad Jump test in the group on leg explosive strength between pre and post-test was 9.712 which is more than the required statistical *tablevalue2.093* at 0.05 levels (*P = 0.000*). Hence, the hypothesis is accepted. Thus the result indicates that the twelve weeks of Circuit training produced a significant improvement in leg explosive strength. The impact of Circuit training is clearly visible through significant improvement with respect to leg explosive strength.

4.2.3.HYPOTHESIS TEST ONPAIRED MEAN DIFFERENCE OFLEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF TRIBAL GIRLS IN AEROBIC DANCE TRAINING GROUP

Results and Discussion on Hypothesis: Results pertaining to the Hypothesis, the hypothesis is "there may be significant difference of leg explosive strength in pre-test and post-test of Tribal school girls in Aerobic dance training Group.

Results and Discussion: Expose the Mean, Standard Deviation, paired differences of Mean, Standard Deviation, CI, 't' value, d.f and p-value between pre and post-test of Tribal school girls Aerobic dance training group in relation to their leg explosive strength through Standing Broad Jump test. The data was analyzed and the results are presented.The observed *t- test* value for Standing Broad Jump test in the group on leg explosive strength between pre and post-test was 12.89 which is more than the required statistical *tablevalue2.093* at 0.05 levels (*P = 0.000*). Hence, the hypothesis is accepted. Thus the result indicates that the twelve weeks of Aerobic dance training produced a significant improvement in leg explosive strength. The impact of Aerobic dance training is clearly visible through significant improvement with respect to leg explosive strength.

4.2.4.HYPOTHESIS TEST ON PAIRED MEAN DIFFERENCE OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF NON-TRIBAL GIRLS IN CONTROL GROUP

Results and Discussion on Hypothesis: Results pertaining to the Hypothesis, the null hypothesis is "there is no significant difference of leg explosive strength in pre-test and post-test of Non-tribal school Girls in Control Group.

Results and Discussion: Reveal the Mean, Standard Deviation, paired differences of Mean, Standard Deviation, CI, 't' value, d.f and p-values between Pre and Post-Test of Non-tribal School Girls Control group in relation to their leg explosive strength through Standing Broad Jump test. The data was analyzed and the results are presented in Table 4.2.12.The observed *t-test* value for Standing Broad Jump test in control group on leg explosive strength between pre and post-test was 1.795 which is less than the required statistical *tablevalue2.093* at 0.05 levels (*P = 0.083*). Thus the result indicates that there is no significant improvement in leg explosive strength of pre-test and post-test scores of control group. Therefore, the hypothesis is accepted.

4.2.5.HYPOTHESIS TEST ON PAIRED MEAN DIFFERENCE OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF NON-TRIBAL GIRLS IN CIRCUIT TRAINING GROUP

Results and Discussion on Hypothesis: Results pertaining to the Hypothesis, the hypothesis is "there may be significant difference of leg explosive strength in pre-test and post-test of Non-tribal school Girls in Circuit training Group.

Results and Discussion: Reveal the Mean, Standard Deviation, paired differences of mean, Standard Deviation, CI, 't' value, d.f and p-value between Pre-and Post-Test of Non-tribal School Girls Circuit training Group in relation to their leg explosive strength through Standing broad jump test.The leg explosive strength was measured using the data of Standing Broad Jump test pre and post training for the Circuit training Group. The data was analyzed and the results are presented in Table 4.2.5.

The observed *t- test* value for Standing Broad Jump test in the group on leg explosive strength between pre-test and post-test was 16.45 which is more than the required statistical *tablevalue2.093* at 0.05 levels (*P = 0.000*). Hence, the hypothesis is accepted. Thus the result indicates that the twelve weeks of Circuit training produced a significant improvement on leg explosive strength during the test.

The impact of training is clearly visible with the improvement in leg explosive strength through circuit training method. Therefore this data provide sufficient evidence that the leg explosive strength of Non-tribal School Girls was significantly improved through Circuit Training.

4.2.6.HYPOTHESIS TEST ON PAIRED MEAN DIFFERENCE OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF NON-TRIBAL SCHOOL GIRLS IN AEROBIC DANCE TRAINING GROUP

Results and Discussion on Hypothesis: Results pertaining to the Hypothesis, the hypothesis is "there may be significant difference of leg explosive strength in pre-test and post-test of Non-tribal school Girls in Aerobic dance training Group.

Results and Discussion: Expose the Mean, Standard Deviation, paired differences of mean, Standard Deviation, CI, 't' value, d.f and p-value between Pre-and Post-Test of Non-tribal School Girls Aerobic dance training group in relation to their leg explosive strength through Standing Broad Jump test.The leg explosive strength was measured using the data of Standing Broad Jump test pre and post training for the Aerobic dance training group. The data was analyzed and the results are presented in Table 4.2.6.

The observed *t- test* value for Standing Broad Jump test in the group on leg explosive strength between pre and post-test was 8.79 which is more than the required statistical *tablevalue2.093* at 0.05 levels (*P = 0.000*). Hence, the hypothesis is rejected. Thus the result indicates that the twelve weeks of Aerobic dance training produced a significant improvement on leg explosive strength.

The impact of training is clearly visible on the improvement in leg explosive strength through Aerobic dance training method. Therefore this data provide sufficient evidence that the leg explosive strength performance was significantly improved through Aerobic dance training.

4.3.1.CORRELATION ANALYSIS OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST IN CONTROL, CIRCUIT TRAINING, AEROBIC DANCE TRAINING GROUP OF TRIBAL SCHOOL GIRLS

Results and Discussion: Showing the Correlation Coefficient between Pre-and Post-Test of tribal School on leg explosive strength lying on standing broad jump -test.

The observed Pearson correlation coefficient '*r'* value in pre-test and post-test of tribal school Girls in control, circuit training, aerobic dance training group were 0.975, 0.990 and 0.988, and p-values are significant in relation to their leg explosive strength at 0.05 levels.

Obviously, the correlation coefficient '*r'* values of leg explosive strength are increased positively from pretest to post training test of control, circuit training and as well in aerobic dance training group of tribal school girls.

4.3.2.CORRELATION ANALYSIS OF LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST IN CONTROL, CIRCUIT TRAINING, AEROBIC DANCE TRAINING GROUP OF NON-TRIBAL SCHOOL GIRLS

Results and Discussion: Showing the Correlation Coefficient between Pre-and Post-Test of non-tribal School girls on leg explosive strength measured through standing broad jump -test.

The observed Pearson correlation coefficient '*r'* values of leg explosive strength in pre-test and post-test of non-tribal school girls in control, circuit training, aerobic dance training group were 0.995, 0.984 and 0.966, and p-values are significant in relation to their leg explosive strength at 0.05 levels.
Obviously, the correlation coefficient '*r'* values of leg explosive strength are increased positively from pretest to post training test of control, circuit training and as well in aerobic dance training group of non-tribal school girls.

4.4.1.ANALYSIS OF VARIATION OF LEG EXPLOSIVE STRENGTH POST TEST IN CONTROL, CIRCUIT TRAINING, AEROBIC DANCE TRAINING GROUP OF TRIBAL SCHOOL GIRLS

Results and Discussion on Hypothesis:

Results pertaining to the Hypothesis, The Null Hypothesis are there may be significant difference on speed and agility in post-test of Tribal school girls among Control group, Circuit training and Aerobic dance training group.

Table- 4.4.1 Showing the Mean, Standard Deviation difference between Pre-and Post-Test of Tribal School Control Group, Circuit Training Group and Aerobic dance Training Group on Leg Explosive Strength

Table-4.4.1(a) reveals analysis of variance of Leg Explosive Strength in post-test of Tribal school girls among Control group, Circuit training and Aerobic dance training groups. F-ratio value, d.f and p-values in post training test in relation to their Leg Explosive Strength were presented. Using Single Factor ANOVA test F- ratio is computed and the obtained value of F-ratio for post-test was 43.300 against the required table (critical) value of F - test of 3.15 and p values are significant at 0.05 levels. Thus the hypothesis is accepted at 0.05 levels since computed value is more than the table value of F ratio. Therefore the significance was found in pre and post training tests among Control, Circuit training group and Aerobic dance group. As a result the training is clearly visible with respect to Leg Explosive Strength of circuit training and aerobic dance group.

Hence, Scheffe's post – hoc test is carried out for the adjusted post-test means to identify the difference between the three groups and the results are presented in table 4.4.2(b).

4.5.1.SCHEFFE POST HOC MULTIPLE COMPARISON TESTS OF LEG EXPLOSIVE STRENGTH IN POST TEST OF TRIBAL SCHOOL GIRLS IN CONTROL, CIRCUIT TARAINING AND AEROBIC DANCE GROUPS

Table 4.4.1(b) Showing the scheffe's and LSD test for the differences between adjusted post-test Means of Tribal High School Girls on Leg Explosive Strength.

Results and Discussion:

From the table 4.4.2-(b). It is observed that the difference of the adjusted post-test means of Leg Explosive Strength between the Circuit training group , Aerobic dance training group with Control group were significant while the mean differences were found as 0.27, 0.134 and Circuit training-aerobic dance training is 0.137 which was lie in the confidence interval depicted at 0.05 levels.

Hence, it is concluded that the two training groups, Circuit training group, Aerobic dance group performed better in Leg Explosive Strength than the control groups. Therefore the study provides sufficient evidence that Leg Explosive Strength was significantly improved by Circuit Training compared with Aerobic dance training.

4.5.1.ANALYSIS OF VARIATION OF LEG EXPLOSIVE STRENGTH POST TEST IN CONTROL, CIRCUIT TRAINING, AEROBIC DANCE TRAINING GROUP OF NON-TRIBAL SCHOOL GIRLS

Results and Discussion on Hypothesis:

Results pertaining to the Hypothesis, the hypothesis are there may be significant difference on Leg Explosive Strength in post-test of non-tribal school among Control group, Circuit training and Aerobic dance training group.

Table- 4.5.1 Showing the Mean, Standard Deviation difference between Pre-and Post-Test of Non Tribal School Control Group, Circuit Training Group and Aerobic dance Training Group on Leg Explosive Strength

Results and Discussion

Table-4.5.1(a) reveals analysis of variance of Leg Explosive Strength in post-test of Non-tribal school girls among Control group, Circuit training and Aerobic dance training groups. F-ratio value, d.f and p-values in post training test in relation to their leg explosive strength was presented.

Using Single Factor ANOVA test F- ratio is computed and the obtained value of F-ratio for post-test was 39.474 against the required table (critical) value of F - test statistic is 3.15 and p values are significant at 0.05 levels.

Thus the hypothesis is rejected at 0.05 levels since computed value is more than the table value of F ratio. Therefore the significance was found in pre and post training tests among control, Circuit training group and aerobic dance group. As a result the training is clearly visible with respect to Leg Explosive Strength through circuit training and aerobic dance group.

Hence, Scheffe's post – hoc test is carried out for the adjusted post-test means to identify the difference between the three groups and the results are presented in table 4.4.3(b).

4.5.2.SCHEFFE POST HOC MULTIPLE COMPARISON TESTS OF LEG EXPLOSIVE STRENGTH IN POST TEST OF NON-TRIBAL SGHOOL GIRLS IN CONTROL, CIRCUIT TARAINING AND AEROBIC DANCE GROUPS

Table 4.5.1(b) Showing the scheffe's and LSD test for the differences between adjusted post-test Means of Non-tribal High School Girls on Leg Explosive Strength during standing broad jump – test.

Results and Discussion:

From the table 4.5.1-(b). It was observed that the difference of the adjusted post-test means between the Circuit training group , Aerobic dance training group with Control group were significant while the mean differences were found as 0.26, 0.17 and Circuit training-aerobic dance training is 0.097 was lie in the confidence interval depicted at 0.05 levels.

Hence, it is concluded that the two training groups, Circuit training group, Aerobic dance significantly improved the speed and agility when compared to control groups. Between these two training groups circuit training method appears to be better on Aerobic training method.

Therefore these studies provide sufficient evidence that performance on leg explosive strength was significantly improved through Circuit Training Group compared with Aerobic dance training group Non-tribal school girls.

4.6.1.ANALYSIS OF COVARIANCE OF (ANCOVA) LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF TRIBAL SCHOOL GIRLS IN CONTROL, CIRCUIT TRAINING AND AEROBIC DANCE TRAINING GROUP

Result and Discussion:
Table-4.6.1 (a) (b) reveal analysis of covariance of leg explosive strength in pre-test and post-test of tribal school girls in control, circuit training group and aerobic dance training group. Using univariate analysis F- ratio is computed and the obtained value of F-ratio of 21.026 for post-test was displayed. Required table (critical) value of F - test was 3.11 at 0.05 levels. The significance was found in post-test for tribal students among control circuit training group and aerobic dance training.Thus the effect of circuit training is clearly visible more performance with respect to leg explosive strength compared with aerobic dance group.

4.6.2.ANALYSIS OF COVARIANCE OF (ANCOVA) LEG EXPLOSIVE STRENGTH IN PRE AND POST TEST OF NON TRIBAL SCHOOL GIRLS IN CONTROL, CIRCUIT TRAINING AND AEROBIC DANCE TRAINING GROUP

Result and Discussion:
Table-4.6.2 (a) (b) reveal analysis of covariance of leg explosive strength in pre-test and post-test of Non-tribal school girls in control, circuit training group and aerobic dance training group. Using univariate analysis F- ratio is computed and the obtained value of F-ratio of 64.873 for post-test was displayed. Required table (critical) value of F - test was 3.11 at 0.05 levels. The significance was found in post-test for Non-tribal students among Control Circuit training group and Aerobic dance training. Thus the effect of Circuit training and aerobic dance group's clearly visible with respect to leg explosive strength.

CONCLUSION

From all the above finally, the overall conclusions are highlighted here under.

1. The two training techniques i.e., Circuit training group, Aerobic Dance training groups have shown significant improvement due to 12 weeks training on Leg explosive strength of Tribal and Non-Tribal school girls and it is clear that the Control group could not produce significant improvement. It is also observed that the tribal school girls have more improvement on leg explosive strength when compared to Non-Tribal school girls in the study.

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Effect Of Aerobic Dance Training On Body Weight And Lipid Profiles Among Sri Lankan Women College Students

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Abstract

The purpose of the present study was to determine the effect of aerobic dance training on body weight, triglycerides, and high-density lipoprotein levels among Sri Lankan women college students Twenty-four (24) students from the Department of cosmetology women students University College Jaffna, aged between 19 and 23 years, were selected as subjects for the study. The subjects were randomly divided into two groups: aerobic dance Training Group (ADTG, n = 12) and Control Group (CG, n = 12). The aerobic dance Training Group underwent a structured aerobic dance training programme consisting of free hand exercise mix with clapping exercises duration of eight weeks. The training sessions were conducted five days per week from 6.30 a.m. to 7.30 a.m., while the Control Group continued with their regular routine activities without any additional training. The criterion variables selected for the study were body weight measured with weighing machine, Lipid selected as Triglycerides, and High-Density Lipoprotein Levels with blood test with Clinical lab. Pre-test and post-test data were statistically analyzed using the paired 't' test, and the level of significance was set at 0.05.The results of the study indicated that the aerobic dance Training Group showed significant improvement in high density lipoproteins and reduced in body weight and triglycerides of women college students. Furthermore, the aerobic dance training group demonstrated superior reduction in body weight and triglycerides and improvement HDL compared to the Control Group, whereas the Control Group did not exhibit any significant changes in the selected criterion variables. Key words: Aerobic Dance Training, Body Weight, Triglycerides and High-Density Lipoproteins

Introduction

Regular physical activity plays a crucial role in maintaining optimal body weight and a healthy lipid profile, particularly among young adults. In recent years, sedentary lifestyles and reduced physical activity levels among college students have contributed to increased prevalence of overweight, obesity, and dyslipidaemia, especially among women (World Health Organization, 2020). Elevated triglyceride levels and reduced high-density lipoprotein (HDL) levels are recognized risk factors for cardiovascular diseases and metabolic disorders (Mann et al., 2014). Aerobic exercise is widely recommended as an effective non-pharmacological intervention for improving body composition and lipid metabolism. Studies have consistently reported that regular aerobic training leads to reductions in body weight and triglycerides and increases in HDL levels by enhancing fat oxidation and improving enzymatic activity involved in lipid transport (Thompson et al., 2013). Among various forms of aerobic exercise, aerobic dance has gained popularity due to its rhythmic movements, music-based structure, and recreational appeal. Aerobic dance combines continuous body movements performed at moderate intensity, which promotes cardiovascular endurance, energy expenditure, and metabolic efficiency (Kravitz et al., 2006). Its enjoyable nature improves exercise adherence, making it particularly suitable for college populations. Previous research has demonstrated that aerobic dance training produces significant improvements in body composition and lipid profiles among women (Gutin et al., 2002; Ahn & Kim, 2015).

Despite extensive evidence supporting the benefits of aerobic exercise, limited studies have specifically examined the effects of aerobic dance training on lipid profile variables among Sri Lankan women college students. Considering cultural preferences and accessibility, aerobic dance may serve as a practical and effective intervention for improving health-related fitness in this population. Therefore, the present study was undertaken to investigate the effect of an eight-week aerobic dance training programme on body weight, triglycerides, and high-density lipoprotein levels among Sri Lankan women college students.

Methodology

The purpose of the present study was to determine the effect of aerobic dance training on body weight, triglycerides, and high-density lipoprotein levels among Sri Lankan women college students Twenty-four (N=24) students from the Department of cosmetology women students University College Jaffna, aged between 19 and 23 years, were selected as subjects for the study. The subjects were randomly divided into two groups: aerobic dance Training Group (ADTG, n = 12) and Control Group (CG, n = 12). The aerobic dance Training Group underwent a structured aerobic dance training programme consisting of free hand exercise mix with clapping exercises duration of eight weeks. The training sessions were conducted five days per week from 6.30 a.m. to 7.30 a.m., while the Control Group continued with their regular routine activities without any additional training. The criterion variables selected for the study were body weight measured with weighing machine, Triglycerides, and High-Density Lipoprotein Levels with blood test with Clinical lab. Pre-test and post-test data were statistically analysed using the paired 't' test, and the level of significance was set at 0.05.

Results

TABLE-I

COMPUTATION WITH 't' TEST BETWEEN THE PRE AND POST TESTS ON BODY WEIGHT OF AEROBIC DANCE TRAINING AND CONTROL GROUP OF SRI LANKAN COLLEGE WOMEN STUDENTS

Variable	Group	Test	Mean	S.D	D.M	σ DM	't'
Body Weight	Aerobic Dance Training Group	Pre Test	57.5	3.0	2.50	0.22	11.36*
		Post Test	55.0	3.11			
	Control Group	Pre Test	56.6	2.90	0.50	0.64	0.78
		Post Test	57.1	3.41			

*Significant Level of significant was fixed at 0.05 with df 11, Table Value 2.20

It observes from the Table-I that the aerobic dance training group's means value for pretest was 57.5 and post-test was 55.0 It revealed that the obtained 't' ratio 11.36. Since the 't' value is greater than the table value 2.20. It was significant at 0.05. level of confidence. The results of the study indicated that there was a significant reduction in the body weight due to the aerobic dance training of Sri Lankan college women students.

The aerobic dance Training Group exhibited a substantial reduction in body weight from pre-test to post-test, with a significant *t* value (11.36). In contrast, the Control Group showed no changes in body weight between the two tests. The results indicate that aerobic dance training had a significant positive change in body weight of college women students.

Figure-I

MEAN VALUES OF AEROBIC DANCE TRAINING AND CONTROL GROUP OF BODY WEIGHT OF SRI LANKAN COLLEGE WOMEN STUDENTS

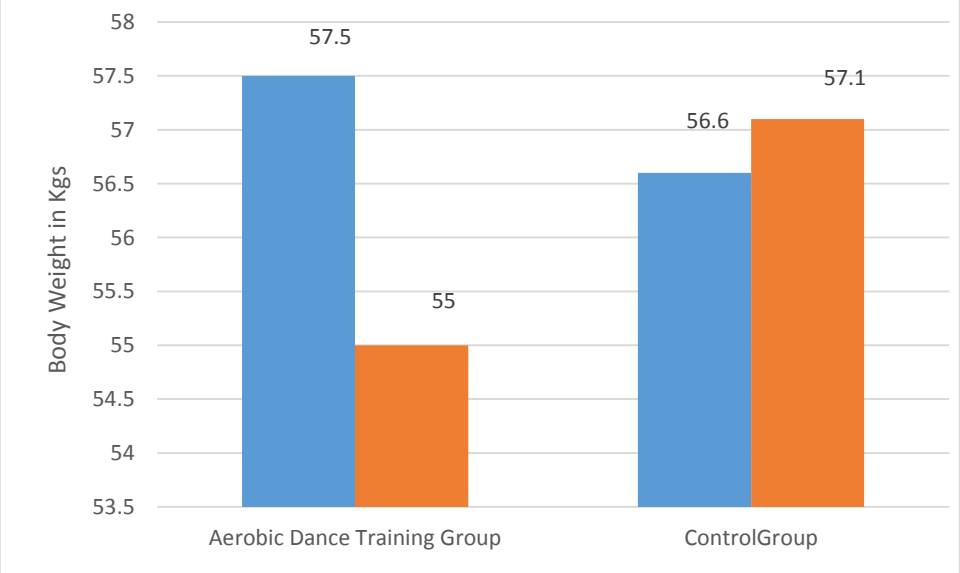


TABLE-II

COMPUTATION WITH 't' TEST BETWEEN THE PRE AND POST TESTS ON TRIGLYCERIDES OF AEROBIC DANCE TRAINING AND CONTROL GROUP OF SRI LANKAN COLLEGE WOMEN STUDENTS

Variable	Group	Test	Mean	S.D	D.M	σ DM	't'
Triglycerides	Aerobic Dance Training Group	Pre Test	141.2	1.60	8.20	1.50	5.46*
		Post Test	133.0	5.60			
	Control Group	Pre Test	141.1	1.12	0.10	0.75	0.13
		Post Test	141.0	2.87			

*Significant Level of significant was fixed at 0.05 with df 11, Table Value 2.20

It observes from the Table-II that the aerobic dance training group's means value for pre-test was 141.2 and post-test was 133.0. It revealed that the obtained 't' ratio 5.46. Since the 't' value is greater than the table value 2.20. It was significant at 0.05. level of confidence. The results of the study indicated that there was a significant reduction in the triglycerides due to the aerobic dance training of Sri Lankan college women students.

The aerobic dance training group exhibited a substantial reduction in triglycerides from pre-test to post-test, with a significant *t* value (5.46). In contrast, the Control Group showed no changes in triglycerides between the two tests. The results indicate that aerobic dance training had a significant change on triglycerides of Sri Lankan college women students.

Figure-2

MEAN VALUES OF AEROBIC DANCE TRAINING AND CONTROL GROUP OF TRIGLYCERIDES OF SRI LANKAN COLLEGE WOMEN STUDENTS

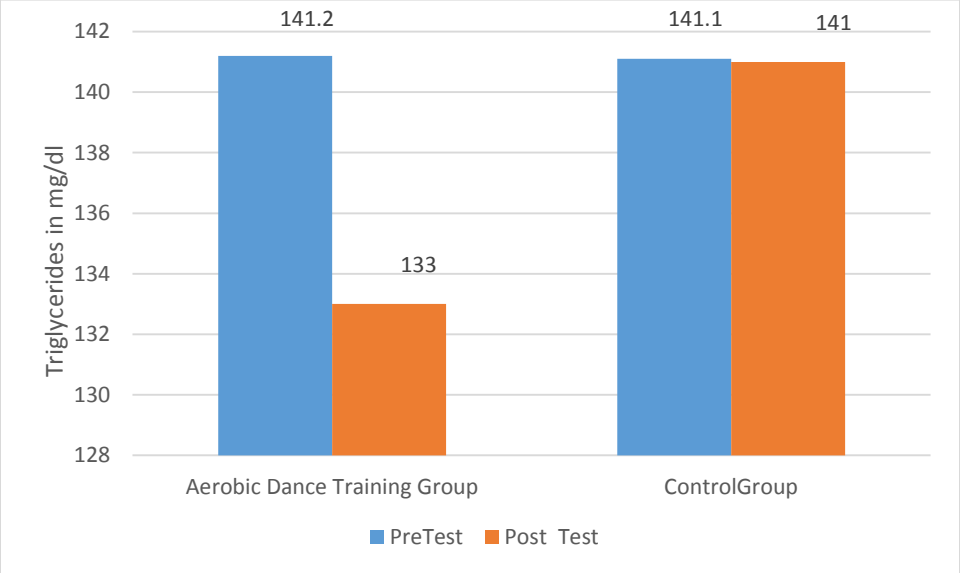


TABLE-III

COMPUTATION WITH 't' TEST BETWEEN THE PRE AND POST TESTS ON HIGH DENSITY LIPOPROTEINS OF AEROBIC DANCE TRAINING AND CONTROL GROUP OF SRI LANKAN COLLEGE WOMEN STUDENTS

Variable	Group	Test	Mean	S.D	D.M	σ DM	't'
High Density Lipo Proteins	Aerobic Dance Training Group	Pre Test	42.6	1.55	5.40	0.68	7.94*
		Post Test	48.00	1.41			
	Control Group	Pre Test	42.0	2.95	0.50	0.46	1.06
		Post Test	41.5	2.31			

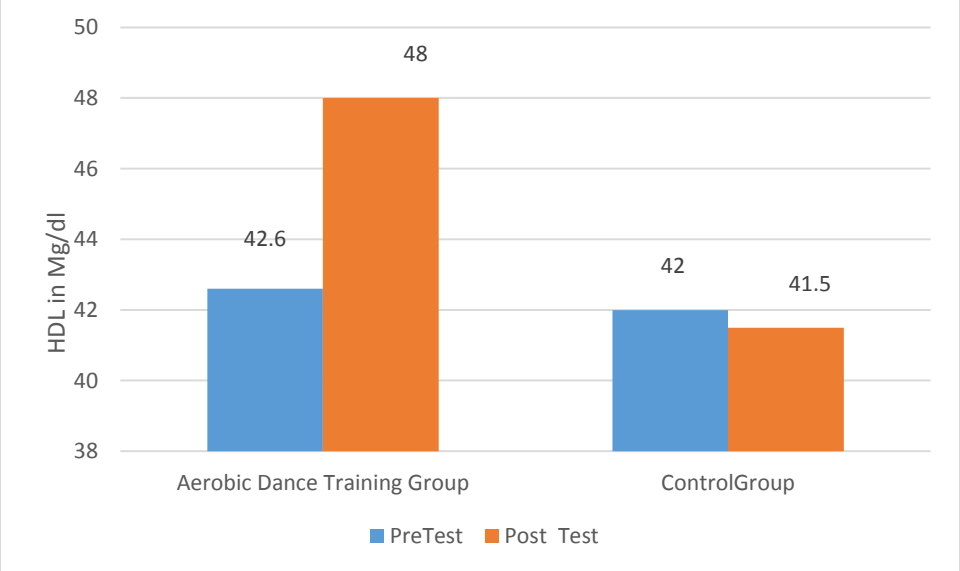
*Significant Level of significant was fixed at 0.05 with df 11, Table Value 2.20

It observes from the Table-III that the aerobic dance training group's means value for pre-test was 42.6 and post-test was 48.0 It revealed that the obtained 't' ratio 7.94 Since the 't' value is greater than the table value 2.20. It was significant at 0.05. level of confidence. The results of the study indicated that there was a significant improvement in the HDL due to the aerobic dance training of Sri Lankan college women students.

The aerobic dance training Group exhibited a substantial improvement in HDL Levels from pre-test to post-test, with a significant *t* value (7.94). In contrast, the Control Group showed no improvement in HDL between the two tests. The results indicate that aerobic dance training had a significant positive effect on HDL improvement in Sri Lankan college women students.

Figure-3

MEAN VALUES OF AEROBIC DANCE TRAINING AND CONTROL GROUP OF HDL LEVELS OF SRI LANKAN COLLEGE WOMEN STUDENTS



Discussion on Findings

The findings of the present study demonstrate that aerobic dance training significantly reduced body weight and triglyceride levels while enhancing HDL levels among Sri Lankan women college students. The reduction in body weight observed in the Aerobic Dance Training Group may be attributed to increased caloric expenditure and improved metabolic efficiency resulting from regular aerobic activity. The results line with that the study concluded that Bharathiar University women students have optimum body mass index. The study also concluded the significant improvements in body mass index of obsess and overweight women students due to the influence of aerobic dance **(Thrisha, et al., 2025).**

Our results confirmed that aerobic dance training programs to music significant influence ($p<0.05$) on the reduction of skinfolds, the regional and overall sum of skinfolds, percentage of body fat and body weight**(Gubiani & Pires Neto (2006).** The research that programmed physical activity can contribute to quantitative and qualitative changes to the anthropometric characteristics of the body, especially a decrease in volume and skinfolds **(Varess et al. 1990). The research conducted e**ffects of isolated and combined effects of aerobic dancing and resistance training on triglycerides reduced the type-2 diabetic patients **(Maniazhagu D. (2018) and Chewang Doma Bhutia and Dr. R Ram Mohan Singh (2017),** Effects of different exercise training intensities on lipoprotein cholesterol fractions in healthy middle-aged men the results shows that significant increases in the HDL cholesterol fractions in the 75% and 85% groups but not in the 65% group or the control group. **(R A Stein et al., 1997)**

The significant decrease in triglyceride levels supports earlier research indicating that aerobic exercise enhances lipid metabolism by increasing lipoprotein lipase activity, which facilitates triglyceride clearance from the bloodstream. Furthermore, the improvement in HDL levels may be due to increased reverse cholesterol transport stimulated by sustained aerobic exercise.

In contrast, the Control Group did not exhibit any significant changes, indicating that routine daily activities alone were insufficient to produce measurable physiological adaptations. The enjoyable and rhythmic nature of aerobic dance likely contributed to consistent participation and training effectiveness. Overall, the study confirms that aerobic dance training is an effective, low-cost, and accessible intervention for improving body composition and lipid profiles among women college students.

Conclusions

The present study concludes that an eight-week aerobic dance training programme significantly improves high-density lipoprotein levels and reduction of body weight, triglycerides, and among Sri Lankan women college students. Aerobic dance can be recommended as an effective physical activity intervention to promote health and prevent lifestyle-related disorders in young women**.**

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A Comparative Study Of Physical And Physiological Variables

Among Female Badminton Players

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Abstract: Badminton was originally intended to be a recreation game. It has now developed into a highly competitive sport, requiring a high degree of fitness. The requisite level of fitness will vary depending upon the level of competition. Participation in top-notch competitive badminton requires that a person should be in a state of optimal fitness. Physical variables namely arm strength, shoulder strength; arm power speed, agility and flexibility, balance etc play a very vital role in most of the game and sports. A good player of badminton requires a specific amount of strength, power, speed, agility and flexibility, speed is an immense importance for defense and attacking.For the purpose of the study was to compare the physical and physiological variables between sub-junior and junior female badminton players. Based on the random sampling, a total of 100 players (sub-junior 50 numbers and junior 50 numbers) subject were selected from of different high schools and Junior colleges of Imphal District, Manipur, the age of sub-junior 13to 16 and junior 17 to 19 years.Sub-junior and junior female Badminton players descriptive statistics using mean, S.D and range. To observe the difference between sub-junior and junior on selected physical abd physiological variables the 'T' test. The level of significant of at 0.05 level.The Physical and physiological variables of Imphal District female badminton players, T value of 0.65 for speed, 0.25 for agility, 0.34 for flexibility and 0.81 for max oxygen consumption for significant at 0.05.Agility and Flexibility there is no significant difference between the sub-junior and junior female badminton players. **Key Words**: Speed, Agility, flexibility and Max oxygen consumption.

Introduction

Today, potential sportsmen are spotted, selected and trained in a systematic way to that they given outstanding performance. It is recognized knowledgeable physical educators that champions are born and not made. However, it is also a fact that if right type of training and suitable environments not provided to a potential champion, it will be difficult to realize his full Potentials. To conclude, it can be safely said that a champion has certain inherent characteristics which are nurtured by imparting the right kind of scientific training in order to exploit his full potential.The game provides a wide opportunity for the development of strength, speed, speed endurance, agility, flexibility, neuro-muscular skill and coordination of all parts of the body by the various actions involved in it, such as running, jumping, bending stretching and other movements which call for balance and poise.

Purpose Of The Study

The purpose of the study was to find out the comparative study of physical and physiological variables among sub-junior and junior female badminton players.

Hypothesis

It was hypothesized that there was be significant differences on sub-junior and junior female volley ball players in their physical and physiological variables

Methodology

In This Study, high schools and junior colleges of Imphal District, Manipur female badminton players age Sub-Junior 13-16 age And Junior 17-19 years were randomly selected as lot method from a total 150 players the age, height and weight of the select subjects, all the tests were conducted in five days a week, tasted only during the morning and evening session. The statistical analysis of data on selected physical and physiological variables mean, S.D, range and ‘T’ test were adopted the level of significance 0.05

Table 1: Criterion Variables and Test

Sl.No	Variables	Test/Instrument	Unit of Measurement
01	Speed	30 mts dash	Seconds
02	Agility	4x10M shuttle run	Seconds
03	Flexibility	Sit and reach	centimeter
04	Max oxygen consumption	Stepping platform in 33cm	ml/kg/min

Results And Discussions

Table -2

Physical and physiological sub-junior female badminton players

variables	Sub-junior badminton players		
	Mean	S.D	Range
Speed	1.30	0.04	1.25-1.35
Agility	3.05	0.05	3-3.18
Flexibility	4.93	1.60	01-7
Mix oxygen consumption	11.01	1.01	9.21-12.71

Table-3 Physical and physiological junior female badminton players

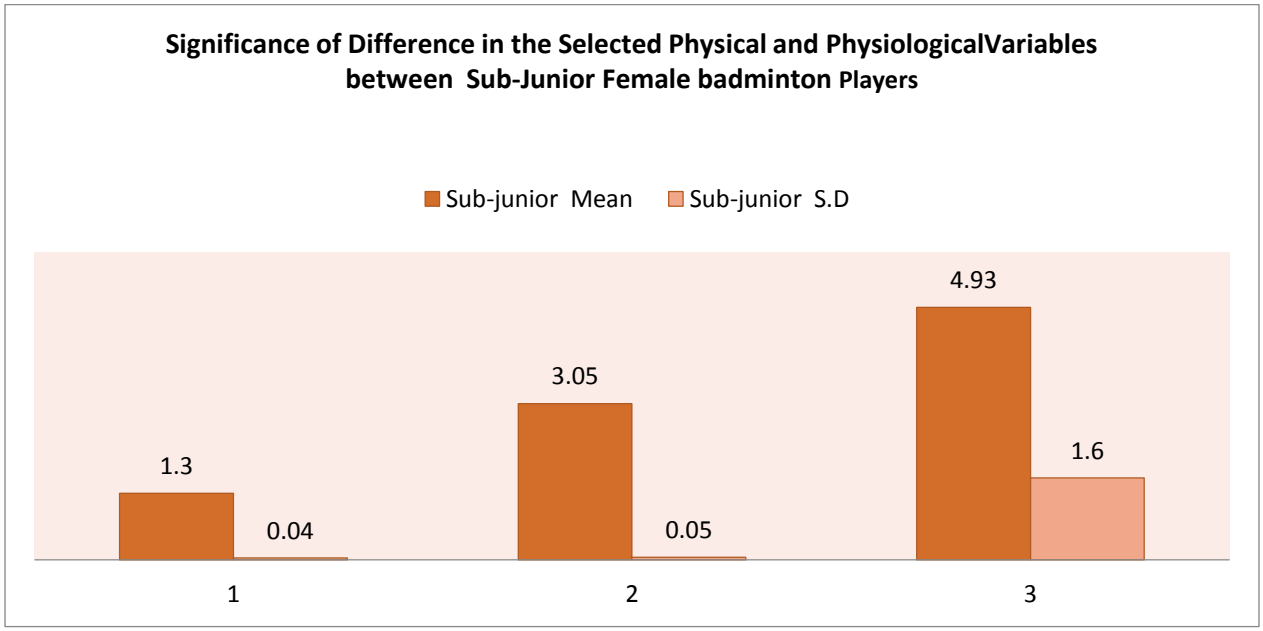
variables	Junior badminton players		
	Mean	S.D	Range
Speed	1.30	0.06	1.18-1.35
Agility	3.10	0.95	4.07-3.35
Flexibility	5.49	0.95	4-7.5
Mix oxygen consumption	12.04	0.98	1.07-14.09

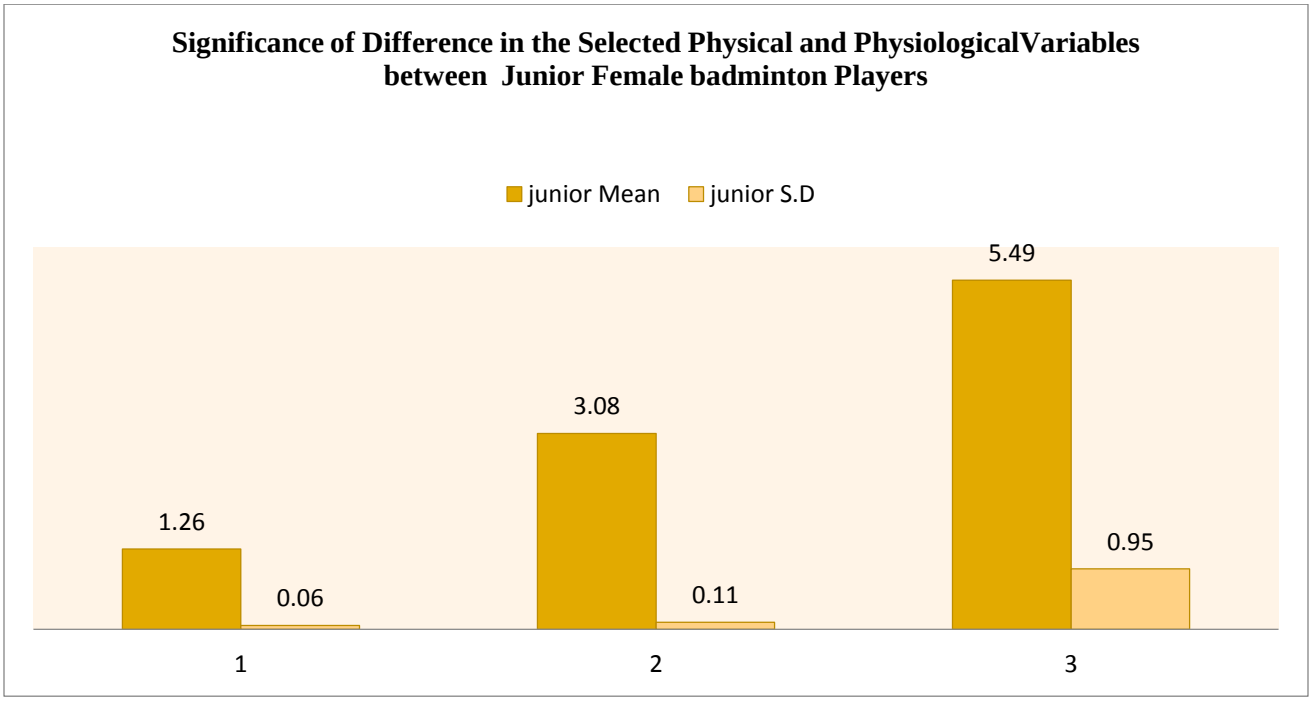
Table-4Significance of Difference in the Selected Physical and Physiological Variables between Junior and Sub-Junior Female badminton Players

Variable	Sub-junior		junior		Mean Difference	t-value
	Mean	S.D	Mean	S.D		
Speed	1.30	0.04	1.26	0.06	0.04	0.65*
Agility	3.05	0.05	3.08	0.11	0.99	0.25*
Flexibility	4.93	1.60	5.49	0.95	0.56	0.34*
Mix oxygen consumption	11.01	1.01	12.04	0.98	1.03	0.81*

*Significant at .05 level.

The physical and physiological characteristics of Sub- junior female badminton players were: Speed 1.50 ± 0.04 sec, agility 3.05±0.05 seconds, and flexibility 4.93±1.60 Seconds and maximal aerobic capacity 11.01±1.01 ml./ kg./min. respectively.The physical and physiological characteristics of junior female badminton players wereSpeed 1.26±0.06 second, agility 3.08 ± 0.11 sec, flexibility 5.49 ± 0.95 cms. And maximal aerobic capacity 12.04 ± 0.98 ml./kg./min. respectively.





Conclusions:

Agility and Flexibility, there is no significant difference between the sub-junior and junior female badminton players and significant difference for speed and maximum oxygen consumption among the sub junior and junior female badminton player.

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Effect Of Six-Week Core Training On Jumping Performance Of Volleyball Players

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Objective: This study examined the effects of a six-week core training program on jumping performance in volleyball players.**Methods:** Eighteen athletes (12 male, 6 female, aged 18–23 years) were randomly assigned to control as well as experimental groups. The experimental group underwent a structured core training program alongside regular volleyball practice, while the control group followed only regular volleyball practice. Jumping performance was measure through Takei Jump Meter. Pre- and post-test data were analyzed using ANCOVA at 0.05 level of significance. **Results:** The experimental group showed significant improvements in jumping performance after the six-weeks core training program whereas the control group remain same performance. These results confirm that core training substantially enhances jump performance. The study highlights the importance of structured core conditioning in volleyball and recommends to broader application across age groups, genders, and sports disciplines. Keywords: Core Training, Jumping Performance, Volleyball, Sports Conditioning etc.

Introduction

Volleyball is a dynamic sport that demands high levels of coordination, speed, agility, and strategic awareness. Core strength plays a central role in supporting the physical demands of the game, as the core muscles stabilize nearly every movement on the court. Whether performing explosive jumps, delivering spikes, or maintaining balance during rapid directional changes, athletes rely on a strong and stable core to execute movements effectively throughout the match.

Among volleyball's physical requirements, vertical jumping is one of the most critical components. Jump height directly influences offensive actions like spiking and blocking, as well as defensive movements such as intercepting attacks.

Efficient force transfer through the trunk—supported by core stability—helps players generate higher and more controlled jumps. Because of this strong link between core function and jump performance, incorporating targeted core training may enhance an athlete's ability to jump higher and land more safely.

While traditional volleyball training often focuses on lower-body exercises and plyometrics to improve jumping ability, emerging evidence suggests that core training can further enhance jumping performance by improving stability, balance, and neuromuscular control. Despite these indications, research specifically examining how core training influences jump performance in volleyball players remains limited. Understanding this relationship is important for optimizing training programs and improving competitive outcomes.

To address this gap, the present study investigates the effect of a structured six-week core training program on the jumping performance of volleyball players. By implementing targeted core exercises and assessing changes in vertical jump ability, this study aims to clarify the role of core training in enhancing jumping performance. The findings may provide valuable insights for coaches and athletes in designing training routines that improve jump height, landing mechanics, and overall performance on the volleyball court.

Method:

The subjects of this study were male and female volleyball players of National Sports University, Manipur (N=18). To achieve the objective of the study, the subjects were randomly assigned in to two groups: the experimental group, (n=9 i.e. 6 male and 3 female) and the control group, (n=9 i.e. 6 male and 3 female). Jumping Performance was measured using the Takei Jump Meter for all the subjects before the six-week training program. Experimental group performed additional units of core strength training lasting about 40-60 minutes each session, three times per week for 6 weeks, no additional training was given to the control group. The training protocol focused on core training based on such exercises as free weight (body weight) exercises. The training load increased progressively throughout the experiment, changing the number of sets and repetitions in accordance with standard training procedures. After six weeks core training, post-test measurement was conducted under identical conditions. Descriptive statistics and ANCOVA was employed to analysed the data.

Result Of The Study

Table 1

Descriptive statistics of jumping performance on volleyball players

Group	Time	Mean	S.D.	Minimum	Maximum	N
Control	Pre-test	39.44	8.00	27	52	9
	Post-test	38.44	8.17	26	51	9
Experimental	Pre-test	40.89	8.13	28	52	9
	Post-test	46.44	7.56	35	55	9

This table presents the descriptive statistics for control and experimental groups, both before (pre-test) and after (post-test) treatment. The control group shows a slight decrease in mean score from 39.44 to 38.44. The experimental group shows a notable increase in mean score from 40.89 to 46.44. Standard deviations are relatively consistent across tests, with slightly higher variability in the experimental group. The number of participants in each group is 9.

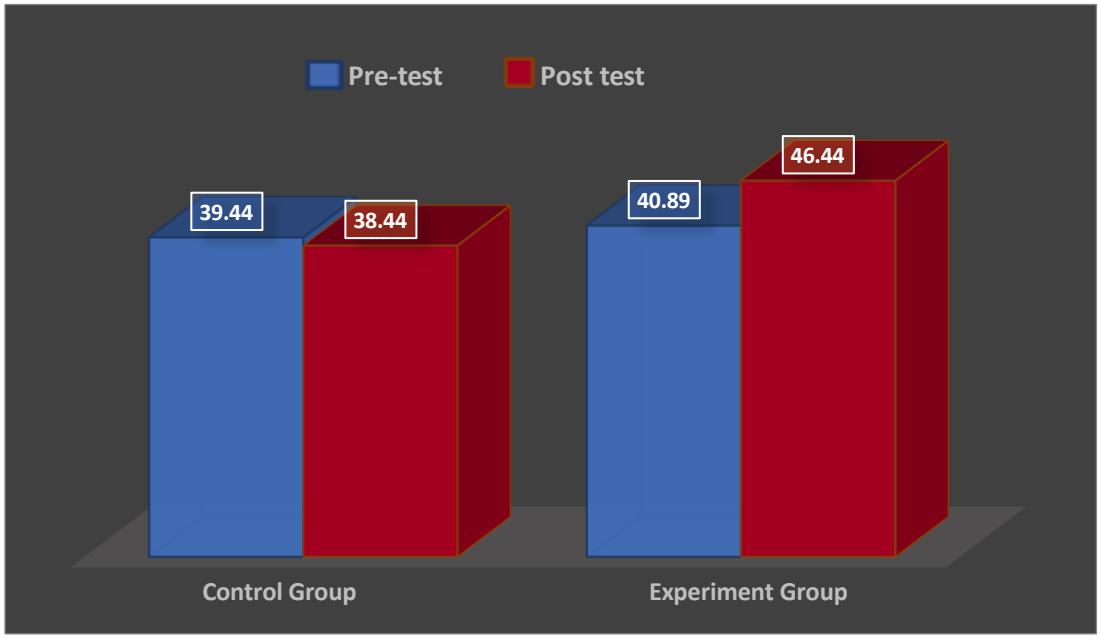

Fig 1. Graphical representation of pre and post-test mean score of jumping performance of Volleyball players

Table 2 :ANCOVA table for the post- treatment data on jump

Dependent Variable: Post Jump

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre Jump	940.76	1	940.76	273.05	.00	.95
Group	195.86	1	195.86	56.85	.00	.79
Error	51.68	15	3.44			
Total	33708.00	18				
Corrected Total	1280.44	17				

Table no 2 shows the F-Value for comparing the adjusted means of the two group (experimental and control group). The improvement in the jump performance was seen and significant difference was observed between the score of experimental group and control group in the pre-test and post test as the calculated p-value associated with is 0.00 which is less than 0.05.

Conclusion

The objective of the research was to assess the effect of six-week core training program on jumping performance of volleyball players. Significant improvement was observed in the jumping performance after the six-week core training program for the experimental group whereas the control group's performance remained same. Based on the findings of this study, it may be concluded that six-week core training program can be use as an effective way to improve jumping performance of volleyball players.

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Comparative study on VO2 max among male sprinters, middle distance runners and long-distance runners of Punjab

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Abstract:
VO2 max became widely recognized as a method for determining the functional capacity of the cardiovascular system. The study is to determine VO2 Max values for three types of runners: long-distance, middle-distance, and sprinters, each with a sample size of 60 (N = 60). Long-distance runners have the highest mean VO2 Max at 61.34, with a standard deviation (SD) of 1.9933, indicating relatively low variability in their oxygen uptake capacity, and a standard error (SE) of 0.25733, showing a precise estimate of the mean. Middle-distance runners have a lower average VO2 Max of 53.43, with an SD of 1.881, suggesting slightly less variability within this group, and an SE of 0.24283. Sprinters exhibit the lowest VO2 Max mean at 41.33, with the smallest SD of 0.9616, indicating very low variation among individuals, and an SE of 0.12414, reflecting high precision in the mean estimate. Overall, long-distance runners demonstrate the highest VO2 Max values, reflecting their aerobic capacity requirements. Key words: VO2 Max, Middle distance, Long distance etc.

Introduction :

At the top levels of a sport, it is common known that one's performance can be hindered by a number of physiological factors. A person's physical fitness may be measured along many dimensions, and it also has upper and lower boundaries. This is a matter of degree, and everyone has some of it, but physical fitness is a complex field that consists of many factors. A person's physical fitness may be measured along many dimensions, and it also has upper and lower boundaries. This is a matter of degree, and everyone has some of it, but physical fitness is a

complex field that consists of many factors. Hill and Lupton were the first people to describe the VO2 max. In the decades that followed, VO2 max became widely recognized as a method for determining the functional capacity of the cardiovascular system. Today, it is commonly used as a measurement for cardiorespiratory fitness. Elite male long-distance runners have average values that range from 75 to 85 ml•kg-1•min-1, whereas elite female long- distance runners have average values that range from 60 to 75 ml•kg-1•min-1.However, trained runners may have identical VO_2MAX values, and other physiological indexes, such as RE and lactate threshold, might contribute to the success of mostly aerobic events (Kipp et al., 2019). Since Cooper's initial work, the physiological effects of exercise have been the matter of a great deal of additional research. It's a widely held belief that the effects of exercise on the overall metabolic rate (post-exercise) are rather minor, and that the biggest effect lasts for only a few hours at the most. Although endurance exercise raises the VO2 max of a huge number of people, the amount to which it raises VO2 max differs significantly between individual Running performance can be determined based on a large number of physiological characteristics, many of which are connected with aerobic function. These are: maximal oxygen uptake (also known as VO2 max), running economy (also known as RE), running velocity at VO2 max (also known as vVO2 max), time limit at vVO2 max (also known as t-limit), running velocity at lactate threshold (also known as VLT), and maximal speed (V max). As a consequence of this, the question that arises is which of these is a more accurate predictor of performance in distance runners. It is quite challenging to respond to this question because different types of runners with varying degrees of skill are used in research. However, it would seem that the most fruitful way to forecast runners' endurance performance would be to use a mix of numerous different physiological parameters.

It has been found that within elite populations, race times have only a low to moderate connection with VO2 max, despite the fact that VO2 max is rather consistent among top runners. For instance, the values of their VO2 max may range anywhere from 70 to 85 ml•kg-1•min-1 when they are elite endurance athletes. On the other hand, it has been demonstrated that physiological markers such as RE, vVO2 max, t limit, and V max are superior predictors of distance running performance. The objective of this article is to investigate the significance of VO2 max, RE, VO2 max, t limit, and VLT in the training of distance runners and to examine the function that each of these variables play in the process. Running performance can be improved

to its full potential if the athletes and coaches take into account the significance of various other physiological parameters Physiological systems have traditionally been tested for their responses to stress by subjecting them to various types of exercise, which has been the traditional method. Therefore, a significant amount of knowledge regarding acute physiological responses to exercise has been accumulated within the more established branches of human physiology. This understanding also assisted in determining the upper limit of human physiological reactions and in making an attempt to determine the elements that restrict performance under a variety of different settings.

Review of Literature:

Acar S. et al. (2020) conducted a study to assess the relations between the physical and motor characteristics of young wrestlers. For the aim of the study, 86 male wrestler age ranges from 10-21 years were selected from Sivas, Turkey. The results of this study revealed that physical assets were correlated significantly with motor fitness variables. Results of this study exposed that wrestler of every age group had great level of fat mass, muscle mass and fat free mass 45 and motor and physical properties found high correlation among wrestler in accord with special training method.

Kumar (2019) conducted a study which was planned to compare physical fitness and anthropometric variables between bowlers and batsman regarding their specific playing ability. For this study he selected 450 male subjects in which 150 slow bowlers ,150 fastbowlers and 150 batsman were selected from various cricket academies of chandigarh Punjab and Haryana state only. The age group ranging between 16-18 years.

The findings of the study presented that playing ability of cricket players specially both types of bowlers is significantly positively correlated to speed but non significant for batsman. Strength wise all categories of cricket players were same.Both categories of bowlers had same arm length but batsman were little behind with shorter arm length compared to bowlers.

Bulgay et al. (2018) done a study to inspect the physical, motor and physiological characteristics of athletes and wrestlers. Subjects age ranges between 12 to 14 who regularly participating in physical exercise in which students formed the research group of 15 students from the ages of 12

and 14 who were involved in regular athletics training, 17 students who regularly perform wrestling and 15 volunteers in the same group who do not participate in any sports. For the analysis of characteristics age, height, body weight, Agility (t-test), hand grip strength, standing jump, vertical jump, body fat percentage, flamingo balance, flexibility, one minute shuttle, BMI, 30 meter speed run, 1000 meter run-walk tests were chosen as variables. Results of this stated that agility, right and left-hand grip strength, flexibility, one min shuttle, Body Mass Index (BMI), 30 meter speed, 1000 meter run-walk tests were found significant. However, the results for height, weight, age, long jump, flamingo balance, body fat percentage, vertical jump tests were not statistically significant.

Hossein et al. (2018) piloted a research to find the relationship between lung capacity, anthropometric traits, and physical fitness characteristics with the achievement of Iranian elite Greco-Roman wrestlers. The study included 25 male Iranian elite Greco-Roman wrestlers of both light and heavy weights, with an average age of 22±4 years. Various anthropometric traits, physical fitness measures, and lung capacity were assessed in a laboratory setting. The findings of the study indicated a significant and positive correlation among arm span, as the sole anthropometric trait, and the success of Iranian elite Greco-Roman wrestlers.

Demirkan et al. (2012) has done research to determine physiological and physical differences between selected and non-selected wrestlers to the national team. For this study 48 elite junior wrestlers age ranges 18-20 years who invited in Greco-Roman national team camp, were selected as sample in this study. For the investigation height, weight, Body Composition, aerobic performance, hand grip, back and leg strength and agility were taken as physical and physiological variables. Independent t-test was used to analyze the data between selected and non-selected grapplers. The findings of this study suggests that leg average power, average arm power, back strength and agility were found significant and it was concluded that for to be a part of national team grappler must be good in training experience, anaerobic performance, strength and agility

Material and Methods:

Table 1: Descriptive Statistics of "VO2 Max among Runners (Long Distance, Middle Distance and Sprinters)

Variable	GROUP (Type of Runners)	N	Mean	SD	SE
VO2 Max	Long Distance	60	61.34	1.9933	0.25733
	Middle Distance	60	53.43	1.881	0.24283
	Sprinter	60	41.33	0.9616	0.12414

The table presents the VO2 Max values for three types of runners: long-distance, middle-distance, and sprinters, each with a sample size of 60 (N = 60). Long-distance runners have the highest mean VO2 Max at 61.34, with a standard deviation (SD) of 1.9933, indicating relatively low variability in their oxygen uptake capacity, and a standard error (SE) of 0.25733, showing a precise estimate of the mean. Middle-distance runners have a lower average VO2 Max of 53.43, with an SD of 1.881, suggesting slightly less variability within this group, and an SE of 0.24283. Sprinters exhibit the lowest VO2 Max mean at 41.33, with the smallest SD of 0.9616, indicating very low variation among individuals, and an SE of 0.12414, reflecting high precision in the mean estimate. Overall, long-distance runners demonstrate the highest VO2 Max values, reflecting their aerobic capacity requirements, followed by middle-distance runners, with sprinters showing the lowest VO2 Max values. The differences in SD and SE across the groups highlight varying levels of oxygen uptake consistency within each type of runner.

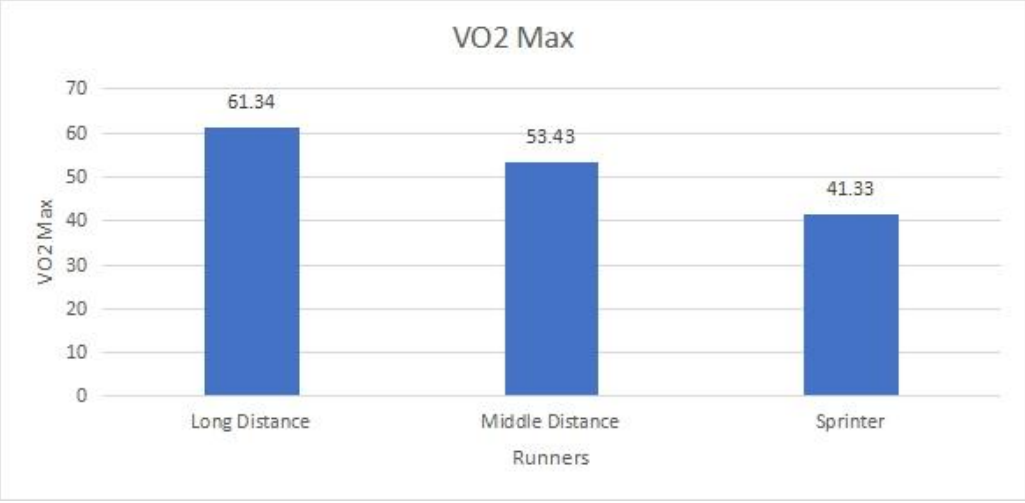

Figure 1: Mean Scores of "VO2 Max"among Runners (Long Distance, Middle Distance and Sprinters)

Table 2: Analysis of Variance (ANOVA) of Long Distance, Middle Distance and Sprinters on "VO2 Max"

ANOVA - VO2 Max					
	Sum of Squares	**df**	**Mean Square**	**F**	**p**
GROUP	12191	2	6095.58	2168	< .001
Residuals	498	177	2.81		

The ANOVA results indicated significant differences in VO2 Max among the three groups, with a total sum of squares of 12,191 and a mean square for the group of 6,095.58. The calculated F-value was 2,168, with a p-value of less than .001, demonstrating a highly significant effect of group type on VO2 Max. The residuals had a sum of squares of 498 and a mean square of 2.81, indicating variability within the groups. The null hypothesis, which posited that there were no differences in VO2 Max among the three groups, was rejected due to the significant p-value. This outcome suggested that at least one group had a mean VO2 Max that significantly differed from the others, emphasizing the importance of group type on VO2 Max. Overall, the analysis confirmed that the type of runner had a significant impact on VO2 Max, warranting further exploration of the factors contributing to these differences.

Table 3: Scheffe's post hoc comparison of Runners (Long Distance, Middle Distance and Sprinters) on "VO2 Max"

Comparison							
Variable	**GROUP**	**GROUP**	**Mean Difference**	**SE**	**df**	**t**	**$p_{scheffe}$**
VO2 Max.	Long Distance	Middle Distance	7.91	0.306	177	25.8	< .001
		Sprinter	20.01	0.306	177	65.4	< .001
	Middle Distance	Sprinter	12.1	0.306	177	39.5	< .001

The post hoc tests demonstrated significant differences in VO2 Max among the three groups of runners. The comparison between long-distance and middle-distance runners indicated a mean difference of 7.91 mL/kg/min, with a standard error (SE) of 0.306.

This comparison resulted in a t-value of 25.8 and a p-value of less than .001, signifying a statistically significant difference. In addition, when evaluating the difference between long-distance runners and sprinters, the mean difference was substantially larger at 20.01 mL/kg/min, with the same SE of 0.306, producing a t-value of 65.4 and a p-value of less than .001, which further confirmed a highly significant difference. Lastly, the comparison between middle-distance runners and sprinters yielded a mean difference of 12.1 mL/kg/min, with a t-value of 39.5 and a p-value of less than .001, indicating a significant difference between these two groups as well. Overall, these findings suggest that sprinters exhibited significantly higher VO2 Max compared to both long-distance and middle-distance runners, while middle-distance runners also outperformed long-distance runners in terms of VO2 Max.

Conclusion:

In conclusion part, these findings from the result presented in the analysis of variance (ANOVA) tables 1 suggest that sprinters exhibited significantly lower VO_2 Max compared to both long-distance and middle-distance runners, while long-distance runners also outperformed middle-distance and sprinter runners both in terms of VO_2 Max. The outcomes of study may be due to facts that long distance runners have more cardiorespiratory fitness And more oxygen intake Because They done more aerobic training in their training schedules. High intensity endurance training improves muscular blood flow of long distance runners. Vitals like heart, lungs and circulatory system works more efficient.

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Effect of Resistance and Normal Training for development of Explosive Power among Female Elite Sprinters of Telangana

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Abstract:

The Purpose of the study is to determine the effect of Resistance and Normal Training for development of explosive Power among Female Elite Sprinters of Telangana between the age group of 18 to 25 Years.. The sample for the present study consists of 30 Female Elite sprinters out of which 15 are experimental group and 15 are controlled group. Out of total subjects of 30 15 underwent Resistance and Normal training on alternate days while the control group did not receive any specific training. The duration of the training period was 12 weeks at a rate of 3 sessions per week. To assess the explosive power in legs Standing Broad Jump Test were used in the Pre Test and Post Test of the Study. This study shows that the Experiment Group of Sprinters increase the explosive power compare to the control group. Key words: Resistance and Normal Training, Sprinters, explosive power etc.

Introduction.

For the sprinters, the first and most important aspect of speed is Posture. Sprinting posture is going to be much different than acceleration. During sprinting we are looking to be much more erect through our trunk, we want our head level, hips high, foot contact slightly ahead of our centre of mass, and large range of motions through our limbs. Obtaining this upright, tall position allows for better freedom of movement, elastic energy production, maximal power production, better relaxation, and efficiency.

Prof. Rajesh Kumar (2020) studied about the effect of Plyometric and Circuit Training on selected Physical Variables among Sprinters of Hyderabad District of Telangana State. To achieve this purpose, forty five Sprinters in the age group of 16 to 20 years those who have participated in the Hyderabad Open Sprints Athletics Championships at Gachibowli Stadium, Hyderabad for the year 2019 taken as subjects. The selected forty five subjects were divided into three equal groups of fifteen each as two experimental groups and one control group, in which group – I (n=15) underwent plyometric training for three days per week for Twelve weeks, group – II (n=15) underwent the Circuit Training for three days per week for Twelve weeks and group – III (n=15) acted as control who are not participate any training apart from their regular activities. The selected Physical variables such as abdominal strength, speed and leg explosive power were assessed before and after the training period. Sit Up Test, 50 M Dash and Standing Broad Jump are the Tests were used to conduct the pre test and post for Measuring the Physical Variables such as Abdominal Strength, Speed and explosive power of legs. The results of the study it was found that there was a significant difference of performance due to Plyometric and circuit training when compared with the control group.

Rajesh Kumar and Erika Zemková (2022) studied the Effect of 12-Week Core Strengthening and Weight Training on Muscle Strength, Endurance and Flexibility in School-Aged Athletes. Ninety male athletes at the age of 12 were randomly divided into three equal groups (30 in each). Group 1 underwent core strengthening training, group 2 underwent weight training, and group 3 was the control. The training was for 12 weeks, with three sessions per week (one hour per session). Prior to and after the training, abdominal strength, endurance, and flexibility were evaluated using the sit-ups test, the Cooper 12 min run test and the sit and reach test. The analysis of variance was used to analyse pre- and post-intervention data. The results showed that both the core strength training group and the weight training group significantly ($p = 0.00$) improved in abdominal strength, represented by the number of sit-ups (from 18.70 3.20 to 22.21 3.50 and from 17.60 3.29 to 21.60 3.63, respectively); endurance, represented by distance covered in 12 min(from1817 185.78 mto2008.97 214.79 mandfrom1806 237.25 mto2002.59 83.32 m, respectively); and flexibility, represented by the sit and reach distance (from 23.48 2.75 cm to 25.96 2.38 cm and from 23.66 2.92cm to 25.86 2.55cm, respectively) when compared to the control group (from 17.20 3.20 to 16.39 2.69; from 1813 224.69 m to 1778.15 05.28 m; from

23.46 3.06 cm to 21.76 2.56 cm). More specifically, abdominal strength and endurance improved slightly more in the weight training group than in the core strength training group, whilst flexibility increased slightly more in the core strength training group than in the weight training group.

These findings indicate that both core strengthening training and weight training are effective in improving physical fitness in school-aged athletes; however, the improvement is to differing extents regarding their endurance, flexibility, and abdominal strength.

Methodology:

. . The sample for the present study consists of 30 Female Elite sprinters out of which 15 are experimental group and 15 are controlled group. Out of total subjects of 30 15 underwent Resistance and Normal training on alternate days while the control group did not receive any specific training. The duration of the training period was 12 weeks at a rate of 3 sessions per week.

TRAINING PROGRAMME OF RESISTANCE+NORMAL FOR SPRINTS – 12 Weeks

DAYS	AM
MON	SURYANAMASKAR+BREATHING EXERCISES VISUALIZATIONWARM- UP ACTIVATIONANKLE DRILLS 3X 30-40-50 (2'3' 6' MIN REST0 5KG PLATE RUN-PUSH RUN-HAND WEIGHTR RUN 1X30-40-50 (FREE RUN 95%), COOL DOWN
WED	WARM-UP 1X4X60M ABC CO-ORDINATION DRILLS 4X250 HILL (5' REST 80-90% INTENSITY 2X250 NORMAL ON TRACK 92.5% 3X40M BACK RUN ON HILL500M JOG
FRI	WARM-UP ACTIVATIONFOOT DRILLS 2X5 HOPS VERTICAL 3X15-20-30(1'2'5' REST) 1ST SET ANKLE(500 GRAMS) 2ND SET HAND WEIGHT 250 GRAMS) 3RD SET ANKLE WTS& HAND WEIGHTS RUN) 1X 15-20-30 FREE RUN (95%) 1X7 SINGLE HURDLE JUP2X7H TUCK JUMPS 1X7 ANKLE JUMPSCOOL DOWN

To assess the explosive power in legs Standing Broad Jump Test were used in the Pre Test and Post Test of the Study..

Results:

The Independent Samples t Test Statistics is applied for the Study. The Comparison were made among Experimental Group and Control Group in Pre Test and Post Test Mean.

Table 1: Showing the Mean values and Independent Samples Test of Standing Broad Jump between experimental and control groups of Female Elite sprinters.

Variables	Group	Pre Test Mean ± SD	Post Test Mean ± SD	t	P - Value
Standing Broad Jump	Experimental	2.30 ± 0.157	2.41 ± 0.185	3.55	0.001
	Control	2.26 ± 0.159	2.22 ± 0.161		

*Significant at 0.05 level

In Table 1 the Mean values of Experimental Group of Elite Sprinters in Pre Test is 2.30 and Control Group is 2.26. Due to Resistance and normal Training the Elite Experimental Group has increased the mean values in post test is 2.41 and due to general training the Control group has decreased from 2.26 to 2.22The Results of the Study shows that Experimental Group of sprinters has increased in the Performance of Standing Broad Jump.This study shows that the Experiment Group of Elite Sprinters increase the explosive power compare to the control group.

Conclusions:

It is concluded that due to Resistance and normal training there is a improvement of explosive power among Female Elite Sprinters.

Recommendations:

This type of Study is useful to the Athletes. It is useful for the Coaches to use the Resistance and Normal Training for the development of Physical Abilities among Athletes.

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Prof. Rajesh Kumar(2020) Effect of Plyometric and Circuit Training On Selected Physical Variables among Sprinters of Hyderabad District of Telangana State, IOSR Journal of Sports and Physical Education (IOSR-JSPE) e-ISSN: 2347-6737, p-ISSN: 2347-6745, Volume 7, Issue 2, (Mar –Apr 2020), PP 55-57 www.iosrjournals.org

Prof. Rajesh Kumar and Prof. Erika Zemkova, *Appl. Sci.* **2022**, The Effect of 12 Week Core Strengthening and Weight Training on Muscle Strength, Endurance and Flexibility in School Aged Athletes – P*12*(24), 12550; **https://doi.org/10.3390/app122412550** indexed within **Scopus**, **SCIE (Web of Science)**, **Inspec**, **CAPlus / SciFinder**, and **other databases**. Q2 (*Engineering, Multidisciplinary*) / CiteScore - Q2 (General *Engineering*) **Impact Factor:** 2.838 (2021); 5-Year Impact Factor: 2.921 (2021) **ISSN: 2076-3417**

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Comparison of Vertical Jump Performance of Male Boxing and Wushu Players.

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Abstract

The present study was conducted on 30 male players (fifteen male boxing players; age: 16.27 ± 1.28 years & fifteen male wushu players; age: 16.53 ± 1.25 years) comprising of inmates of Sports Training Centre and Centre of Excellence scheme of Sports Authority of India, training at NS NIS Patiala (India). The experimental protocol developed by Bosco et al., 1983 and Mcguigan et al., 2006 were used to measure the vertical jump performance of male boxing and wushu players. Test of significance of the differences was applied and data was judged at 0.01 and 0.05 level of significance. The analysis of data shows that the male wushu players performed better in vertical jump test parameters like the squat jump flight time, squat jump height, counter movement jump height, counter movement flight time, Eccentric Utilization Ratio (EUR), Elasticity Index (EI), Peak Power (0-15sec), Peak Power (45-60sec) and Mean Power (0-60sec) then male boxing players. Key words: Vertical jump Performance, Peak Power, Muscular Power.

Introduction

Despite the increasing popularity of boxing and wushu, only a few studies have been conducted on the biomechanics of these sports. Compared with athletes engaged in other sport disciplines, boxers and wushu players had similar explosive power as wrestlers and basketball players (Fleck 1983). Coaches and trainers are greatly interested in developing training techniques designed to improve power performance of the legs and vertical jump ability (Blattner & Stuart 1978). Muscle force and lower extremity strength have a significant influence on executing competitive performance i.e. different technical-tactical demands in many sports (Ivanovic et al., 2011). As a result, adequate preparation of leg extensors is highly important especially in sports which involve different jumping techniques, frequent changes of direction in the frontal and lateral

plane, numerous high and long jumps (Čoh, 2010). Numerous studies of young athletes indicated that specific training in track and field, gymnastics, swimming, soccer, basketball improve vertical jumping performance, explosive strength of upper and lower limbs. Soccer, (Gorostiaga et al. 2002), basketball (Foley 1988, Klizning, 1991), volleyball (Mills et al. 2005) and tennis training (Huff 1972, Liemohn 1983) improve the explosive strength of lower limbs and consequently vertical jumping performance. During the last few years, performing plyometric exercises in general (Wilt 1978) and drop jumps (Komi and Bosco 1978), also called depth jumps (Wilt 1978), in particular, has become very popular in training. Strength is the ability to produce maximal force, which is considered a basic motor ability and contributes to high performance in most physical activities and sports for prevention of injury (Coyle et al. 1981, Pangrazi 1999). Previous studies have reported that the high performance in many sporting endeavours is characterized by the ability to display high amounts of muscular power. Power is the product of muscular force and velocity or as an instantaneous value during a given movement. The latter, often referred to as peak power (PP), is typically associated with explosive movements such as sprinting, jumping and may be an important variable associated with success in a given discipline. The measurement of Peak Power by strength and conditioning-coaches is an important consideration in the training process. Changes in peak power throughout the annual plan may be indicative of training status or adaptation to the workload and could be used to plan or adjust the training program based on the athlete's performance. The knowledge of mechanical power components of lower extremities of athletes of selected game disciplines can be of great interest for coaches and sport scientists to optimize talent selection in many sports disciplines. Therefore, the aim of the present study was to compare the vertical jump performance of male boxing and wushu players.

Material And Method

Thirty male players (fifteen male boxing players; age: 16.27 ± 1.28 years & fifteen male wushu players; age: 16.53 ± 1.25 years) briefed for the purpose of the study and the experimental protocol (Bosco et al., 1983, Mcguigan et al., 2006) comprising of inmates of Sports Training Centre and Centre of Excellence scheme of Sports Authority of India, training at NS NIS Patiala (India). All the risks involved were also explained to each player and voluntary consent was taken from them.

Each volunteer was first subjected to physical examination that include measurements of corporal data like date of birth, age, training age, height, body mass and sports discipline. The participants performed an adaptation process previous to the vertical jump test so that error could be minimized. The vertical jump test measurement system consisted of a portable hand-held computer unit connected to a contact mat (Swift Performance, New South Wales, Australia). It has been previously reported that the system is reliable compared with a force platform (Cronin et al., 2001). Vertical Jump Tests: Three jumps: Squat jump (SJ), Counter movement jump (CMJ) and Continuous vertical jump Test for 60 seconds (CVJT) were performed according to the experimental protocol (Bosco et al., 1983, Mcguigan et al., 2006). Explosive strength and endurance variables: In this study, Eccentric Utilization Ratio (EUR) was calculated from vertical jump height (CMJ/SJ) or peak power (CMJ/SJ) by using Sayers et al (1999) peak power formula. Muscle Elasticity index was calculated from the jump height reached in CMJ and SJ Jumps (CMJ – SJ *100 / SJ) (Sayers SP, et al., 1999). The explosive strength and endurance variables were power peak (PP), mean power (MP) and fatigue index (FI). Concerning the CVJT (continuous vertical jump test), the PP was estimated by the mechanical power produced in the first 15 seconds of a 60-second work. The MP was estimated by the amount of work during a 60-second continuous effort. For PP and MP, the results were expressed in watts/kg (W/kg), according to the equation described by Bosco et al. (1983). The fatigue Index (FI) was calculated as the difference between the power peak (work produced in the first 15 seconds) and the mean power generated in the last 15 seconds of a continuous vertical jump work of 60 seconds relative to first 15 seconds peak power. The result was expressed in percentage (%). Test procedure and data collection: The participants were told to perform a 15-minute routine warm-up before performing the tests through stretching, running, coordination exercises and consecutive jumps (two sets of five vertical jumps). Three squat jumps (SJ) and three counter movement jumps (CMJ) were performed in random order on a jump mat connected to an electronic timer without the aid of an arm swing; this was standardized by having participants hold their hands on their hips. Two minutes rest period between attempts was established. The SJ involved the subject flexing the knee to approximately 90 degree maintaining the position for 3 seconds, and then jumping on the command ‘‘go.’’

The CMJ was performed under the same conditions but involved flexion of the knee followed immediately by extension of the legs. Test was executed following the original protocol for both jumps (Sayers SP, et al., 1999). On the next day, again the participants performed a 15-minute routine warm-up before the tests through stretching, running, coordination exercises and consecutive jumps (two sets of five vertical jumps).The participants were told to perform the continuous vertical jump Test (CVJT) during a work performed at maximal effort, with no pauses between jumps for 60 seconds. The subjects were told to keep chest in vertical position, with no excessive advance to avoid influence in the results; as well as to keep knees in extension during the flight, remaining with hands around waist. The participants were given stimulus to jump the highest as possible during the tests. Statistical Analysis: Mean and standard deviation for all the attributes age, height, body mass and biomechanical transients related to vertical jump tests were calculated. Test of significance of the differences was applied and data was judged at 0.01 and 0.05 level of significance.

Results & Discussion

Table 1. Mean±SD of Age, height & body mass of male Boxing & Wushu players Discipline Statistics Age (years) Height (cm) Mass (kg) Boxing (N=15) Mean 16.27 174.40 59.27 S.D. 1.28 6.20 8.61 Wushu (N=15) Mean 16.53 171.27 57.00 S.D. 1.25 7.43 9.24

Table 2. Shows mean, S.D. and t-value of Vertical Jump performance variables of the three vertical jump tests of male Boxing & Wushu players Groups Statistics Squat Jump (SJ) Counter Movement Jump (CMJ) Continuous Vertical Jump test 60 seconds(CVJT) Mechanical Power (w/kg) JH (cm) Flight Time (Sec) JH (cm) Flight Time (Sec) EUR EI PP (0-15) PP (45-60) MP (0-60) FI Boxing Mean 22.73 0.43 26.53 0.46 1.12 18.03 16.93 10.88 13.77 35.32 S.D. 3.75 0.04 3.23 0.03 0.07 12.21 2.75 2.35 2.29 12.60 Wushu Mean 29.40 0.49 32.93 0.52 1.10 12.47 20.83 11.97 15.71 42.37 S.D. 5.03 0.04 5.04 0.04 0.05 5.72 4.10 3.43 2.76 12.80 t-value 3.80** 3.62** 4.02** 4.31** 0.79# 1.55# 3.70** 1.00# 2.33* 1.29# *significant at the 0.05 level; ** significant at the 0.01 level; #non-significant JH - Jump Height; FT-Flight Time; EUR-Eccentric Utilization Ratio; EI-Elasticity Index; PP- Peak Power; MP- Mean Power; FI - Fatigue Index Significance difference was observed between the various vertical jump performance parameters of male boxing and wushu players.

The Francisco et al., (2010) observed that the average squat jump height 15.8±4.2cm, flight time 357±44.4msec, countermovement jump height 16.9±4.8cm, flight time 369.0±49.9msec and elasticity index 7.1±3.2 for male table tennis players (age 11.32±1.82 years). Whereas in the present study the average value of squat jump height 22.73±3.75cm, flight time 430±40msec for male boxing players & squat jump height 29.40±5.03cm, flight time 490±40msec for male wushu players, countermovement jump height 26.53±3.23cm, flight time 460±30msec for male boxing players & countermovement jump height 32.93±5.04cm, flight time 520±40msec for male wushu players was observed. The Eccentric Utilization Ration (EUR) has been suggested as a useful indicator of power performance in athletes. McGuigan et al., (2006) observed the average value of Eccentric Utilization Ration (EUR) 1.03±0.20 for male soccer players, 1.00 ±0.17 for softball male players, 1.03±0.20 for football male players & 1.01±0.20 for rugby male players. In the present study the average Mean Power (0-60sec) recorded during the vertical jump test for boxing players was 13.77±2.29w/kg & for wushu players was 15.71±2.76w/kg whereas Bosco et al. 1983 found that average Mean Power (0-60sec) for school going Boys (age 17.3±0.8 years) was 22.2±1.8 w/kg. Jefferson et al., (2007) found the average Peak Power (0-15sec) 27.76±3.78w/kg, Mean Power (0-60sec) 19.56±2.59w/kg & fatigue index (%) (FI) 48.60±7.01 for male volleyball players (age 19.01±1.36 years). In another study by Jefferson et al., (2006) of the Intermittent vertical jump tests (IVJT) observed the average Peak Power (0-15sec) 24.68±2.70w/kg, Mean Power (0-60sec) 18.79±2.23w/kg & fatigue index (%) 57.50±9.51 for the male handball and basketball players (age of handball players 25.74±4.71years & basketball players 18.60±0.77years). In the present study the male wushu players performed better in vertical jump test parameters then the male boxing players.

Conclusion

The Analysis Of Data Shows That The Male Wushu Players Performed better in vertical jump test parameters like the squat jump flight time, squat jump height, counter movement jump height, counter movement flight time, Eccentric Utilization Ratio (EUR), Elasticity Index (EI), Peak Power (0-15sec), Peak Power (45-60sec) and Mean Power (0-60sec) then male boxing players which may be due to the differnce in length of training and effect of specificity of training in particular sport. Jumping test is possibly a useful tool in evaluating the mechanical power of the leg extensor muscles during explosive stretch-shortening type exercises in boxing and wushu players.

The potential applications are to screen the changes in variables of mechanical power throughout the annual training with the purpose of monitoring the athlete's effectiveness of training and making the adjustments to the training program of individual player, depending on the test results.

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Effect Of 12 Weeks Circuit Training and Plyometric Training On Abdominal Muscular Strength and Endurance Among Sprinters Of Telangana State

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Abstract:

The purpose of the present study was to determine the effect of Circuit training and plyometric training on Abdominal Muscular Strength and endurance among Sprinters of Telangana State. To achieve the purpose of the study, the Male Sprinters were randomly selected from Telangana State and their age group was 18 to 25 years. The selected subjects were divided into three groups of 15 each, namely, two experimental groups and one control group. Out of total subjects of 45, 15 Circuit Training on alternate days another set of 15 underwent Plyometric training while the control group did not receive any specific training. The duration of the training period was 12 weeks at a rate of 3 sessions per week. Sit ups Test were used in the Study to assess Abdominal Muscular Strength and Endurance. The results of the study reveal that there is a significant improvement on Circuit Training group and Plyometric training group when compared to control group. Key words: Circuit Training, Plyometric Training, Abdominal Muscular Strength and Endurance etc.

Introduction

For the sprinters, the first and most important aspect of speed is Posture. Sprinting posture is going to be much different than acceleration. During sprinting we are looking to be much more erect through our trunk, we want our head level, hips high, foot contact slightly ahead of our centre of mass, and large range of motions through our limbs. Obtaining this upright, tall position allows for better freedom of movement, elastic energy production, maximal power production, better relaxation, and efficiency.

Phases of Sprinting

100 Meters divided into a few phases as follows:

a. Starting Block (set up)
b. Starting Block Clearance (0-5 meters)
c. Drive Phase/Acceleration (5-15 meters)
d. Transition (15-30 meters)
e. Maximum Velocity (30-60 meters)
f. Speed Maintenance (60-100 meters)

There are several phases in sprinting, for instance the acceleration phase is the most important phase in a race. During this phase, after the sprinter has left the starting blocks, the athlete increases the length of their stride and decreases the amount of strides taken per second. Male sprinters usually have a stride rate of 4.6 strides per second, with female athletes little less with 4.8 strides per second. Elite sprinters reach their highest speed at around the 60-70-meter distance, in a 100-meter race, for men. Professional women sprinters reach their top speeds at around the 50-60-meter distance. Top runners usually cover 20-30 meters at top speed.100m sprinting predominately uses the Anaerobic ATP-PC system 95%, Anaerobic glycolytic system 3% system and the Aerobic system 2%.

Dr. G. R. Vadivel1, Dr. D. Maniazhagu (2022) studied the Effects of Circuit Training and Circuit Weight Training on Muscular Strength Endurance. The Purpose of the present study was to find out the effects of circuit training and circuit weight training on Muscularstrength endurance. To achieve this purpose, thirty men kabaddi players from Alagappa University College of physicaleducation, karaikudi, were randomly selected as subjects. The age of the subjects ranged between 21 to 28 years. Theselected subjects were divided into three groups of ten subjects each. The experimental group – 1(n=10 CT) underwentcircuit training, the experimental group – 2 (n = 10 CWT) underwent circuit weight training and control group-3 (n= 10,CG) did not participate in any special training programme apart from their regular activities. The data was collected atprior to and after the training programme of nine weeks. Muscular strength endurance was chosen as a criterion variable.The analysis of co variance (ANCOVA) was used to analyze the data. The results of the study showed that the Muscularstrength endurance was significantly improved due to the circuit and circuit weight training

Prof. Rajesh Kumar (2020) studied about the effect of Plyometric and Circuit Training on selected Physical Variables among Sprinters of Hyderabad District of Telangana State. To achieve this purpose, forty five Sprinters in the age group of 16 to 20 years those who have participated in the Hyderabad Open Sprints Athletics Championships at Gachibowli Stadium, Hyderabad for the year 2019 taken as subjects. The selected forty five subjects were divided into three equal groups of fifteen each as two experimental groups and one control group, in which group – I (n=15) underwent plyometric training for three days per week for Twelve weeks, group – II (n=15) underwent the Circuit Training for three days per week for Twelve weeks and group – III (n=15) acted as control who are not participate any training apart from their regular activities. The selected Physical variables such as abdominal strength, speed and leg explosive power were assessed before and after the training period. Sit Up Test, 50 M Dash and Standing Broad Jump are the Tests were used to conduct the pre test and post for Measuring the Physical Variables such as Abdominal Strength, Speed and explosive power of legs.

The results of the study it was found that there was a significant difference of performance due to Plyometric and circuit training when compared with the control group.

METHODOLOGY

The purpose of the present study was to determine the effect of Circuit training and plyometric training on Abdominal Muscular Strength and endurance among Sprinters of Telangana State. To achieve the purpose of the study, the Male Sprinters were randomly selected from Telangana State and their age group was 18 to 25 years. The selected subjects were divided into three groups of 15 each, namely, two experimental groups and one control group. Out of total subjects of 45, 15 Circuit Training on alternate days another set of 15 underwent Plyometric training while the control group did not receive any specific training. The duration of the training period was 12 weeks at a rate of 3 sessions per week. Sit ups Test were used in the Study to assess Abdominal Muscular Strength and Endurance. The results of the study reveal that there is a significant improvement.

TRAINING PROGRAMME OF CIRCUIT TRAINING FOR SPRINTERS – 12 Weeks

DAYS	AM
MON	WARM- UP, ABC DRILLS Circuit Training 8 to 12 Stations continuous method
WED	WARM-UP :ABC CO-ORDINATION DRILLS Circuit Training 8 to 12 stations Interval method Cool Down
FRI	WARM-UP,ACTIVATION FOOT DRILLS Circuit Training 8 to 12 stations Repetition method COOL DOWN

TRAINING PROGRAMME OF PLYOMETRIC TRAINING FOR SPRINTERS – 12 weeks

DAYS	AM
TUE	WARM- UPACTIVATION,FOOT DRILLS Plyometric Exercise hopping, Bounding, Depth Jumps, Tuck Jumps, Hurdle Jumps etc.
THU	WARM-UP 1X4X60M ABC CO-ORDINATION DRILLS Plyometric Exercise hopping, Bounding, Depth Jumps, Tuck Jumps, Hurdle Jumps etc
SAT	WARM-UP ACTIVATIONFOOT DRILLS 2X5 HOPS DOWN STEPS Plyometrics hopping, Bounding, Depth Jumps, Tuck Jumps, Hurdle Jumps etc

Sit ups Test were used in the Study.

Results and Discussion

The mean difference between the pre and post-test results of control and experimental groups was tested using "t" ratio to determine the significance of the difference exhibited by the experimental and control groups during the training period of 12 weeks.

Paired Sample t-Test Results of Pre-Test and Post-Test Scores on Sit ups Performance among Circuit Training, Plyometric Training, and Control Groups

T-Test

Group	SIT UPS	N	Mean	Std. Deviation	Std. Error Mean	Mean Differences	T- Cal Value	T-Tab Value	df	P-Value
Circuit Training	Pre Test	30	31.77	1.223	0.223	7.300	23.178	2.045	29	0.000
	Post Test	30	39.07	1.946	0.355					
Plyometric Training	Pre Test	30	31.17	1.315	0.240	3.933	36.935	2.045	29	0.000
	Post Test	30	35.10	1.062	0.194					
Control Group	Pre Test	30	30.93	1.552	0.283	0.267	1.114	2.045	29	0.274
	Post Test	30	31.20	1.710	0.312					

The above table shows the Sit-Ups performance of selected subjects from Telangana. For the Circuit Training Group (Experimental Group-I), it is observed that the pre-test mean is 31.77, and post-test mean significantly increases to 39.07. The mean difference in Sit-Ups performance for the Circuit Training Group is 7.300. Hence, there is a significant improvement from pre-test to post-test.Similarly, the Plyometric Training Group (Experimental Group-II) shows a pre-test mean of 31.17 and a post-test mean of 35.10. This results in a mean difference of 3.933 in Sit-Ups performance. Hence, there is a significant difference seen from pre-test to post-test.It shows a pre-test mean of 30.93 and post-test mean is 31.20 2. It indicate no statistically significant change in performance between the pre-test and post-test.

Conclusions

In conclusion, the study demonstrates that both circuit t and plyometric training significantly improve abdominal strength and endurance, as evidenced by higher Sit-Ups scores.In contrast, the control group shows no notable changes, highlighting the effectiveness of these training interventions in enhancing core fitness levels.

Recommendations:

Similar research work should be done on similar set of sports to validate the results. The study also helps the physical educationists and coaches understanding the knowledge and performance of the Sprinters.

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Effect Of 12 Weeks Circuit Training and An Aerobic Training On Speed Among Long Jumpers of Osmania University

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Abstract:

The purpose of the present study was to determine the effect of Circuit training and An Aerobic training on Speed among Long Jumpers of Osmania University.. To achieve the purpose of the study, the Male Long jumpers were randomly selected from Osmania University and their age group was 18 to 25 years. The selected subjects were divided into three groups of 15 each, namely, two experimental groups and one control group. Out of total subjects of 45, 15 Circuit Training on alternate days another set of 15 underwent An Aerobic training while the control group did not receive any specific training. The duration of the training period was 12 weeks at a rate of 3 sessions per week. 30 M Run were used in the Study to assess the Speed. The results of the study reveal that there is a significant improvement on Circuit Training group and An Aerobic training group when compared to control group. Key words: Circuit Training, An Aerobic Training, Speed etc.

INTRODUCTION

The long jump, a staple in track and field, demands a blend of fitness and skill to achieve maximum distance. Mastering specific techniques involves four phases: run, take-off, flight, and landing, each crucial for optimal performance (Linthorne, 2008; Kamnardsiria et al., 2015). Successful long jumpers need sprinter-like speed during the approach run, a critical factor for performance (Theodorou et al., 2017).Enhancing speed, defined as the rate of motion irrespective of direction, is pivotal for performance improvement in sports. Coaches employ various strategies to develop speed, which encompasses velocity—a crucial component of effective sports movement (Beato et al., 2018). Key elements in running, such as stride length and frequency, require a balanced approach to achieve optimal speed, and running involves distinct phases, including swing and recovery, which are essential for effective propulsion (Brown & Ferrigno, 2014; DeJong et al., 2022). Training methods for speed focus on enhancing acceleration and maximum velocity through techniques such as over-speed training. Coaches utilize strategies like strength training and plyometrics to develop speed-specific skills, while reaction speed, crucial in sports scenarios, can be improved through focused preparation. Fundamental principles of speed development emphasize proper technique

Dessalegn Wase et al (2025) Effect of 12-week Training Program on the Fitness and Performance of Long Jumpers Horizontal and vertical explosive strength, muscular endurance, flexibility, and speed are essential biomotor abilities for enhancing long jump performance. Regular and well-structured training is essential for improving fitness levels and athletic performance, which extends to improving jumping ability. Objective: The objective of this investigation was to apply scientifically oriented instructional methods and finally to evaluate its impact on both fitness levels and long jump performance. Methods: A parallel true experimental design was employed involving 40 long jump athletes (28 males and 12 females) selected using stratified sampling based on gender. Subjects were divided into an experimental group (EG) and a control group (CG), each with 20 athletes (14 males and 6 females), assigned through simple random sampling. The subjects' age was 18 to 24 years old. he experimental protocol focused on lower body horizontal strength (LBHS), lower body upward strength (LBUS), speed (SP), static

muscular endurance (SME), flexibility (FLX), and long jump performance (LJP). The EG participated in supervised training sessions lasting 60 minutes, conducted four days in a week, over a period of twelve weeks. In contrast, the CG did not receive any treatment. This group served only as comparison purpose. A paired sample t-test was used to compare the mean of the pre-and post-tests for six variables in both the EG and CG. Results: The results showed significant improvements in the EG for LBHS, LBUS, SP, SME, FLX, and LJP ($p<0.01$). In contrast, the CG only indicated a notable variation in SP ($p<0.01$), with no significant changes in the other variables ($p>0.05$). An independent t-test of post-test results showed major variations in all variables between the EG and CG ($p<0.05$), indicating notable improvements in the EG across all measured parameters. Conclusion: The EG demonstrated significant improvements in fitness and long jump performance compared to the CG, showcasing the effectiveness of the 12-week training program. This study highlights the clear benefits of a well-structured and scientifically designed training regimen for long jump athletes. Therefore, incorporating scientifically based training into long jump programs is essential for maximizing athletes' performance and potential

METHODOLOGY

The purpose of the present study was to determine the effect of Circuit training and An Aerobic training on Speed among Long Jumpers of Osmania University.. To achieve the purpose of the study, the Male Long jumpers were randomly selected from Osmania University and their age group was 18 to 25 years. The selected subjects were divided into three groups of 15 each, namely, two experimental groups and one control group. Out of total subjects of 45, 15 Circuit Training on alternate days another set of 15 underwent An Aerobic training while the control group did not receive any specific training. The duration of the training period was 12 weeks at a rate of 3 sessions per week. 30 M Run were used in the Study to assess the Speed. The results of the study reveal that there is a significant improvement on Circuit Training group and An Aerobic training group when compared to control group.

TRAINING PROGRAMME OF CIRCUIT TRAINING FOR LONG JUMPERS – 12 Weeks

DAYS	AM
MON	WARM- UP, ABC DRILLS Circuit Training 8 to 12 Stations continuous method
WED	WARM-UP :ABC CO-ORDINATION DRILLS Circuit Training 8 to 12 stations Interval method Cool Down
FRI	WARM-UP,ACTIVATION FOOT DRILLS Circuit Training 8 to 12 stations Repetition method,COOL DOWN

TRAINING PROGRAMME OF AN AEROBIC TRAINING FOR SPRINTERS – 12 weeks

DAYS	AM
TUE	WARM- UPACTIVATION,FOOT DRILLS Plyometric Exercise hopping, Bounding, Depth Jumps, Tuck Jumps, Hurdle Jumps etc.
THU	WARM-UP 1X4X60M ABC CO-ORDINATION DRILLS Plyometric Exercise hopping, Bounding, Depth Jumps, Tuck Jumps, Hurdle Jumps + Military press, back press, bicep curl, up right rowing, bench press
SAT	WARM-UP ACTIVATIONFOOT DRILLS 2X5 HOPS DOWN STEPS Plyometrics hopping, Bounding, Depth Jumps, Tuck Jumps, Hurdle Jumps etc

30 M Run Test were used in the Study.

Results and Discussion

Table :1: Comparison of Pre-Test and Post-Test 30-Meter Run Scores Among Long Jumpers Using t-Test Analysis

Group	30 M Run	N	Mean	Std. Deviation	Std. Error Mean	Mean Differences	T-Cal Value	T-Tab Value	df	P-Value
Circuit Training	Pre- test	30	4.415	0.194	0.035	0.238	10.798	2.045	29	0.000
	Post- test	30	4.177	0.136	0.025					
Anaerobic Training	Pre- test	30	4.418	0.185	0.034	0.242	9.890	2.045	29	0.000
	Post- test	30	4.176	0.128	0.023					
Control Group	Pre- test	30	4.500	0.249	0.045	0.001	0.441	2.045	29	0.662
	Post- test	30	4.499	0.244	0.045					

The above table shows the 30-meter run test performance of selected long jumpers at Osmania University. For the Circuit Training Group, it is observed that in the pre-test the mean is 4.415 with standard deviation of 0.194 and standard error of 0.035, while the post-test mean significantly decreases to 4.177, with standard deviation of 0.136 and standard error of 0.025. The mean difference in 30-meter run performance for the Circuit Training Group is 0.238. The calculated t-value is 10.798 with 29 degrees of freedom, and the p-value is 0.000, which is less than the significance level of 0.05. Therefore the calculated t-value is significantly greater than the table value at the 0.05 level of significance. Hence, there is a significant difference seen from pre-test to post-test.Similarly, the Anaerobic Training Group shows a pre-test mean of 4.418 with standard deviation of 0.185 and standard error of 0.034, while the post-test mean decreases to 4.176 with standard deviation of 0.128 and standard error of 0.023. The mean difference is 0.242 in 30-meter run time. For this group, the calculated t-value is 9.890 with 29 degrees of freedom, and the p-value is 0.000, confirming a significant improvement in sprint performance from pre-test to post-test.The Control Group shows a pre-test mean of 4.500 with standard deviation of 0.249 and standard error of 0.045, while the post-test mean is 4.499 with standard deviation of 0.244 and standard error of 0.045, indicating no meaningful change in performance. The mean difference is 0.001, with a calculated t-value of 0.441, which is much lower than the table value (2.045), and the p-value of 0.662 is greater than 0.05, Hence there is no significant difference.

Conclusions

From the above findings, it is observed that both Circuit Training and Anaerobic Training significantly improve motor fitness, as evidenced by faster 30-meter run times among long jumpers, while the Control Group shows no changes observed. Therefore the effectiveness of the training interventions in enhancing sprint performance

Recommendations:

Similar research work should be done on similar set of sports to validate the results. The study also helps the physical educationists and coaches understanding the knowledge and performance of the Long Jumpers.

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Case Study on Violations, Irregularities, and Fraud in the Composition of the Selection Committees of Sports Teams of Maharshi Dayanand University, Rohtak

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Abstract
The present case study was conducted to analyze and investigate the violations, irregularities, and fraudulent activities within the composition of the Selection Committee of the Sports Teams at Maharshi Dayanand University, Rohtak. This case study is limited to MDU-Rohtak and emphases on the period from the 2011-12 to 2022-23 session. For this case study, primary data was collected from several sources, including obtaining relevant information through RTI requests to access official records and documents, gathering data from the university's official website (which includes official announcements, guidelines, and the Handbook of Information on Sports), and extracting information from the Annual Sports Calendar of the university, which outlines important dates, events, and the functioning of the sports department. The simple percentage statistical technique will be used to analyse the data. **Conclusion**: The results of the study showed that there were violations of the Maharshi Dayanand University Sports Council's (MDUSC) rules, nepotism, fraudulent activities, and the inclusion of unauthorized non-sportspersons as members of the selection committee.**Keywords:** Sports, Fraud, Selection Committee, Sports Council, MDU-Rohtak etc

Introduction

Maharshi Dayanand University (MDU) is a prominent public university located in Rohtak, Haryana, India. Established in 1976, it is named after the great social and religious reformer, Maharshi Dayanand Saraswati. The university offers a wide range of undergraduate, postgraduate, and doctoral programs across various disciplines, including arts, sciences, commerce, engineering, law, management, and more. MDU Rohtak is known for its academic excellence, research output, and a vibrant campus life. It also provides various facilities like libraries, hostels, and sports infrastructure, contributing to the overall development of students. The university aims to foster a comprehensive educational environment that prepares students for the challenges of the modern world.

Department of Sports, Maharshi Dayanand University, Rohtak: The Department of Sports at Maharshi Dayanand University (MDU), Rohtak plays a significant role in promoting sports culture, physical fitness and holistic development among students, faculty and staff of the university. It functions as the central administrative and operational body responsible for planning, coordinating and implementing sports-related activities at the institutional level. Through its initiatives, the department seeks to encourage active participation in sports, foster discipline and sportsmanship and contribute to the physical and mental well-being of the university community.

The mission of the Department of Sports is to create an enabling environment that promotes health, fitness and excellence in sports while providing equal opportunities for students to develop their athletic potential. The department emphasizes skill development, competitive exposure and adherence to ethical standards in sports participation. It also aims to nurture talent that can represent the university at inter-collegiate, state, national and international levels.

Among its key functions, the department organizes a wide range of intra-university sports events, inter-college competitions and university representation in various tournaments. It provides systematic coaching and training across multiple sports disciplines to enhance athletic performance and competitive readiness. A critical responsibility of the department is the selection, formation and management of university sports teams which requires structured trials, selection processes and coordination with selection committees.

The Department of Sports is supported by substantial sports infrastructure, including outdoor grounds for cricket, football and athletics with a Synthetic Track, indoor sports halls for Badminton, Table Tennis, Basketball and Volleyball, a well-equipped Gymnasium, a Swimming Pool and dedicated facilities for Boxing, Wrestling and Judo. Additionally, yoga and meditation centers support mental well-being and overall fitness.

Each academic year, the department issues an Annual Sports Calendar outlining schedules for competitions, training camps, team selections, inter-college events and inter-university sports festivals, ensuring systematic planning and execution of sports activities.

Literature Review on **Corruption and Governance Failure:** Kumar (2024) investigates age fraud in Indian university sports, highlighting widespread manipulation of birth and academic records to gain competitive advantages. The study calls for stricter verification and regulatory enforcement.

Jain and Lamba (2020) focus on the role of forensic accounting in detecting and preventing financial fraud in university sports. Their research highlights the importance of specialized financial monitoring tools in identifying embezzlement and irregularities at an early stage.

Mohamedbhai (2020) explores corruption in Indian higher education with specific reference to sports, documenting age fraud, financial mismanagement, bribery, and manipulation of eligibility norms. The study situates sports fraud within broader structural and governance deficiencies of universities.

Closa (2020) analyses corruption in college sports through the lens of the NCAA's Amateurism Rule, arguing that compensation restrictions incentivize illicit benefits and academic fraud. The study links amateurism to antitrust challenges and NIL reforms, framing corruption as a structural outcome of out dated regulatory ideology.

Sharma (2021) proposes blockchain technology as a governance tool to enhance transparency and prevent financial irregularities in university sports administration. The study underscores the potential of decentralized and tamper-proof systems in reducing corruption.

IINCIN India (2018) examines the legal and regulatory framework governing sports betting in India, highlighting persistent loopholes that enable gambling-related fraud, particularly in cricket. The study emphasizes the spill over effects of betting corruption on university-level sports, where young athletes remain vulnerable due to weak enforcement mechanisms.

Forrest and McHale (2015) assess the effectiveness of betting-monitoring systems in detecting match-fixing and betting irregularities in university-level cricket. Their findings demonstrate the role of data analytics in identifying suspicious patterns and preventing sports fraud.

Lakshman and Akhter (2013) analyse governance scandals in the Indian Premier League, identifying illegal betting, money laundering, and conflicts of interest. The study draws parallels between professional and university sports, emphasizing systemic weaknesses in sports management frameworks.

Gupta (2012) analyses corporate governance failures in Indian sports administration through the case of the 2010 Commonwealth Games, revealing corruption, financial mismanagement, and lack of accountability. The study demonstrates how governance failures at national levels cascade into university sports systems, increasing susceptibility to fraud.

Corgan (2012) examines financial corruption in college athletics by focusing on unethical sports agents and compensation limits. Using the Reggie Bush case, the study highlights enforcement failures and argues that permitting endorsement deals could reduce incentives for illicit conduct by addressing athletes' financial vulnerabilities.

University of North Carolina Academic-Athletic Fraud (1990s–2011) Studies of the UNC scandal document long-term, institutionally facilitated academic fraud through sham courses designed to maintain athlete eligibility. Researchers stress that the case exposed limitations in NCAA enforcement authority and revealed how academic autonomy can be exploited to shield athletic misconduct.

University of Minnesota Men's Basketball Scandal (1990s) Scholars examining the University of Minnesota case identify academic fraud as a consequence of institutional pressure to sustain athletic success. The literature emphasizes that coursework completion by staff reflected systemic governance failures rather than individual wrongdoing, highlighting weaknesses in academic oversight within NCAA programs.Despite extensive research on financial fraud, limited attention has been paid in **procedural violations in the composition and functioning of university sports selection committees**. This study addresses this gap through a case study of Maharshi Dayanand University, Rohtak.

Objective of this case study: The main objective of this case study is to investigate and analyze the violations, irregularities, and fraudulent associated with the composition of the Selection Committee for the sports team of Maharshi Dayanand University (MDU), Rohtak. This study is aims to:

Examine the Composition Process: Scrutinize the procedure followed in forming the selection committee, including the qualifications, appointments, and roles of its members.**Identify Instances of Violation and Fraud**: Investigate any deviations from established policies, ethical guidelines, or procedural norms in the selection process, focusing on the potential fraudulent in composition of selection committee or biased decision-making.

Assess the Impact on Fairness and Integrity: Evaluate the consequences of such violations on the selection of athletes, ensuring that deserving individuals are not unfairly overlooked or excluded.

Provide Evidence-Based Analysis: Document and present factual findings, supported by evidence, to substantiate the claims of misuse of power, irregularity, or fraud.

Propose Solutions and Recommendations: Offer actionable recommendations for reforming the process of composition of selection committee to ensure fairness, transparency, and accountability in future composition of selection committee for the sports team of MDU.

Research Methodology: The methodology of this case study focuses on Maharshi Dayanand University, Rohtak which has been selected as the subject of analysis.

Sources of Data: The data for this study was gathered through multiple sources, including RTI requests to access official records and documents, as well as information from the university's official website, which contains official announcements, guidelines, and the Handbook of Information on Sports. Additionally, data was extracted from the Annual Sports Calendar of the university, which outlines key events, dates and the functioning of the sports department.

Statistical Technique: To present the findings visually, simple bar diagrams were used for graphical presentation, while simple percentage techniques were applied as statistical methods to analyze and treat the collected data.

Limitationsof the case study:

1. **Scope Restricted to Maharshi Dayanand University, Rohtak (MDU-Rohtak):** The study is limited to the context of Maharshi Dayanand University, Rohtak, and does not extend to other universities or institutions. This means that the findings and conclusions drawn from this case study may not be directly applicable to other academic institutions or sports teams outside of MDU-Rohtak. The context, policies, and sports administrative frameworks specific to MDU-Rohtak play a significant role in shaping the outcomes of this study.

2. **Timeframe Constraints:** The study is restricted to the period between the academic sessions 2011-12 to 2022-23. This limitation means that any developments or changes outside this period, including possible reforms or issues that may have arisen before or after these years, are not considered. Therefore, the study cannot provide insights into the long-term effects or any ongoing consequences beyond the given timeframe.
3. **Data Availability and Access:** The research relies on the availability of documented records, reports and data regarding the composition of the selection committee. Limited or incomplete access to such documents may restrict the comprehensiveness of the study. Additionally, non-disclosure of certain internal records could also limit the depth of investigation into the specific irregularities or fraud.
4. **Bias in Available Data:** There may be potential biases in the sources of data, including, internal reports, or external observations. The study may face challenges in obtaining impartial accounts, particularly if the sports administration of university or selection committee members is unwilling to disclose sensitive information due to the nature of the allegations.
5. **Methodological Constraints:** As a case study, the research is inherently qualitative in nature, focusing on a detailed examination of a specific instance. This approach may limit the ability to generalize findings to a broader population or other similar cases outside of MDU-Rohtak. The study's findings are not necessarily universally applicable.

Delimitations of the case study:

Focus on composition of Selection Committee of MDU-Rohtak's Sports Team:-The study is delimited to the **composition of Selection committee** of the sports team at Maharshi Dayanand University, Rohtak. This means that other aspects of university administration or academic policies, unrelated to the selection committee, are outside the scope of the study. The focus on the composition and functioning of the selection committee means that other university sports-related matters, such as coaching, training, or competitions, are not part of the investigation.

1. Time Period from 2011-12 to 2022-23: The study specifically focuses on the academic sessions from 2011-12 to 2022-23. This delimitation allows the research to concentrate on a defined period, ensuring that any frauds, nepotism, irregularities, or exceedsmembers in the selection committee can be analyzed within this timeframe. Any changes in policy or procedures post-2023 or prior to 2011 are not included in this study.

2. Emphasis on Selection Committee Composition: The research is delimited to examining the illegality in composition of the Selection Committee itself. It does not extend to investigating other aspects of the sports team's operations, such as the performance of the athletes, the administration of the sports events, or the effectiveness of coaching and training programs. The primary concern of the study is with the integrity and legitimacy of the selection committee's formation and actions.
3. Exclusion of Broader Institutional Issues: The study does not explore broader institutional issues within MDU-Rohtak beyond the sports selection committee. This includes areas such as financial mismanagement, administrative inefficiencies, or other forms of institutional corruption that may be indirectly related but are not directly tied to the composition of selection committee being studied.

Findings and Discussion and interpreting the results: the data was collected through RTI as well as information from the university's official website, which contains official announcements, guidelines, and the Handbook of Information on Sports. Additionally, data was extracted from the Annual Sports Calendar of the university is analyzed and the findings of the study are as under:-

Excess members of the Selection Committee: as per the Handbook of Information on Sports of MDU-Rohtak the restriction of numbers of 05 member of selection committee is reproduce as: "*when a university sports club is started in any of the game or sports that comprise the M.D.U. Sports tournament, it shall conform to the following rules and regulations. The Club Committee shall consist of 5 members including, Chairman. Secretary, the University coach shall be one of the members of the selection committee in his game"*

1.Excess and Illegal Members Included in Sports Clubs/Selection Committees: As per Rule-37 of the MDUSC Handbook, every University Sports Club/Selection Committee must consist of only 5 members, including the Chairman. Contrary to this mandatory rule: The then Directors Sports illegally increased selection committee's strength from 5 to as high as 10 members. This practice continued year after year across multiple sessions, causing unauthorized expenditure on honorarium, TA/DA, and related payments.

Analysis from available records and documents shows that 1304 excess members were illegally added in violation Rule-37 of the MDUSC Handbook of Rules and regulations resulting in huge

financial loss amounting in many **lakhs of rupees** from Sports Funds. This manipulation constitutes clear financial embezzlement, procedural violation, and abuse of position.

Figure -1: Graphical Presentation of Data

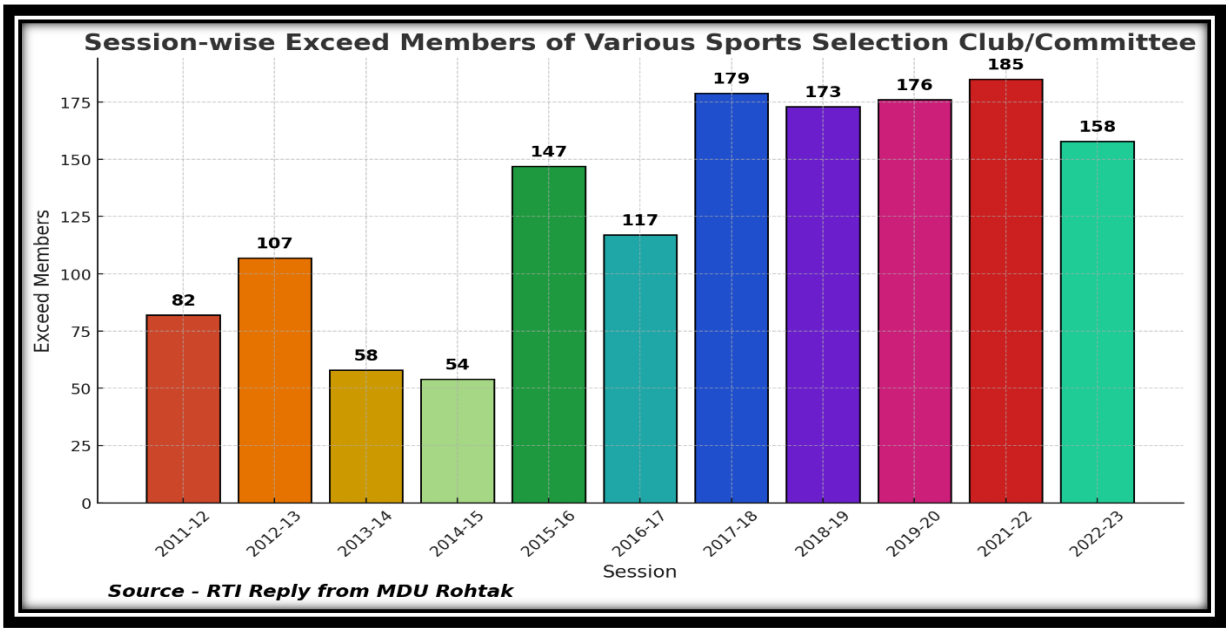

Table-1

Sr. No.	Session	Excess Members of Section Committees
1.	2011-2012	82
2.	2012-2013	107
3.	2013-2014	58
4.	2014-2015	54
5.	2015-2016	147
6.	2016-2017	117
7.	2017-2018	179
8.	2018-2019	173
9.	2019-2020	176
10.	2021-2022	185
11.	2022-2023	158

Results and Discussion: The analysis of selection committee composition across academic sessions from 2011–2012 to 2022–2023 reveals a persistent and significant presence of excess members beyond the prescribed norms. As shown in Table 1, a total of 1,304 excess members were identified over the study period, indicating systematic deviations from established statutory and regulatory provisions governing selection committees. The results demonstrate notable temporal variation but an overall increasing trend. In the initial phase (2011–2012 to 2014–2015), the number of excess members remained comparatively lower, ranging between 54 and 107. However, a sharp escalation is observed from 2015–2016 onwards, with excess membership rising to 147 and remaining consistently high in subsequent sessions. The highest deviation was recorded in 2021–2022, with **185 excess members**, followed closely by elevated figures in 2022–2023 (158). This sustained pattern suggests that the irregularities were not isolated or incidental but became increasingly normalized within the administrative processes.

From a governance perspective, the persistence of excess members over multiple academic cycles indicates structural weaknesses in compliance monitoring and institutional oversight. Selection committees are central to ensuring transparency, fairness, and merit-based decision-making; therefore, deviations in their composition undermine the legitimacy of the selection process. The recurring nature of these irregularities raises concerns regarding procedural integrity and potential manipulation of outcomes. The cumulative scale and continuity of excess membership point toward systemic governance failures rather than clerical errors. These findings underscore the need for stricter enforcement of statutory provisions, enhanced accountability mechanisms, and periodic audits of selection committee compositions to restore institutional credibility and ensure adherence to established norms.

Conclusion: The analysis of selection committee composition across multiple academic sessions reveals persistent and large-scale deviations from prescribed norms at Maharshi Dayanand University. The cumulative presence of 1,304 excess members over more than a decade reflects not isolated administrative oversights but a sustained pattern of non-compliance.

The progressive increase in excess membership in later years further indicates the normalization of procedural irregularities within institutional practices.These findings highlight significant weaknesses in governance, oversight, and accountability mechanisms governing selection processes. Given the critical role of selection committees in ensuring transparency, fairness, and merit-based outcomes, such deviations undermine institutional credibility and raise concerns regarding procedural integrity. The study underscores the urgent need for stricter enforcement of statutory provisions, routine audits, and transparent monitoring mechanisms to prevent recurrence. Addressing these structural deficiencies is essential to restore confidence in selection processes and to uphold the principles of good governance within university administration.

Note: This Paper is the sole Responsibility of the Authors.

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A Comparative study on Vital capacity among male sprinters, middle distance runners and long distance runners of Punjab.

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Abstract:
The sample size of 60 individuals (N = 60). Long-distance runners exhibit the highest mean vital capacity at 4.29 liters, with a relatively low standard deviation (SD) of 0.1138, indicating minimal variation in vital capacity within this group, and a standard error (SE) of 0.0147, signifying a high precision in the mean estimate. Middle-distance runners have a slightly lower mean vital capacity at 4.27 liters, with a higher SD of 0.2388, indicating greater variability in this group, and an SE of 0.03083, suggesting a moderate level of precision in the mean. Sprinters show the lowest mean vital capacity at 3.66 liters, with the highest SD of 0.2826, reflecting the most variation in vital capacity among the groups, and an SE of 0.03649, indicating a slightly lower precision of the mean. Overall, long-distance runners demonstrate the highest average vital capacity, while sprinters show the lowest, with middle-distance runners positioned in between. The differences in SD and SE suggest varied consistency in vital capacity measurements among these runner types. Key Words: Middle distance, Sprinters, Vital Capacity etc.

Introduction:

In the modern period, sports and games have taken on a nature that is both highly specialized and intensely competitive. Nowadays, contests are so difficult that even very little elements that influence sports performance can have a significant part in determining whether or not an athlete will succeed in international competition At the top levels of a sport, it is common known that one's performance can be hindered by a number of physiological factors. Athletics has a positive impact on the improvement of one's health through active involvement in activities such as walking, walking- running, and running in a diversity of cross-country competitions of individual and huge character occur on a consistent basis. Running is not only the most general means of thorough preparation for the athlete, but it also holds a very important role in the preparation for other sorts of sports. Athletic operates on the basis of a certain system of knowledge that contains within its content the theoretical and methodological foundations of sport training. This system of knowledge is known as athletic. There is much discussion regarding the advantages of engaging in regular physical activity. Some of these advantages include a decreased likelihood of developing obesity or cardiovascular disease However, trained runners may have identical

VO_2MAX values, and other physiological indexes, such as RE and vital capacity, might contribute to the success of mostly aerobic events. . Although endurance exercise raise vital capacity of a huge number of people, the amount to which it raises vital capacity differs significantly between individuals. Runners with a high respiratory efficiency (RE) use less oxygen to maintain the same speed than runners who have a lower optimum economy. If two runners have comparable vital capacity levels, the runner with a developed RE would have a faster overall performance time. In comparison to runners from Europe, Kenyans and Ethiopians have historically been more successful at middle and long distance running races. Although the African runners do not have a advanced vital capacity from their European counterparts, they are able to perform significantly better.

Review of Literature:

Bulgay et al. (2018) done a study to inspect the physical, motor and physiological characteristics of athletes and wrestlers. Subjects age ranges between 12 to 14 who regularly participating in physical exercise .For the analysis of characteristics age, height, body weight, Agility (t-test), hand grip strength, standing jump, vertical jump, body fat percentage, flamingo balance, flexibility, one minute shuttle, BMI, 30 meter speed run, 1000 meter run-walk tests were chosen as variables. Results of this stated that agility, right and left-hand grip strength, flexibility, one min shuttle, Body Mass Index (BMI), 30 meter speed, 1000 meter run-walk tests were found significant. However, the results for height, weight, age, long jump, flamingo balance, body fat percentage, vertical jump tests were not statistically significant.

Hossein et al. (2018) piloted a research to find the relationship between lung capacity, anthropometric traits, and physical fitness characteristics with the achievement of Iranian elite Greco-Roman wrestlers. The study included 25 male Iranian elite Greco-Roman wrestlers of both light and heavy weights, with an average age of 22±4 years. Various anthropometric traits, physical fitness measures, and lung capacity were assessed in a laboratory setting. The findings of the study indicated a significant and positive correlation among arm span, as the sole anthropometric trait, and the success of Iranian elite Greco-Roman wrestlers.

Demirkan et al. (2015) has done a comparative study to investigate the physical and physiological profiles of elite and amateur young wrestlers and to identify the markers of success in wrestling. A total of 126 male wrestlers were included in the study, and they were categorized into three groups based on their level of competition (top elite, elite, and amateur).. The results of the study indicated that top elite and elite wrestlers had significantly more training experience and higher maximal oxygen uptake in comparison to the amateur group ($p \leq 0.05$). In terms of

weight classes, light and middle weight elite wrestlers showed significantly greater training experience (7-20 percent) compared to their amateur counterparts within the same weight class ($p \leq 0.05$). No significant differences were observed between the elite and amateur groups in terms of age, body mass, height, body mass index, and body fat ($p<0.05$), except for the height of heavy wrestlers.

Demirkan et al. (2012) has done research to determine physiological and physical differences between selected and non-selected wrestlers to the national team. For this study 48 elite junior wrestlers age ranges 18-20 years who invited in Greco-Roman national team camp, were selected as sample in this study. For the investigation height, weight, Body Composition, aerobic performance, hand grip, back and leg strength and agility were taken as physical and physiological variables. Independent t-test was used to analyze the data between selected and non-selected grapplers. The findings of this study suggests that leg average power, average arm power, back strength and agility were found significant and it was concluded that for to be a part of national team grappler must be good in training experience, anaerobic performance, strength and agility

Koul (2009) conducted an examination on "anthropometric physiological and physical outlines of the cricketers" with aim for becoming ready anthropometric physiological and physical outlines of cricketers. The results reasoned that subjects were differ in anthropometric, physiological and physical merits, quick bowlers were more remarkable in muscle to fat ratio, leg length, chest circumference, calf size, fit bodyweight, circulatory strain, hemoglobin content, necessary limit and anaerobic limit than spinners and batsmen. Nevertheless, batsmen were found lower resting beat rate than fast bowlers and spinners. As regards to speed and perseverance quick bowlers were found fundamentally better to batsmen and spinners.

Material and methods :

Table No.1 : Descriptive Statistics of "Vital Capacity" among Runners (Long Distance, Middle Distance and Sprinters)

Variable	GROUP (Type of Runners)	N	Mean	SD	SE
Vital Capacity	Long Distance	60	4.29	0.1138	0.0147
	Middle Distance	60	4.27	0.2388	0.03083
	Sprinter	60	3.66	0.2826	0.03649

The table presents the average vital capacity of three types of runners: long-distance, middle-distance, and sprinters, each with a sample size of 60 individuals (N = 60). Long-distance runners exhibit the highest mean vital capacity at 4.29 liters, with a relatively low standard deviation (SD) of 0.1138, indicating minimal variation in vital capacity within this group, and a standard error (SE) of 0.0147, signifying a high precision in the mean estimate. Middle-distance runners have a slightly lower mean vital capacity at 4.27 liters, with a higher SD of 0.2388, indicating greater variability in this group, and an SE of 0.03083, suggesting a moderate level of precision in the mean. Sprinters show the lowest mean vital capacity at 3.66 liters, with the highest SD of 0.2826, reflecting the most variation in vital capacity among the groups, and an SE of 0.03649, indicating a slightly lower precision of the mean. Overall, long-distance runners demonstrate the highest average vital capacity, while sprinters show the lowest, with middle-distance runners positioned in between. The differences in SD and SE suggest varied consistency in vital capacity measurements among these runner types.

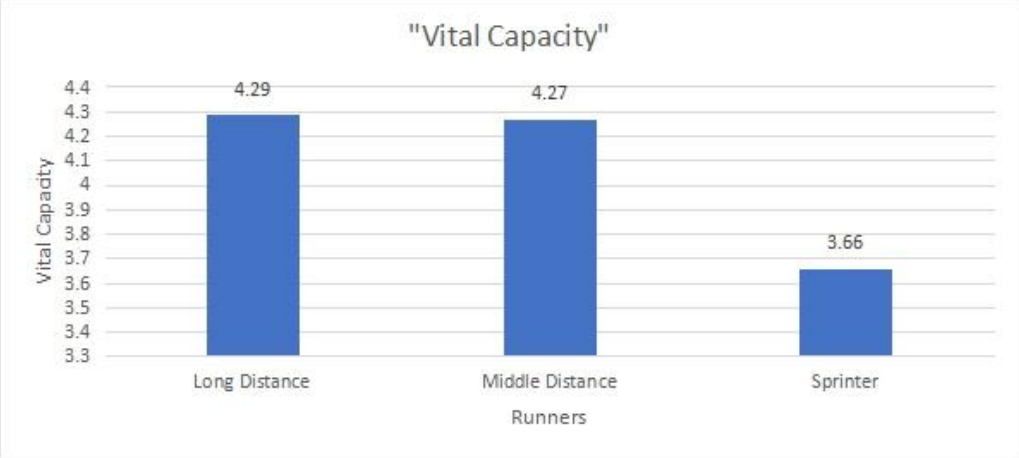

Figure 1: Mean Scores of " Vital Capacity" among Runners (Long Distance, Middle Distance and Sprinters)

Table 2: Analysis of Variance (ANOVA) of Long Distance, Middle Distance and Sprinters on "Vital Capacity"

ANOVA - Vital Capacity					
	Sum of Squares	**df**	**Mean Square**	**F**	**p**
GROUP	15.28	2	7.6395	153	< .001
Residuals	8.84	177	0.05		

The ANOVA results revealed significant differences in vital capacity among the three groups, with a total sum of squares of 15.28 and a mean square for the group of 7.6395. The calculated F-value was 153, accompanied by a p-value of less than .001, indicating a highly significant effect of group type on vital capacity. The residuals had a sum of squares of 8.84, with a mean square of 0.05, reflecting variability within the groups. The null hypothesis, which stated that there were no differences in vital capacity among the three groups, was rejected due to the significant p-value.

This finding suggested that at least one group had a mean vital capacity that significantly differed from the others, emphasizing the influence of runner type on vital capacity. Overall, the analysis confirmed that the type of runner significantly impacted vital capacity, warranting further investigation into the factors contributing to these variations.

Table 3: Scheffe's post hoc comparison of Runners (Long Distance, Middle Distance and Sprinters) on "Vital Capacity"

Comparison							
Variable	**GROUP**	**GROUP**	**Mean Difference**	**SE**	**df**	**t**	**$p_{scheffe}$**
Vital Capacity	Long Distance	Middle Distance	0.0218	0.0408	177	0.535	0.867
		Sprinter	0.6287	0.0408	177	15.406	< .001
	Middle Distance	Sprinter	0.6068	0.0408	177	14.871	< .001

The post hoc tests for vital capacity indicated significant differences among the three groups of runners. The comparison between long-distance and middle-distance runners showed a mean difference of 0.0218, with a standard error (SE) of 0.0408. This resulted in a t-value of 0.535 and a p-value of 0.867, indicating no statistically significant difference between these groups. In contrast, when comparing long-distance runners to sprinters, the mean difference was substantially larger at 0.6287, with the same SE of 0.0408. This yielded a t-value of 15.406 and a p-value of less than .001, indicating a highly significant difference favoring sprinters. Additionally, the comparison between middle-distance runners and sprinters revealed a mean difference of 0.6068, with a t-value of 14.871 and a p-value of less than .001, confirming a significant difference in favor of sprinters as well. Overall, these results suggest that sprinters had a significantly higher vital capacity compared to both long-distance and middle-distance

runners, while no significant difference was found between the long-distance and middle-distance groups.

Conclusion:

In conclusion part ,it is noticed from the result presented in the analysis of variance (ANOVA) tables (1) showed that the long-distance runners were observed to be significantly better when compared to Middle distance runners and sprinters was found statistically significant. The mean differences between Long distance Runners and middle distance, Long distance Runners and sprinters, Middle distance runners and sprinters was found statistically significant. Overall, these results suggest that long distance runners had the highest peak expiratory flow, followed by middle-distance runners, while sprinter runners had the lowest values among the groups. The reason is lung function and adaptive changes seen in the respiratory and cardiovascular systems with respect to physiological strain associated with the long distance running. Adaptive changes result in deepened respiration and more forced air flow through air Passage. This helps increase oxygen uptake And carbon dioxide elimination.

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Effect Of Aqua Aerobic Training On Selected Physical Fitness Variable Among Middle Age Women

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Abstract

The purpose of this study was to investigate the effect of 12 weeks aqua aerobic training on selected physical fitness variable among middle age women of Manipur.**Methods:** A total of 40 women from Kakching district, Manipur were selected randomly as the subjects and divided into the experimental and control groups for the study. The age of the subjects ranged between 35-45years.The variable selected for the present study were aqua aerobic training (independent variable), muscular strength (dependent variable). For the study pre test - post test randomized group design, which consists of experimental group (20 women) and control group (20 women) was used. The data were from the pre test and post test of both groups were collected before and after the aqua aerobic training program.**Statistical technique:** For comparing pre test and post test means experimental and control groups of selected physical fitness variable, descriptive analysis and paired sample t-test were employed. The data analyzed with the help of SPSS (20 version) software and to test hypothesis, the level of significance was set at 0.05. **Results:** There was significance difference between the pre and post test means comparison of back strength and leg strength for the experimental group as the obtained 't'= 11.67 and 't'= 8.07 is greater than the tabulated ' t' =2.09 at 0.05 level of significance and $p<0.05$. However insignificance difference was found for the control groups pre and post test means comparison of leg strength as the calculated 't'= 0.28 is lesser than the tabulated 't' = 2.09 at 0.05 level of significance and $p>0.05$. In back strength , the control group also found a significant difference as calculated 't' = 2.79 is greater than the tabulated 't' 2.09 and $p<0.05$.**Conclusion:** The study was concluded that 12 weeks aqua aerobic training program might be responsible for the improvement of selected physical fitness variable like muscular strength (back and leg strength) .**Keywords:** Aqua Aerobic Training, Physical Fitness, Muscular Strength, Back Strength, Leg Strength.

Introduction

In an earlier investigation, we found that aquatic exercise increased the muscular strength and flexibility of older women who had sedentary lifestyles (Candeloro et al. 2007). In an effort to examine the possible functional impacts of the muscular strength aqua aerobic training program for leg and back strength, we replicated earlier experimental approach in this present study. Older individuals quality of life has a negative relationship with sedentary behaviour. In addition, it has been related to an increased risk of cardiovascular disease, obesity, type-2 diabetes, and bone hypodensity (Kim 2019). Aquatic exercises are well accepted by older adults for muscle strength training. Programs for aquatic training often include the depth of the pool, the direction and speed of movement, spoken instructions and cues, and the intensity and frequency of exercises (Mattos et al. 2016). Research has been done to investigate if various settings can help enhance muscular strength and balance, especially with light of aquatic exercise regimes for women. Similar to land-based training programs, research suggests that regular involvement in aquatic fitness programs can significantly improve body composition, muscular strength, and flexibility (Delevatti et al. 2015). These programs include exercises done in the water, taking use of its unique qualities, such buoyancy and natural resistance, which offer a strenuous yet joint-friendly workout, particularly when exercising the lower limbs (De Mattos et al. 2016). Aqua fitness is accessible for those of all ages and fitness levels due to the aquatic environment's ability to reduce injury risk, improve circulation, and promote a wider range of motion [Kim et al 2013]. Additionally, women who are treating age-related health concerns such as osteoporosis (J Rhumatol et al. 1998), osteoarthritis hypertension and other musculoskeletal difficulties (Barbosa et al. 2009) will find that water fitness is the best kind of exercise.

Objective of the study

To find out the effect of 12 weeks aqua aerobic training on muscular strength among middle age women.

Hypothesis of the study

It was hypothesized that there would be significant differences in Muscular Strength after 12 weeks of aqua aerobic training in experimental groups.

Methodology

Selection of subjects

A total of 40 women were selected randomly as subjects from, Kakching district, Manipur (India).The subjects were randomly assigned into two equal group, experimental group (n=20) and control group (n=20). The age groups of the subjects selected were between 35 to 45 years.

Selection of variables

The researcher selected the following variables for the current investigation while keeping the practicability criterion in mind:

1. Aqua Aerobic Training (Independent Variables)

2. Physical Fitness Variables (Dependent Variables)

i) Muscular Strength
   a) Back Strength
   b) Leg Strength.

Criterian Measures

To estimate the Muscular Strength through Back Strength and Leg Strength.

Back Strength: To check the back strength of the subjects, back strength dynamometer test was administered and the highest of the three lifts attempted was recorded in kilograms.

Leg Strength: To check the leg strength of the subjects, leg strength dynamometer test was administered and the highest of the three lifts attempted was recorded in kilograms.

Experimental Design

It was experimental pre test and post test control group design. The experimental group participated in aqua aerobic training for a period of twelve weeks. The control group did not participate in any training program rather they involved in their daily routine program.

Collections of data

Before the administration of aqua aerobic training, the selected test for selected physical fitness variables were administered on both the experimental and control groups to collect pre test data. After the completions of the twelve weeks of aqua aerobic training again the same tests were conducted to collect the post training data. Necessary instructions were given to the subjects before administration of the tests.

Administration of training

The training for experimental group was administered at Kha Manipur College, Kakching, Manipur. Selected aqua aerobic training was given to experimental group on five day i.e. (Monday to Friday) sessions per week for twelve weeks. Each training session consisted of 45minutes included 5minutes of warming up & 5minutes for cooling down. Remaining minutes allotted for aqua aerobic training program.

Table no. 1

Aqua Aerobic Training Program

Aqua Aerobic Exercises/ training Control	No. of circuit
The Main Training(30mins) Aqua jogging Flutter Kicking Leg lifts Standing water push up. Alternating Scissor jump Kick Your Tuck Jump Chest fly Splash the water Cross punches with hip rotation Front Kick, back Kick & jogging Alternate front Kick Back Kick & rotate whole body Butterfly beat (clap) Punches Jumping jack in the pool	4(1-4 weeks) 5(5-8 weeks) 6(9-12 weeks)

Statistical Procedure

The data were analyzed by applying descriptive statistics and paired sample t- test. The data analyzed with the help of SPSS (20 Version) Software and the level of significance was set at 0.05.

Results and findings of the study

The mean (M), standard deviation and standard error mean (SEM) were calculated by using the descriptive statistics. The paired sample t-test was applied to find out the significance of mean differences between pre test and post test of Back Strength and Leg Strength for the both experimental and control groups). The level of significance was set at the 0.05.

The mean (M), standard deviation (SD), standard error mean(SEM) and paired sample t-test of pre and post test of Back Strength of experimental group and control group was presented in the Table 2.

Table no.2

Table 2: The Descriptive and Paired‘t’ Test of Back Strength for Experimental and Control Groups

Parameter	Groups	Test	N	Mean	SD	SEM	df	t	p
Back Strength	Experimental	Pre	20	65.90	8.69	1.95	19	11.67*	.00
		Post	20	68.75	8.26	1.85			
	Control	Pre	20	62.10	5.22	1.16	19	2.79*	.012
		Post	20	61.46	5.31	1.19			

*Significant at 0.05 level,‘t’ 0.05(19) = 2.093

The above Table -2, it is shown that the mean and standard deviation of pre and post-test of back strength of experimental group were 65.90±8.69 and 68.75±8.26 respectively. The standard error mean of pre and post-test of experimental group were found to be 1.95 and 1.85 respectively. Here calculated‘t’= 11.67 is found greater than table‘t’ = 2.093 at 0.05 level of confidence at 19 degree of freedom. Therefore, there was significant difference found of experimental group in back strength of middle age women of Manipur. As for control group, the mean and standard deviation of pre and post-test were 62.10 ±5.22 and 61.46±5.31 respectively. The standard errors mean of pre and post-test were 1.16 and 1.19 respectively. In back strength, the control group also found a significant difference as calculated‘t’ = 2.79 is greater than table‘t’ = 2.093.

The pre and post-test means of experimental and control groups of Back Strength are graphically represented in figure 1.

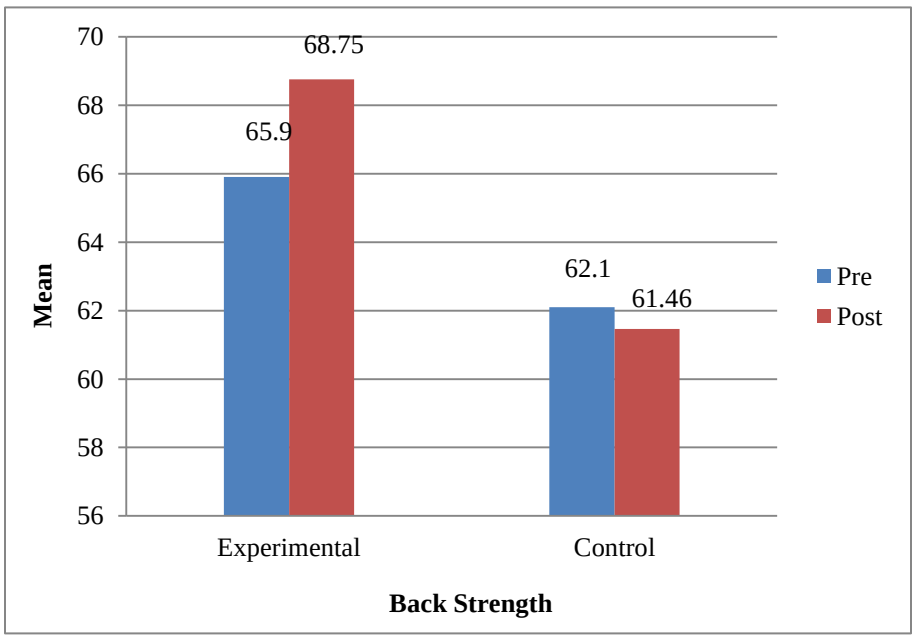

Figure 1: Pre-test and post-test means among experimental and control groups on Back Strength.

The mean (M), standard deviation (SD), standard error mean(SEM)and paired sample t-test of pre and post test of Leg Strength of experimental group and control group was presented in the Table 3.

Table no.3

Table 12: The Descriptive and Paired't' Test of Leg Strength for Experimental and Control Groups

Parameter	Groups	Test	N	Mean	SD	SEM	df	t	p
Leg Strength	Experimental	Pre	20	71.12	16.88	3.77	19	8.07*	0.00
		Post	20	75.81	16.08	3.60			
	Control	Pre	20	70.05	8.48	1.88	19	0.28	0.78
		Post	20	69.97	8.74	1.96			

***Significant at 0.05 level, 't' 19 = 2.093**

In the above Table 3, it is shown that the mean and standard deviation of pre and post-test of experimental group were 71.12 ± 16.88 and 75.81 ± 16.08 respectively. The standard error mean of pre-test was 3.77 and post-test was 3.60. The calculated't' = 8.07 was found to be greater than table't' = 2.09 at 0.05 level of confidence and 19 degree of freedom. Therefore, there was significant improvement found in experimental group on leg strength of middle age women of Manipur. For control group, the mean and standard deviation of pre and post-test were 70.05 ± 8.48 and 69.97 ± 8.74 respectively. The standard error mean of pre-test was 1.88 and that post-test was 1.96. There was insignificant difference found as calculated't' = 0.28 which was less than table't' = 2.09 at 0.05 level of confidence.

The pre and post-test means of experimental and control groups of Leg Strength are graphically presented in figure 2.

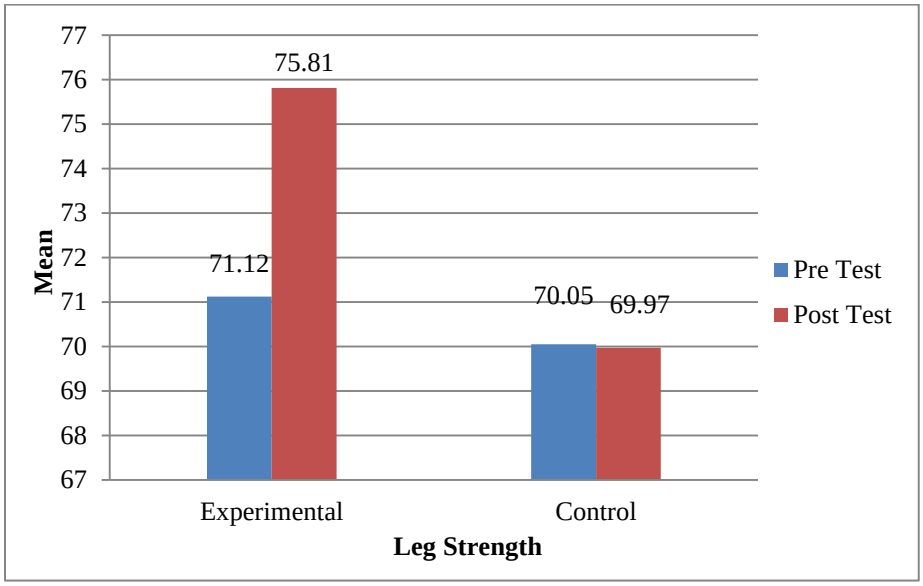

Figure 2: Pre-test and post-test means among experimental and control groups on Leg Strength

Discussion of finding

According to the study's findings, the aqua aerobic training group's muscle strength has greatly increased when compared to the control group. In general, aqua aerobics concentrates on big muscles, including the ones in our limbs. One ends up with stronger muscles when they combine it with water resistance. As though there were weights linked to the body in every direction, the force of the water on the body's surface causes splashes similar to what a kick board that holds the water would produce if used for an on-land workout. Additionally, working two opposing muscle groups concurrently in the water is possible, whereas one would likely need to concentrate on one group at a time on land. One can build up their stamina in the basic pull and push motions of their arms and legs in the water without feeling the full force of it. The buoyancy of water will become women's new best friend. During aqua aerobic exercises, the buoyancy of the water relieves pressure on your joints and bones. As you exercise, the additional resistance of the water is beneficial for strengthening your muscles. Your muscles have to work harder with each movement since it is harder to move your body through water. Your chance of injury is also reduced when you exercise in a pool. Water is a naturally occurring, flowing, and changing substance, and as such, its movements can be somewhat unpredictable. Water provides about 12 times more resistance than air due to its increased density, and since it flows in multiple directions, the resistance in a pool can be four to 42 times greater than air, guaranteeing that the body's muscles get a rigorous workout. Working against this increased resistance over time strengthens the muscles and improves grip strength, back strength, leg strength, and muscle endurance. When compared to the identical training programmes on land, exercising in the water yields faster benefits. We can build up opposing muscle groups by moving the joints through

their whole range of motion while building up the muscles because the fat and water around us resist movements in all directions. Therefore, it was proved that 12 weeks aqua aerobic training were effective for the improvement of Muscular Strength among middle age women of Manipur.

Hypothesis testing

It was hypothesized that there would be significant effect of aqua aerobic training on Muscular Strength among middle age women of Manipur. From the above findings, significant differences were found for experimental group by employing paired Sample't' test techniques. Hence, the research hypothesis was accepted.

Conclusion

A 12-week aqua aerobics training program appeared to be beneficial for increasing muscular strength, particularly in the upper and lower limbs, according to the present findings. Additionally, the program decreases the blood pressure and body fat mass. Lessons appear to be carried out with low-intensity loads in a real-life setting, which could provide learners as well as professionals valuable information. Particularly for strength exercises, sessions should be established and carried out at a level of intensity that maximizes the impact.

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