

Effect of Workout Station and Explosive Power Training on Endurance among College Students of Calicut University

Author(s):



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Abstract

The purpose of the study was to find out the effect of Station training and Explosive Power training on endurance of college students of Calicut University. At the initial stage 110 college students representing three colleges under Calicut University kozhikode District, Kerala State were randomly selected as subjects. After the Pretest data collection, 30 male and 30 female students were finally selected as subjects for the study. There were two experimental groups namely Station training, Explosive Power and one control group for the study. Each group consisted of 10 male and 10 female students and their age ranged between 18 to 21 years. The variables selected for the study was endurance. 12 minutes run or walk test developed by Dr.Kenneth H Cooper was used for measuring the endurance of the subjects. The experimental groups underwent the experimental training programme for a period of twelve weeks with three training sessions in a week. Students representing control group did not undergo any training. General linear model Uni variate analysis of variance was used to find out the significant differences in means among the two experimental and control groups. The level of significance chosen was 0.05. It was found out that Station training and Explosive Power training was effective to improve endurance of the college students. It was also found that there was no significant difference exist between experimental groups such as Station training and Explosive Power training groups. Keywords - Station training, Explosive Power training and Endurance

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Keywords – Station training, Explosive Power training and Endurance

1.0. Introduction

The increasing prevalence of sedentary lifestyles among college students has raised concerns about their physical fitness and overall health. Endurance, a critical component of physical fitness, is essential for performing daily tasks and maintaining overall well-being. Station training and Explosive Power training are two effective methods to improve endurance. Station training involves a series of exercises performed in succession with minimal rest, while Explosive Power training involves explosive movements to improve power and speed. Despite the benefits of these training methods, there is a lack of research on their comparative effects on endurance among college students. This study aims to investigate the effect of Station and Explosive Power training on endurance among college students.

1.1 Importance of the study

The importance of this study lies in its potential to revolutionize the physical conditioning standards for the collegiate population at Calicut University. As students aged 18 to 21 are at a critical physiological peak, understanding the combined impact of Station and Explosive Power training offers a scientifically backed method to maximize their cardiorespiratory and muscular endurance. In an academic environment where time is a significant constraint, this research is vital as it explores high-efficiency training modalities that can be integrated into a busy student lifestyle without requiring the long hours traditionally associated with distance running. Furthermore, the study holds immense practical value for the university's athletic departments. By examining how Explosive Power enhances "running economy" and how Station training boosts metabolic thresholds, the findings can provide coaches with specific protocols to improve the performance of varsity teams in sports like football, volleyball, and athletics. Beyond sports performance, the research addresses the growing concern of sedentary lifestyles among youth in Kerala, promoting a sustainable model for long-term cardiovascular health. Ultimately, this study contributes localized, age-specific data to the field of sports science in India, offering a blueprint for modernizing the physical education curriculum at Calicut University to foster a more resilient and fit student body.

1.2 Definition of Technical Terms

Station Training: A type of training where a series of exercises are performed in succession with minimal rest.

Explosive Power Training: A type of training that involves explosive movements, such as jump squats and box jumps, to improve power and speed.

Endurance: The ability to sustain physical activity over a prolonged period

2.0 Hypothesis

The following hypotheses were formulated for the present study.

- 1) There would be significant difference between pretest and post-test means of the two experimental groups namely Station training and Explosive Power training on endurance
- 2) There would be significant difference between the experimental groups namely Station training and Explosive Power training on endurance

3.0 Review of related literature

Ali, B., et al. (2019) conducted a study on Station training and cardiovascular health in female college students. The study revealed that 12-week Station training program significantly improved the Cardiovascular Endurance of students. It proved effective even for those with low initial physical fitness levels. A study conducted by Vadivel, G. R., & Maniazhagu, D. (2022) on comparison between Station training and Station weight training showed that Station Weight Training (using resistance/weights) is more effective than standard Station training for increasing muscular strength and endurance. Jayabalakrishnan, S., et al. (2026) conducted a study on strength and Station training in football players and brought forward that program was enhanced the explosive Power and cardio respiratory endurance of players. It directly contributed to better sprinting speed and overall match performance. Shaji, P., & Ramesh, V. (2025) focused on a study on Station and interval training for long-distance runners. The study revealed that combining Station training with interval training optimizes VO₂ max (the maximum oxygen the body can use) and helps runners cover longer distances without fatigue.

Mandal, C., & Kumar, R. (2023) investigated on effect of Station training on strength and endurance among college students. Study highlighted the dual benefit of Station training, proving it develops both strength and stamina simultaneously. It is cited as an ideal method for improving general fitness in students. Muriyedath, A., et al. (2025) conducted a study on TRX and Explosive Power training for volleyball players and found out the combination of TRX (suspension) and Explosive Power s improved Biomotor abilities (speed, flexibility, balance) and significantly increased vertical jump height. Lum, D., et al. (2019) conducted a study on sprint and Explosive Power training effects and the result showed that Explosive Power exercises were found to improve Running Economy. This allows athletes to run at higher speeds while using less energy. Gomez, J., et al. (2023) conducted a similar study and revealed that the meta-analysis showed that Explosive Power s increase muscle elasticity. This helps endurance runners maintain speed for longer periods without respiratory distress. Arazi, H., et al. (2014) focused on Land-based vs. Water-based Explosive Power training. The result showed Water-based Explosive Power s are just

as effective as land-based ones but come with much lower impact stress on joints, reducing the overall risk of injury. Ramirez-Campillo, R., et al. (2021) conducted a study on Explosive Power training for team sport players and found out that athletes in team games (like football or basketball), Explosive Power s significantly boost speed, jumping ability, and Agility (the ability to change direction quickly).

4.0 Objective of the Study

1. The study would bring out the effect of Station training on endurance of high college students
2. The study would bring out the effect of Explosive Power training on endurance of college students
3. The study would be useful to understand which training programme id more effective for improving endurance

5.0 Methodology

The purpose of the study was to find out the effect Station training and Explosive Power training on endurance college students. At the initial stage 110 College students representing three colleges of Kozhikode district Kerala State under Calicut University were randomly selected as subjects. After the Pretest data collection, 30 male and 30 female students were finally selected as subjects for the study. There were two experimental groups namely Station training and Explosive Power training and one control group. Each group had 10 male and 10 female students. The age of the subjects ranged between 18 to 21 years. The variable selected for the study was endurance. The experimental groups underwent the experimental training programme for a period of twelve weeks with three training sessions in a week. Analysis of Variance was used to find out the significant differences in means among the two experimental and control groups. The level of significance chosen for the study was 0.05.

5.1 Selection of Subjects

Initially 110 high school students representing three colleges of Kozhikode District of Kerala State were randomly selected as subjects. After the Pretest data collection, 30 male and 30 female students were finally selected as subjects for the study. There were two experimental group namely Station training and Explosive Power training and one control group. Each group had 10 male and 10 female students and their age ranged between 18 to 21 years

5.2 Selection of Variables and Tools

Physical fitness variable endurance as the dependant variable and Station training and Explosive Power training programme as independent variable were selected for the study. Endurance was measured by 12 minutes run or walk test.

5.3.0 Design of Station training programme

Subjects were given Station training of total of 30 minutes with three rounds of six s. Each s have 30 seconds and 5 second rest between s and 2 minutes rest between rounds.

Table 5.3.1
Design of Station training programme

	Exercise	Duration	Key Research metric	Focus Area
1	Squat Jumps	30 Seconds	Vertical Power	Lower Body Explosiveness
2	Burpees	30 Seconds	Repetition Count	Full Body/ Metabolic
3	Push Ups	30 Seconds	Muscular Endurance	Upper Body Push
4	Lunges	60 Seconds	Symmetry/ Stability	Unilateral Lower Body
5	Plank	30 Seconds	Time under Tension	Core Isometrics
6	Sit-Ups	30 Seconds	Flexion Volume	Core power
Total	Active Work	3.5 Minutes	-	Per Round

5.3.2. Design of Explosive Power training programme

Explosive Power training programme was included total of 7 exercise and work time duration of each exercise was 40 Seconds. Rest between set was given 60 Seconds (to allow for ATP-PC resynthesis) and rest between Stations was 3 Minutes. Requency of exercise was times per week

Table 5.3.2
Design of Station training programme

Sl.No	Exercise	Duration	Total Work
1	Box Jump	40 Seconds	40 Seconds
2	Lateral Bounds	40 Seconds	40 Seconds
3	Tuck Jumps	40 Seconds	40 Seconds
4	Plyo Push- Ups	40 Seconds	40 Seconds
5	Single- Leg Hops	40 Seconds/Leg	80 Seconds
6	Depth Jumps	40 Seconds	40 Seconds
7	Board Jumps	40 Seconds	40 Seconds
Total	Active Work	-	5.3 Minutes

6.0 Analysis of Data and Results of the study

The pre and post test means of physical fitness variable endurance of experimental and control group were statistically analyzed by SPSS based Analysis of Co-variance to find out the significant differences in means among the two experimental and control groups. The level of significance chosen was 0.05.

6.1.0 Statistical analysis on endurance

Table-6.1.1

ANALYSIS OF VARIANCE ON ENDURANCE OF STATION TRAINING, EXPLOSIVE TRAINING AND CONTROL GROUP

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	452648.847 ^a	3	150882.949	8.976	.000
Intercept	515757.475	1	515757.475	30.682	.000
PRE	377648.847	1	377648.847	22.466	.000
GROUP	73847.570	2	36923.785	2.197	.121*

* Significant at 0.05 level

7.0 Result and Discussions

On the basis of the results of the study the following conclusions were drawn. Training of Station training and Explosive Power training showed significant improvement and change from pretest to post test means on physical fitness variable Endurance. Table 6.1.1 for differences in paired final means among the different Experimental and Control groups indicate significant values of .121 among experimental and control group. The findings indicate that Station and Explosive Power training were effective to improve the physical fitness variable endurance of college students. Hence the hypothesis formulated for the study was accepted.

8.0 Recommendations

On the basis of the results of the study and the following recommendations are made. Since this study was useful to found out the effect of Station training and Explosive Power training for reducing the performance endurance of college students, it is also recommended that Station training and Explosive Power training can be incorporated in the sports training programme . It is also recommended that further study may be conducted to find out the effect other physical fitness variables such as speed and strength

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THE EFFECTS OF COMBINED COMPLEX AND CLOSED KINETIC CHAIN TRAINING VERSUS TRADITIONAL CONDITIONING ON COLLEGE STUDENTS' FITNESS PROFILES

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Abstract

This study examined the impact of an 8-week combined program of Complex Training and Closed Kinetic Chain exercises, compared with traditional conditioning, on specific fitness parameters in college athletes. 30 male students aged 19 to 22 were randomly assigned to an Experimental Group (15) and a Control Group (15). The experimental group followed a structured training regimen involving heavy-to-light complex training with multi-joint closed-kinetic-chain exercises three times weekly, while the control group maintained usual conditioning routines. Performance was measured through standardized tests for speed (40 m sprint), muscular endurance (sit-ups), upper-body explosive power (medicine ball throw), flexibility (sit-and-reach), and lower-body explosive power (standing broad jump). Statistical analyses, including independent t-tests, ANCOVA, and effect size estimates, demonstrated significant gains in the experimental group across speed, muscular endurance, and explosive power, with large-to-very large effect sizes for the primary performance metrics. Flexibility, however, did not show notable differences between groups. The results indicate that combining Complex Training with Closed Kinetic Chain exercises enhances neuromuscular performance more effectively than conventional conditioning, especially for speed and power development in collegiate athletes. Keywords: Complex Training, Closed Kinetic Chain, Explosive Power, Strength and Conditioning.

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Keywords: Complex Training, Closed Kinetic Chain, Explosive Power, Strength and Conditioning.

INTRODUCTION

Developing explosive power, movement speed, and efficient movement has become a central focus in modern athletic training, particularly in college sports. Coaches and sports scientists continually seek training techniques that enhance both strength and sport-specific movement skills. Traditional resistance training primarily aims to increase muscle strength, whereas modern, performance-oriented approaches incorporate velocity-based and neuromuscular methods that address the full force-velocity spectrum (Bompa & Buzzichelli, 2019; Suchomel, Nimphius, & Stone, 2016). In this framework, training strategies that integrate strength, power, stability, and coordination are increasingly valued in both research and practice. Notably, Complex Training and Closed Kinetic Chain exercises are widely recognized for their effectiveness in boosting athletic performance.

Complex Training blends high-load resistance exercises with similar plyometric or explosive movements in the same session (Docherty, Robbins, & Hodgson, 2004). For instance, heavy squats might be followed immediately by jump squats or depth jumps. The physiological basis of Complex Training is often linked to Post-Activation Performance Enhancement. This phenomenon occurs when a heavy muscle contraction temporarily boosts subsequent explosive actions. This effect is likely due to increased motor unit recruitment, better neuromuscular coordination, higher muscle temperature, and enhanced phosphorylation of myosin regulatory light chains (Tillin & Bishop, 2009; Blazevich & Babault, 2019). Research shows that Complex Training can significantly improve the rate of force development, sprinting speed, jumping ability, and overall power output in trained athletes (Seitz & Haff, 2016).

Closed Kinetic Chain exercises are also vital in functional athletic conditioning. In these exercises, the distal part of the limb remains fixed against a surface or resistance, as in squats, lunges, push-ups, and step-ups. These movements promote coordinated multi-joint patterns, improve proprioceptive feedback, and encourage co-contraction of agonist and antagonist muscles, which enhances joint stability and neuromuscular control (Escamilla et al., 2012). Closed Kinetic Chain exercises also lead to better core stability, balance, and functional force transfer—all essential for moving effectively in sports and preventing injuries (Kisner & Colby, 2017). Since many sports actions take place in weight-bearing positions, these exercises closely mirror the physical demands of competitive performance.

While previous research has examined the benefits of Complex Training and Closed Kinetic Chain exercises separately, few studies have explored combining these methods in a single conditioning program. Combining Complex Training with Closed Kinetic Chain exercises

could provide a stronger stimulus by increasing neuromuscular power while improving movement stability. The neural activation from Post-Activation Performance Enhancement might work well with the structural and proprioceptive benefits of Closed Kinetic Chain exercises, resulting in better athletic performance. This integrated approach could be especially beneficial for college athletes who need a balance of strength, speed, coordination, and effective movement to succeed.

This study aimed to compare the effects of an integrated training program of Complex Training and Closed Kinetic Chain exercises against traditional conditioning exercises on physical and physiological performance measures in college athletes. It focused on changes in speed, explosive power, flexibility, and core endurance after an eight-week training program. The hypothesis was that athletes participating in the combined training would show significantly larger improvements in performance measures than those using standard training methods.

METHODOLOGY

This study employed a randomized pre-test-post-test experimental design to compare an 8-week Complex Training program with Closed Kinetic Chain exercises against traditional conditioning in college athletes. Thirty male athletes were divided into experimental and control groups, and performance was assessed using standardized fitness tests before and after the intervention to measure training effects.

Experimental Approach to the Problem

This study used a randomized parallel-group design with pre- and post tests to assess the effects of specific athletic training interventions on physiological and motor performance. It compared an integrated Complex Training and Closed Kinetic Chain program against a traditional conditioning routine over eight weeks. The independent variable was the type of training, while the repeated measures included pre-test and post-test assessments.

The dependent variables consisted of specific anthropometric traits and fitness components linked to athletic performance. These included body height, body weight, and five standardized motor tests: the 40-meter sprint for speed and acceleration, the sit-up test for muscular endurance, the medicine ball throw for upper-body explosive power, the sit-and-reach test for flexibility, and the standing broad jump for lower-body explosive strength and reactive

power. The study aimed to assess whether the combined intervention would yield greater improvements in athletic performance than traditional training methods.

Participants

30 healthy male college athletes voluntarily participated in this study. All were actively involved in collegiate sports and had at least one year of structured resistance training before the study began. To ensure safety and uniformity in training, participants were screened based on specific inclusion criteria. Athletes with any recent neuromuscular disorders, metabolic diseases, or musculoskeletal injuries in the six months before the baseline assessment were excluded.

After screening, participants were randomly assigned to two equal groups: an Experimental Combination Group ($n = 15$) that underwent the integrated Complex Training and Closed Kinetic Chain exercise program, and a Control Group ($n = 15$) that followed a traditional conditioning routine. Before data collection, all participants received a detailed explanation of the study's objectives, procedures, potential risks, and benefits. Written informed consent was obtained from each participant before baseline testing began.

Testing Protocols

All physical and performance variables were measured during two identical evaluation phases at Week 0 (pre-test) and Week 9 (post-test). To ensure reliability and minimize fatigue effects, assessments were conducted over three consecutive days under consistent environmental conditions between 07:00 AM and 10:00 AM. Anthropometric measurements included body height, recorded with a wall-mounted stadiometer, and body weight, measured with a calibrated digital scale, to the nearest 0.1 cm and 0.1 kg. Speed and acceleration were evaluated with a 40-meter sprint test, in which participants completed three maximal trials from a standing start, and the best result was used for analysis. Core muscular endurance was assessed with a 60-second sit-up test, and the highest number of correct repetitions was recorded. Upper-body explosive power was measured with a seated 2 kg medicine ball chest throw, and the furthest distance among three attempts was recorded in meters. Flexibility of the lower back and hamstrings was assessed using the sit-and-reach test, and the best score from three trials was recorded in centimeters. Lower-body explosive power was assessed with the standing broad jump, in which

participants performed three maximum horizontal jumps, and the longest distance was used for analysis.

Table 1. *Description of Testing Variables and Measurement Procedures*

Variable	Test Used	Unit of Measurement	Performance Component
Height	Stadiometer Measurement	Centimeters (cm)	Anthropometric Variable
Weight	Digital Weighing Scale	Kilograms (kg)	Anthropometric Variable
Speed & Acceleration	40-Meter Sprint Test	Seconds (sec)	Speed Performance
Muscular Endurance	60-Second Sit-Up Test	Number of Repetitions	Core Endurance
Upper Body Explosive Power	Medicine Ball Throw (2 kg)	Meters (m)	Explosive Strength
Flexibility	Sit-and-Reach Test	Centimeters (cm)	Flexibility
Lower Body Explosive Power	Standing Broad Jump	Meters (m)	Explosive Power

Table 1 outlines the variables, tests, and units used to assess participants' anthropometric and performance characteristics. Height and weight were measured using standard instruments. At the same time, speed, endurance, explosive power, and flexibility were assessed using validated field tests, including the 40-meter sprint, sit-ups, medicine ball throw, sit-and-reach, and standing broad jump. Overall, these measures provide a simple and reliable profile of the athletes' physical fitness.

Training Interventions

The experimental cohort completed an 8-week intervention meeting three times per week on alternating days (Mondays, Wednesdays, and Fridays) for approximately 60–75 minutes per session. Each session began with a 10-minute dynamic mobility warmup and concluded with a 5-minute structural static cool-down.

The core protocol combined high-load structural compound movements with explosive closed-kinetic-chain variations. For example, a lower-body sequence paired a heavy back squat (3–5 reps at 80–85% 1RM) with an explosive plyometric jump variation (5–6 reps of depth jumps or explosive bodyweight squats) to leverage Post-Activation Performance Enhancement

mechanisms. Upper-body sequences paired heavy bench-press loads with explosive plyometric push-ups. The control group performed standard physical conditioning routines, including calisthenics, moderate-intensity aerobic running, and generalized low-resistance circuit variations, maintaining the same total weekly training volume and duration but without the structured heavy-to-light complex pairs.

ANALYSIS AND RESULTS

The data collected in this study were analyzed to examine differences between the experimental and control groups from pre-test to post-test. Descriptive statistics, such as the mean and standard deviation, were used to summarize performance variables, while inferential tests were used to determine the significance of changes following the intervention. The analysis focused on identifying improvements in anthropometric and physical fitness components resulting from the training program.

Table 2. Independent Samples t-Test of (Post–Pre) Differences Between Combination Training and Control Groups for Selected Performance Variables

Dependent Performance Variable	Combination Pre	Combination Post	Control Pre	Control Post	Mean Difference	<i>t</i> -value	df	<i>p</i> -value
40M Sprint (s)	6.11	6.04	5.99	6.03	-0.108	-4.016	24.96	0.0004*
Sit-Ups (reps)	45.00	46.13	45.07	44.87	+1.333	2.082	26.55	0.0471*
Medicine Ball Throw (m)	4.59	4.67	4.65	4.65	+0.075	2.561	27.94	0.0181*
Sit & Reach (cm)	32.27	32.53	34.73	34.73	+0.267	0.636	27.35	0.5317
Standing Broad Jump (m)	2.22	2.30	2.20	2.21	+0.069	4.956	26.24	0.0001*

*Significant at $p < 0.05$

Table 2 shows that the experimental group (Combination Training) demonstrated greater improvements across most performance variables than the control group. Significant differences were observed in 40 m sprint, sit-ups, medicine ball throw, and standing broad jump ($p < 0.05$),

indicating superior gains in speed, muscular endurance, upper-body power, and lower-body explosive strength following the intervention. However, flexibility (sit-and-reach) did not differ significantly between groups.

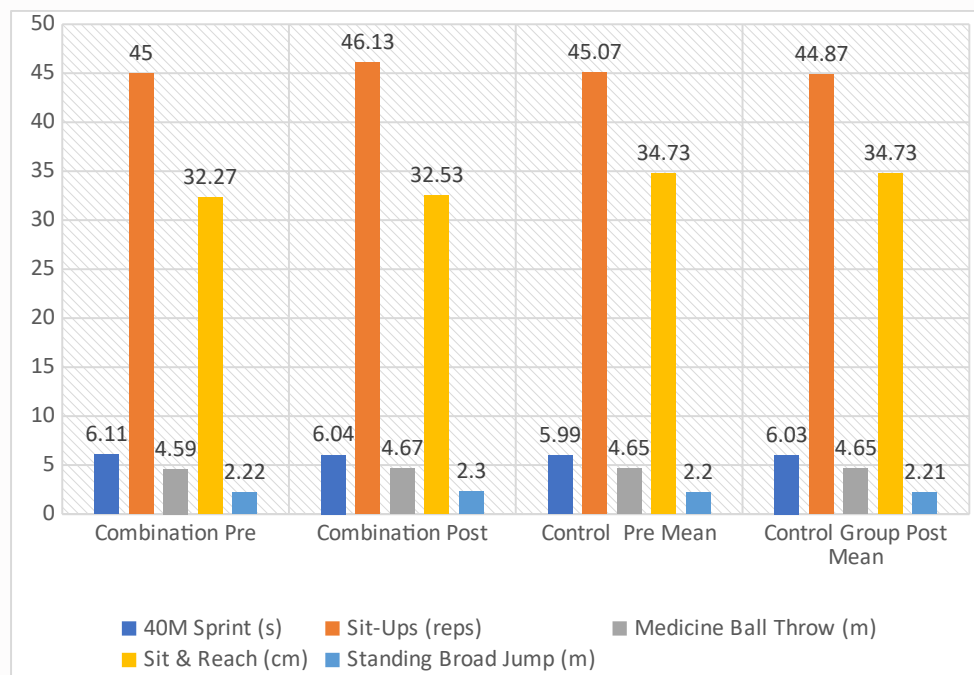


Figure 1. *Post- and Pre- Between-Group Comparison of Combination Training and Control Groups for Selected Performance Variables*

Table 3 *ANCOVA Summary for Adjusted Post-Test Scores Between Combination and Control Groups*

Variable	Combination Adjusted Post Mean	Control Adjusted Post Mean	Mean Difference	F-value	p-value
40M Sprint (s)	6.04	6.03	-0.108	16.13	0.0004*
Sit-Ups (reps)	46.13	44.87	+1.333	4.33	0.0471*
Medicine Ball Throw (m)	4.67	4.65	+0.075	6.56	0.0181*
Sit & Reach (cm)	32.53	34.73	+0.267	0.40	0.5317
Standing Broad Jump (m)	2.30	2.21	+0.069	24.56	0.0001*

*Significant at $p < 0.05$

Table 3 presents the ANCOVA results of adjusted post-test scores between the Combination Training and Control groups. The findings reveal that the experimental group showed significantly better performance in 40 m sprint, sit-ups, medicine ball throw, and standing broad jump ($p < 0.05$), indicating that the training intervention had a strong positive effect on speed, endurance, and explosive power even after adjusting for baseline differences. However, no significant difference was observed in flexibility (sit-and-reach), suggesting that both training methods had similar effects on this variable.

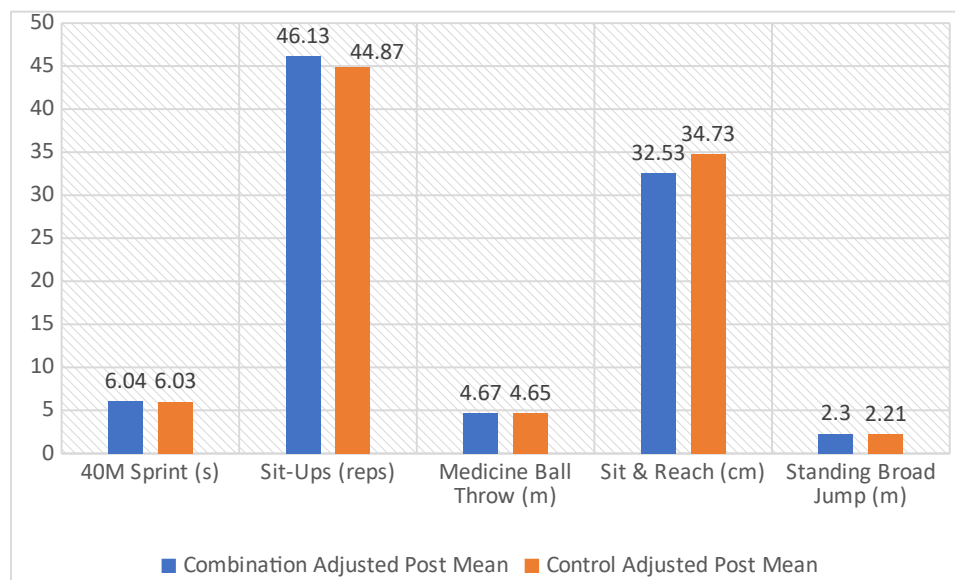


Figure 2: Adjusted Post-Test Scores Between Combination and Control Groups

Table 4 Effect Size Analysis (Cohen's d) for Performance Variables

Variable	Cohen's d	Effect Magnitude
40M Sprint (s)	1.47	Large
Sit-Ups (reps)	0.76	Moderate
Medicine Ball Throw (m)	0.94	Large
Sit & Reach (cm)	0.23	Small
Standing Broad Jump (m)	1.81	Very Large

Table 4 presents the effect size analysis using Cohen's d to determine the magnitude of training effects across performance variables. The results indicate a very large effect for the

standing broad jump and large effects for the 40 m sprint and medicine ball throw, showing great improvements in speed and explosive power due to the training intervention. Sit-ups demonstrated a moderate effect, while sit-and-reach showed only a small effect, indicating minimal change in flexibility.

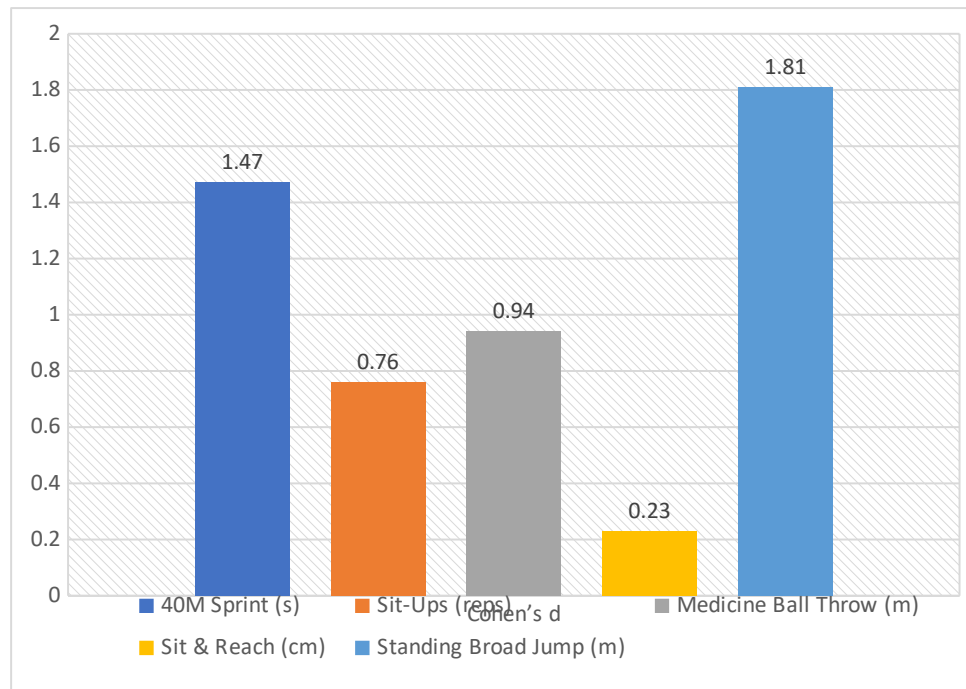


Figure 3: *Effect Size (Cohen's d) for Performance Variables*

DISCUSSION ON FINDINGS

The results of this study strongly confirm the primary hypothesis: an 8-week training program that combines Complex Training with Closed Kinetic Chain (CKC) exercises leads to superior fitness gains compared to traditional conditioning. Notably, significant improvements were seen in lower-body explosive power, upper-body strength, and sprint performance, highlighting the benefits of combining high-load resistance exercises with explosive movements. These outcomes align with earlier research by Seitz and Haff (2016), who found that complex training effectively enhances sprinting and jumping capabilities by improving neuromuscular efficiency and the rate of force development.

The gains in Standing Broad Jump (+0.076 m) and 40 m Sprint (−0.068 s) are linked to Post-Activation Performance Enhancement (PAPE). This involves alternating heavy resistance exercises with plyometric actions to boost neuromuscular readiness. As explained by Tillin and Bishop (2009) and supported by Blazevich and Babault (2019), heavy loading increases myosin light-chain phosphorylation and enhances actin–myosin sensitivity. These changes improve cross-bridge cycling and motor unit recruitment. This neural “priming” effect enables athletes to engage higher-threshold motor units during explosive activities, leading to increased power output.

Additionally, Boulosa et al. (2020) and Cormier et al. (2020) demonstrate that combining heavy resistance training with plyometric exercises results in greater horizontal force production than using each method alone, reinforcing the current findings.

Including Closed Kinetic Chain (CKC) exercises further boosts performance by enhancing joint stability, proprioception, and core control. Unlike open-chain movements, CKC exercises involve multi-joint coordination under load, increasing axial compression and stimulating mechanoreceptors that enhance neuromuscular feedback. As noted by Escamilla et al. (2012) and Kisner and Colby (2017), these movements improve co-contraction patterns and functional stability, which are crucial for effective athletic performance.

The improvement in core endurance (Sit-Ups +1.133 reps) is probably due to the ongoing activation of trunk stabilizers during CKC-based training. This increased core stability likely enhanced force transfer between the lower and upper body, which may have led to better performance in tasks like the medicine ball throw.

The Sit & Reach results did not show a significant change ($p = 0.5317$), suggesting that neither training method effectively impacted muscle–tendon length adaptations. This supports Behm et al. (2016), who found that resistance and plyometric exercises mainly improve neural drive and muscle stiffness instead of flexibility. As a result, enhancing joint range of motion usually needs specific stretching or mobility exercises. Overall, the results confirm that the combined Complex Training and CKC approach provides a more comprehensive and effective

stimulus to enhance speed, strength, and explosive power than traditional conditioning, making it a valuable strategy for collegiate athletic development.

CONCLUSIONS

1. The 8-week combined Complex Training and Closed Kinetic Chain (CKC) program significantly improved selected physical fitness variables in college athletes.
2. The experimental group showed greater improvements in speed, muscular endurance, and explosive power compared to the traditional conditioning group.
3. Significant gains were observed in 40 m sprint, sit-ups, medicine ball throw, and standing broad jump performance.
4. Flexibility (sit-and-reach) did not show meaningful improvement, indicating limited effect of the training on range of motion.
5. The integration of heavy resistance and plyometric training enhanced neuromuscular efficiency and rate of force development.
6. Closed Kinetic Chain exercises contributed to better core stability and functional force transfer.
7. Overall, combined training was more effective than traditional conditioning for improving athletic performance in collegiate athletes.
8. The findings support the use of integrated strength and power training methods in sports conditioning programs.

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COMPARATIVE STUDY OF AGGRESSION AND ANXIETY LEVELS IN FEMALE COLLEGE FIELD HOCKEY AND SEPAK TAKRAW PLAYERS

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Lona K

Abstract

This study compared aggression and anxiety levels among female college athletes in Field Hockey and Sepak Takraw. Forty women aged 18 to 25 participated, with 20 from each sport, selected from intercollegiate competitions. We measured aggression using the Buss-Perry Aggression Questionnaire (BPAQ) and assessed anxiety with the Sports Competition Anxiety Test (SCAT). For data analysis, we calculated means and standard deviations and used independent t-tests to find differences between groups. Correlation analysis looked at the relationship between aggression and anxiety, including their sub-domains. Results showed that Field Hockey players exhibited significantly higher levels of aggression, particularly physical and verbal aggression, anger, and confidence. In contrast, Sepak Takraw players experienced higher somatic and cognitive anxiety. We found a moderate negative correlation between aggression and anxiety, suggesting that greater aggression and confidence relate to lower anxiety. The correlation matrix also displayed positive links among aggression sub-domains and an inverse relationship between self-confidence and anxiety. The study concludes that the unique physical, technical, and competitive demands of each sport affect the psychological traits of college women athletes. These findings emphasize the need for sport-specific psychological strategies to address aggression, manage anxiety, improve confidence, and regulate emotions. This approach can enhance performance and mental health among women athletes. Keywords: Aggression, Anxiety, Field Hockey, Sepak Takraw, Collegiate Women Athletes, Sports Psychology

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Abstract

This study compared aggression and anxiety levels among female college athletes in Field Hockey and Sepak Takraw. Forty women aged 18 to 25 participated, with 20 from each sport, selected from intercollegiate competitions. We measured aggression using the Buss–Perry Aggression Questionnaire (BPAQ) and assessed anxiety with the Sports Competition Anxiety Test (SCAT). For data analysis, we calculated means and standard deviations and used independent t-tests to find differences between groups. Correlation analysis looked at the relationship between aggression and anxiety, including their sub-domains. Results showed that Field Hockey players exhibited significantly higher levels of aggression, particularly physical and verbal aggression, anger, and confidence. In contrast, Sepak Takraw players experienced higher somatic and cognitive anxiety. We found a moderate negative correlation between aggression and anxiety, suggesting that greater aggression and confidence relate to lower anxiety. The correlation matrix also displayed positive links among aggression sub-domains and an inverse relationship between self-confidence and anxiety. The study concludes that the unique physical, technical, and competitive demands of each sport affect the psychological traits of college women athletes. These findings emphasize the need for sport-specific psychological strategies to address aggression, manage anxiety, improve confidence, and regulate emotions. This approach can enhance performance and mental health among women athletes.

Keywords: Aggression, Anxiety, Field Hockey, Sepak Takraw, Collegiate Women Athletes, Sports Psychology

INTRODUCTION

Sport participation involves various aspects, including physical, physiological, technical, tactical, social, and psychological factors. In today's competitive environment, being mentally prepared is just as important as physical fitness for success and performance. Psychological traits affect athletes' abilities to control their emotions, manage stress, stay focused, perform skills, and maintain motivation during training and competitions (Weinberg & Gould, 2019; Cox, 2012; Anshel, 2016).

Sport psychologists have observed that athletes with greater psychological stability can adapt more effectively, regulate their emotions, and remain confident and resilient under pressure (Williams, 2010; Cratty, 1989; Gould & Krane, 1992). Therefore, psychological factors play a vital role in sports science and athletic performance research.

Among the psychological factors related to sports, aggression and anxiety significantly affect behavior and success. Aggression usually involves deliberate actions aimed at asserting dominance, winning, defending, or responding vigorously (Buss & Perry, 1992; Baron & Richardson, 1994). In sports, aggression can be either constructive or destructive. Constructive aggression enhances assertiveness, determination, confidence, competitiveness, and motivation, which improves performance in challenging situations (Gill, 2000; Cox, 2012). On the other hand, uncontrolled aggression can damage emotional stability, relationships, sportsmanship, and decision-making (Jarvis, 2006; Wann, 1997). Athletes in physically demanding and confrontational sports often show higher levels of aggression due to the environment and the need for quick tactical and physical responses (Bredemeier, 1975; Silva, 1980; Weinberg & Gould, 2019).

Anxiety greatly affects sports participation and achievement. Competitive anxiety includes feelings of apprehension, nervousness, fear, tension, and worry before or during performance (Martens, 1977; Spielberger, 1983). It can harm cognitive and physical functions, leading to difficulty concentrating, low confidence, muscle tension, disrupted coordination, and reduced performance (Cratty, 1989; Weinberg & Gould, 2019). Martens et al. (1990) found that athletes with high anxiety struggle to control their emotions and perform well under pressure. While moderate anxiety can increase alertness, high anxiety usually results in poor performance, emotional instability, and low self-esteem (Hardy, 1996; Jones, 1995). Anxiety levels vary based on the type of sport, level of competition, personality, coping skills, and performance expectations (Anshel, 2016; Williams, 2010).

Different sports present unique psychological demands on athletes, resulting in varied emotional and behavioral responses. Field Hockey is a dynamic and physically demanding team sport known for speed, body contact, rapid transitions, aggressive movement patterns, and ongoing interaction among players. To succeed in Field Hockey, athletes often need assertiveness, emotional toughness, quick decision-making, physical courage, and controlled aggression during matches (Cox, 2012; Singh & Devi, 2018). The game's confrontational and aggressive nature can naturally encourage aggressive tendencies in athletes as part of their competitive adaptation.

Previous research suggests that athletes in contact and collision sports tend to exhibit higher levels of aggression than those in non-contact and skill-focused sports (Gill, 2000; Silva, 1983; Buss & Perry, 1992). Moreover, the fast-paced and competitive environment of Field Hockey may contribute to emotional arousal and assertive behavior among players. Sepak Takraw is a highly technical sport requiring agility, flexibility, balance, timing, concentration, coordination, and precision. It features continuous aerial movements and complex motor skills applied under intense pressure. Success often depends on technical skill and accuracy, which can lead athletes to feel anxious about mistakes and performance expectations (Jarvis, 2006; Martens, 1977). Athletes in skill-oriented sports often report increased cognitive anxiety since minor errors can affect match outcomes (Spielberger, 1983; Hardy, Jones, & Gould, 1996).

Sports that demand high levels of coordination and concentration can create psychological pressure, increasing emotional stress and nervousness (Williams, 2010; Weinberg & Gould, 2019). At the collegiate level, women athletes deal with psychological challenges from academic workloads, social expectations, emotional stress, and balancing education and athletics. These pressures may impact emotional regulation, well-being, confidence, motivation, and relationships (Anshel, 2016; Cox, 2012). Research indicates that female athletes experience greater emotional sensitivity and performance stress during competition compared to male athletes (Gill, 2000; Williams, 2010). Understanding these psychological traits is essential for developing effective mental training, counseling, and performance strategies (Weinberg & Gould, 2019; Gould & Krane, 1992).

Although several studies have looked into aggression and anxiety across different sports, little research has focused specifically on collegiate women's Field Hockey and Sepak Takraw players. These sports differ significantly in physical confrontation, technical skills,

movement styles, and competition formats, which likely results in notable psychological differences among their athletes. Understanding these sport-specific psychological variations can help coaches, sports psychologists, and physical educators create tailored interventions for emotional regulation, aggression control, anxiety management, and mental readiness in collegiate women athletes. This study aims to compare aggression and anxiety levels between college women's Field Hockey and Sepak Takraw players, shedding light on how specific sports requirements shape psychological traits and competitive behavior.

METHODOLOGY

This study used a comparative method to look at the differences in aggression and anxiety between college women's Field Hockey players and Sepak Takraw players. We selected 40 female athletes, aged 18 to 25, from different colleges who actively competed in intercollegiate tournaments, based on their participation and experience. The participants were divided into two equal groups, each with 20 Field Hockey players and 20 Sepak Takraw players. All participants were informed about the study's purpose, and we obtained their voluntary consent before collecting data. We maintained necessary ethical considerations throughout the investigation.

The independent variable was the type of sport, while the dependent variables were aggression and anxiety. We measured aggression using the Buss–Perry Aggression Questionnaire (BPAQ), developed by Buss and Perry in 1992. The BPAQ is a standardized tool that measures aggression across domains such as physical aggression, verbal aggression, anger, and hostility. We assessed anxiety with the Sports Competition Anxiety Test (SCAT), developed by Martens in 1977, which evaluates competitive trait anxiety in athletes. Both tools have good validity and reliability and are commonly used in sports psychology research. We collected data individually under consistent testing conditions to ensure uniformity. Participants received clear instructions on how to complete the questionnaires and had ample time to do so. We scored responses according to the manuals for each instrument. We analyzed the data using both descriptive and inferential statistics.

Descriptive measures included the mean, standard deviation, minimum and maximum scores, skewness, and kurtosis to evaluate data characteristics and check the normality of the distribution. An independent samples t-test identified significant differences between Field Hockey and Sepak Takraw players in terms of aggression and anxiety. We calculated

Cohen's d effect size to assess the practical significance and magnitude of these differences. We set the significance level at 0.05.

ANALYSIS OF RESULTS

The data were analyzed using descriptive and inferential statistics to compare aggression and anxiety levels among collegiate women's Field Hockey and Sepak Takraw players. Descriptive stats summarized psychological traits with mean and standard deviation. Independent t-tests checked for significant differences between groups in aggression, anxiety, and sub-domains. Correlation analysis examined relationships between aggression and anxiety. Significance was set at 0.05. Results are in the following tables and figures.

Table 1 *Independent Sample t-Test for Aggression and Anxiety Variables Among Collegiate Women Athletes*

Variable	Group	Mean	SD	Mean Difference	Standard Error Difference	t-value	p-value
Aggression	Field Hockey	73.84	5.92	5.57	1.63	3.41*	0.001
	Sepak Takraw	68.27	5.41				
Anxiety	Field Hockey	19.36	3.14	-3.48	0.89	3.89*	0.000
	Sepak Takraw	22.84	3.27				

* Significant at 0.05 level (Critical t = 2.02)

Table 1 highlights notable differences in aggression and anxiety levels between women collegiate players of Field Hockey and Sepak Takraw. Field Hockey athletes showed significantly higher aggression scores (Mean = 73.84) compared to Sepak Takraw athletes (Mean = 68.27). Conversely, Sepak Takraw players exhibited significantly higher anxiety levels (Mean = 22.84) than their Field Hockey counterparts (Mean = 19.36). The t-values for aggression (3.41) and anxiety (3.89) were both statistically significant at the 0.05 level, indicating that the sport's characteristics and competitive pressures may shape these psychological traits in women athletes.

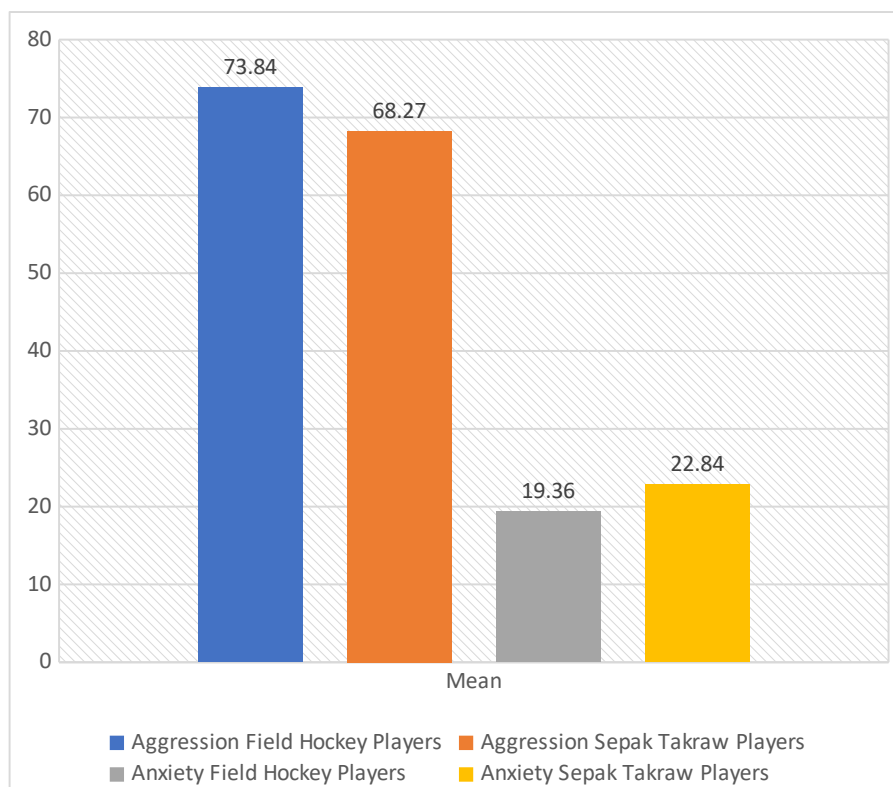


Figure 1: *Aggression and Anxiety Variables Among Collegiate Women Athletes*

Table 2 *Correlation Analysis Between Aggression and Anxiety Variables Among Collegiate Women Athletes*

Variables	N	Mean	SD	r-value	r ²	p-value
Aggression	40	71.06	6.21	-0.42*	0.18	0.007
Anxiety	40	21.10	3.58			

* Significant at 0.05 level (Critical $r = 0.312$)

Table 2 presents the correlation analysis between aggression and anxiety among collegiate women athletes. The results revealed a significant moderate negative correlation between aggression and anxiety ($r = -0.42$, $p = 0.007$), indicating that athletes with higher aggression scores tended to report lower anxiety levels. The coefficient of determination ($r^2 = 0.18$) suggests that approximately 18% of the variation in anxiety is associated with aggression among the participants.

Table 3 *Independent Sample t-Test for Aggression and Anxiety Sub-Domain Scores Among Collegiate Women Athletes*

Variable	Field Hockey Mean	Sepak Takraw Mean	Mean Difference	t-value	p-value
Physical Aggression	24.18	20.74	3.44	3.55*	0.001
Verbal Aggression	16.27	14.81	1.46	2.86*	0.007
Anger	18.44	16.89	1.55	2.41*	0.021
Hostility	14.95	15.83	0.88	1.24	0.223
Somatic Anxiety	8.41	10.36	1.95	3.36*	0.002
Cognitive Anxiety	10.95	12.48	1.53	2.43*	0.020
Self-Confidence	13.62	11.44	2.18	2.95*	0.005

* Significant at 0.05 level (Critical t = 2.02)

Table 3 presents the independent-samples t-test results comparing aggression and anxiety scores between women's college Field Hockey and Sepak Takraw players. Field Hockey players scored higher in physical aggression, verbal aggression, and anger, but there was no difference in hostility. Sepak Takraw players had higher somatic and cognitive anxiety, while Field Hockey players had higher self-confidence.

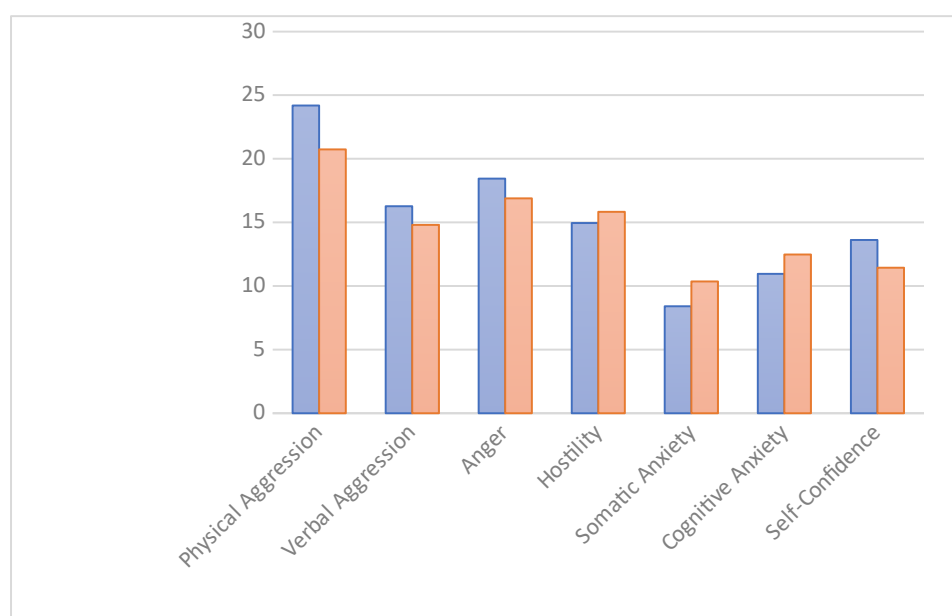


Figure 2 *for Aggression and Anxiety Sub-Domain Scores Among Collegiate Women Athletes*

Table 4 *Correlation Analysis Among Aggression and Anxiety Sub-Domain Variables*

Variables	Mean	SD	Correlated Variable Mean	SD	r-value	r ²	p-value
Physical Aggression	22.46	3.18	Somatic Anxiety	9.38	1.94	-0.46*	0.21
Physical Aggression	22.46	3.18	Cognitive Anxiety	11.72	2.11	-0.39*	0.15
Verbal Aggression	15.54	2.26	Cognitive Anxiety	11.72	2.11	-0.31*	0.10
Anger	17.67	2.41	Somatic Anxiety	9.38	1.94	-0.28	0.08
Self-Confidence	12.53	2.08	Cognitive Anxiety	11.72	2.11	-0.58*	0.34
Self-Confidence	12.53	2.08	Somatic Anxiety	9.38	1.94	-0.49*	0.24

* Significant at 0.05 level (Critical r = 0.312)

Table 4 shows correlations among aggression and anxiety variables in collegiate women athletes. Significant moderate negative correlations exist between physical aggression and both somatic and cognitive anxiety ($r = -0.46, -0.39, p < 0.05$), indicating that higher physical aggression relates to lower anxiety. A low negative correlation was found between verbal aggression and cognitive anxiety ($r = -0.31, p < 0.05$), while anger and somatic anxiety were not significantly related ($r = -0.28, p > 0.05$). Self-confidence showed moderate negative correlations with cognitive ($r = -0.58, p < 0.05$) and somatic anxiety ($r = -0.49, p < 0.05$), suggesting that increased self-confidence may reduce anxiety.

Table 5 *Correlation Matrix of Aggression and Anxiety Sub-Domain Variables Among Collegiate Women Athletes*

Variables	Physical Aggression	Verbal Aggression	Anger	Hostility	Somatic Anxiety	Cognitive Anxiety	Self-Confidence
Physical Aggression	1.00	0.48*	0.52*	0.29	-0.46*	-0.39*	0.44*
Verbal Aggression	0.48*	1.00	0.43*	0.31*	-0.24	-0.31*	0.36*
Anger	0.52*	0.43*	1.00	0.47*	-0.28	-0.26	0.33*
Hostility	0.29	0.31*	0.47*	1.00	0.18	0.21	-0.19
Somatic Anxiety	-0.46*	-0.24	-0.28	0.18	1.00	0.58*	-0.49*
Cognitive Anxiety	-0.39*	-0.31*	-0.26	0.21	0.58*	1.00	-0.58*
Self-Confidence	0.44*	0.36*	0.33*	-0.19	-0.49*	-0.58*	1.00

Confidence							
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* Significant at 0.05 level

Table 5 shows the correlation matrix among aggression and anxiety sub-domains in college women athletes. It reveals significant positive associations among traits such as physical aggression, verbal aggression, anger, and hostility, indicating that these traits are interconnected. Notably, physical aggression negatively correlates with somatic ($r = -0.46$) and cognitive anxiety ($r = -0.39$), meaning higher aggression relates to lower anxiety. Self-confidence also negatively correlates with somatic ($r = -0.49$) and cognitive anxiety ($r = -0.58$), suggesting greater confidence reduces anxiety.

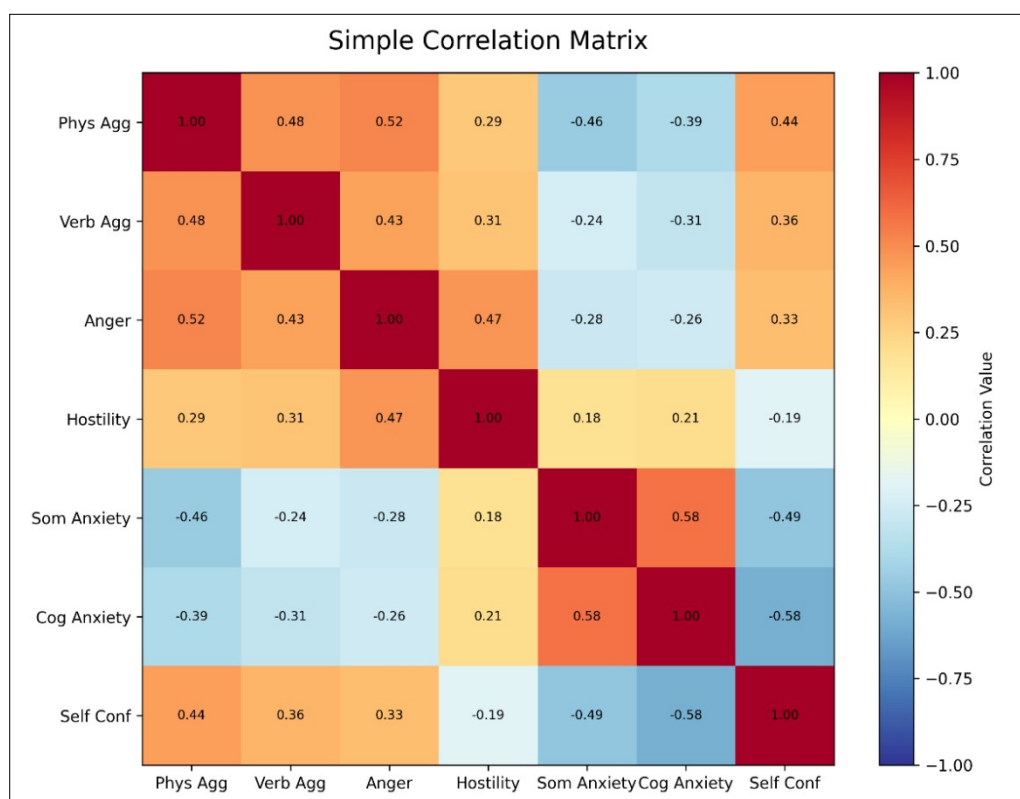


Figure 3 Correlation Matrix of Aggression and Anxiety Variables Among Collegiate Women Athletes

DISCUSSION ON FINDINGS

Field Hockey players scored higher on aggression than Sepak Takraw players, possibly due to the physically demanding and confrontational nature of field hockey, which involves body contact, quick decision-making, assertive movement, and intense competition. Contact sports often encourage controlled aggression to enhance performance and assert dominance. The elevated levels of physical and verbal aggression among Field Hockey

players align with research by Gill (2000), Silva (1983), and Weinberg and Gould (2019), who noted that athletes in aggressive sports are more aggressive than those in technical sports. Buss and Perry (1992) also stated that aggression can be a competitive adaptation in physically assertive sports. These results imply that the aggressive behaviors in Field Hockey may be a psychological adaptation from exposure to intense competitive situations.

Sepak Takraw players exhibited significantly higher anxiety levels compared to Field Hockey players. As a sport that is highly skill-dependent and precision-driven, it demands remarkable concentration, coordination, flexibility, timing, and technical skill. Even small errors during a match can directly affect the outcome, adding psychological pressure to the athletes. The increased somatic and cognitive anxiety seen in Sepak Takraw players may be due to the mental strain of maintaining technical accuracy during competition. These results support the multidimensional anxiety theory by Martens et al. (1990), which states that athletes in technically challenging sports often face more cognitive worry and physiological tension. Similar findings were reported by Hardy et al. (1996) and Williams (2010), who observed that sports requiring high focus and precision tend to raise emotional stress and performance anxiety among participants.

The findings showed a moderate negative correlation between aggression and anxiety, with more aggressive athletes reporting lower anxiety. This suggests that assertiveness and aggression may boost emotional confidence and competitiveness, leading to less fear of failure. Cox (2012) and Jones (1995) also found that greater confidence correlates with reduced competitive anxiety.

The subdomain analysis revealed that Field Hockey players scored higher on physical and verbal aggression, anger, and self-confidence, indicating greater emotional assertiveness and competitive confidence due to their exposure to physically demanding situations that require courage, quick reactions, and aggressive tactics. Conversely, Sepak Takraw players experienced higher somatic and cognitive anxiety, reflecting more physical tension and mental worry before or during competitions. Hostility levels were similar, suggesting that increased aggression does not equate to greater hostility or negative interpersonal feelings.

The correlation matrix examining aggression and anxiety sub-domains further illuminated the relationship between these psychological factors. Significant positive correlations among physical aggression, verbal aggression, anger, and hostility reveal that

these aspects of aggression are closely linked. Conversely, the negative associations between aggression indicators and anxiety suggest that higher aggression and confidence levels might assist athletes in managing competitive stress more effectively. Notably, self-confidence exhibits a strong negative correlation with both somatic and cognitive anxiety, implying that athletes with greater confidence tend to experience less emotional and physiological stress. This supports the findings of Weinberg and Gould (2019), highlighting the crucial protective role of self-confidence in reducing competitive anxiety and improving athletic performance.

The results indicate that the specific demands of different sports significantly shape the psychological profiles of college women athletes. Field hockey tends to foster assertiveness, aggression, and confidence because of its physical and tactical nature, whereas Sepak Takraw is linked to higher anxiety levels owing to its technical precision and performance stress. These findings highlight the importance of creating sport-specific psychological training programs. Coaches, sports psychologists, and trainers should craft mental conditioning strategies that address each sport's unique emotional challenges. For example, field hockey players might find it useful to engage in interventions aimed at managing emotions and controlling aggression. In contrast, Sepak Takraw athletes may benefit from anxiety management techniques such as relaxation exercises, cognitive restructuring, visualization, and confidence-building activities. Providing this psychological support can improve emotional stability, mental readiness, and overall performance among collegiate women athletes.

CONCLUSIONS

1. Significant differences were found in aggression and anxiety levels between collegiate women's Field Hockey and Sepak Takraw players.
2. Field Hockey players demonstrated significantly higher aggression levels compared to Sepak Takraw players.
3. Sepak Takraw players exhibited significantly higher anxiety levels than Field Hockey players.
4. Field Hockey players scored higher in physical aggression, verbal aggression, anger, and self-confidence.
5. Sepak Takraw players showed higher somatic anxiety and cognitive anxiety.
6. No significant difference was observed in hostility between the two groups.

7. A significant negative correlation existed between aggression and anxiety, indicating that higher aggression was associated with lower anxiety.
8. Self-confidence showed a negative relationship with both somatic and cognitive anxiety, suggesting that confident athletes experience lower competitive anxiety.
9. The psychological characteristics of athletes are influenced by the nature, physical demands, and technical requirements of their respective sports.
10. Sport-specific psychological training programs are essential for improving emotional regulation, anxiety management, confidence, and overall sports performance among collegiate women athletes.

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Effect of Yoga Practice With and Without Acupressure on Stress and Anxiety of High School Students

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Abstract

The purpose of the study was to find out the effect of specific yoga practice with and without acupressure on stress and anxiety of High school students. At the initial stage 120 High school students representing four High schools of Kozhikode District, Kerala State were randomly selected as subjects. After the Pretest data collection, 30 male and 30 female students were finally selected as subjects for the study. There were two experimental groups namely Yoga with acupressure and Yoga without acupressure and one control group. Each group had 10 male and 10 female students and their age ranged between 14 to 15 years. The variables selected for the study were stress and anxiety. Self made stress and anxiety questionnaire was used for the study. The experimental groups underwent the experimental training programme for a period of twelve weeks with three training sessions in a week. Analysis of co-variance was used to find out the significant differences in means among the two experimental and control groups. The level of significance chosen was 0.05. It was found out that training on yoga with and without acupressure showed significant improvement and change on the stress and anxiety level of High school students. It was also found that there was significant difference exist between experimental groups such as Yoga with acupressure and Yoga without acupressure. Yoga with Acupressure training is more effective than Yoga without Acupressure. Keywords - Yoga, Acupressure, Stress and Anxiety

Effect of Yoga Practice With and Without Acupressure on Stress and Anxiety of High School Students

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Abstract

The purpose of the study was to find out the effect of specific yoga practice with and without acupressure on stress and anxiety of High school students. At the initial stage 120 High school students representing four High schools of Kozhikode District, Kerala State were randomly selected as subjects. After the Pretest data collection, 30 male and 30 female students were finally selected as subjects for the study. There were two experimental groups namely Yoga with acupressure and Yoga without acupressure and one control group. Each group had 10 male and 10 female students and their age ranged between 14 to 15 years. The variables selected for the study were stress and anxiety. Self made stress and anxiety questionnaire was used for the study. The experimental groups underwent the experimental training programme for a period of twelve weeks with three training sessions in a week. Analysis of co-variance was used to find out the significant differences in means among the two experimental and control groups. The level of significance chosen was 0.05. It was found out that training on yoga with and without acupressure showed significant improvement and change on the stress and anxiety level of High school students. It was also found that there was significant difference exist between experimental groups such as Yoga with acupressure and Yoga without acupressure. Yoga with Acupressure training is more effective than Yoga without Acupressure.

Keywords – Yoga, Acupressure, Stress and Anxiety

1.0. Introduction

Stress and anxiety have become common psychological challenges in school students due to fast-paced lifestyles, academic pressure, examination demands, and social family responsibilities. Prolonged stress and anxiety of students negatively affect both mental and physical health, leading to problems such as fatigue, insomnia, reduced concentration, high blood pressure, weakened immunity, psychosomatic disorders and poor performance in examinations. Therefore, adopting safe, natural, and holistic methods for managing stress and anxiety has become essential. Among such approaches, Yoga and Acupressure are widely recognized for their effectiveness in promoting mental calmness, emotional balance, and overall well-being.

Yoga is an ancient Indian system of holistic health that integrates physical postures (āsanas), breathing techniques (prāṇāyāma), relaxation, meditation, and ethical principles.

The primary aim of yoga is to achieve harmony between the body, mind, and soul. Regular practice of yoga helps reduce stress and anxiety by calming the nervous system, improving circulation, enhancing oxygen supply to the brain, and regulating hormonal secretion. Yogic practices such as slow breathing, mindfulness, and meditation activate the parasympathetic nervous system, which induces relaxation and reduces the stress response. As a result, yoga improves emotional stability, self-control, and mental clarity, making it an effective non-pharmacological intervention for stress and anxiety management.

Acupressure, a complementary therapy derived from Traditional Chinese Medicine, involves applying gentle pressure to specific points on the body known as acupoints. These points lie along energy pathways called meridians, through which vital energy or “Qi” flows. According to acupressure theory, stress and anxiety occur due to imbalances or blockages in this energy flow. By stimulating specific acupoints, acupressure helps restore energy balance, release muscular tension, improve blood circulation, and promote relaxation. Acupressure is simple, cost-effective, and non-invasive, making it suitable for self-care and daily practice.

The combined application of yoga and acupressure offers a holistic approach to managing stress and anxiety by addressing both psychological and physiological aspects of health. While yoga enhances internal awareness, breath control, and mental discipline, acupressure provides immediate physical relaxation and relief from tension. Together, these practices promote emotional balance, improve coping ability, and enhance quality of life. Hence, yoga and acupressure can be effectively used as preventive and therapeutic strategies for managing stress and anxiety in individuals of all age groups.

1.1 Importance of the study

Stress and anxiety of students during their study as well as in the performance of examinations and competitions are very crucial while considering the high level of competition demands. High school students are undergoing tremendous level of stress and tensions. These emotional conflicts need to be controlled and managed for better performance. If a student fails to control emotional state, that will be acting as a debilitating and deciding factor to lose in examinations. Stress and tensions are needed to be addressed effectively and efficiently. Emotional imbalance is directly related to stress and anxiety. When a person is undergoing tension and fears his heart rate and respiratory rate will also increase. So the elevated heart rate and respiratory rate cause imbalance in the physiology of a person. Sympathetic nervous system gets activated and extra energy is burned to cop up with stress reaction. Yoga and acupressure is useful to reduce stress and tensions. It can be useful to stimulate para-sympathetic nervous system. Hence a study on effect of specific yoga with and without acupressure techniques on stress and anxiety of high school going students are highly useful and the need of the hour.

2.0 Hypothesis

The following hypotheses were formulated for the present study.

- 1) There would be significant difference between pretest and post-test means of the two experimental groups namely Yoga with acupressure and Yoga without acupressure on the selected psychological variables stress and anxiety

- 2) There would be significant difference between the experimental groups namely Yoga with acupressure and Yoga without acupressure on the variables stress and anxiety

3.0 Review of related literature

Relevant information regarding the area of the present research study has been obtained from related books, journals, sport magazines and newspapers. Shafeer, R. K., (1998). conducted a study on stress in male and female of sedentary people and found out that stress is a debilitating factor of general health and well being . - Yoga Reduces Stress: A systematic review of 13 randomized controlled trials (RCTs) found that yoga significantly reduces stress in stressed adults, with low-quality evidence for short-term effects compared to passive control groups (SMD=-0.69, 95%CI=-1.12- -0.25). ¹

Acupressure Relieves Anxiety: Acupoint massage emerged as a safe and effective alternative therapy for anxiety relief, with a meta-analysis of 39 studies showing a significant reduction in anxiety (SMD = -5.39, 95% CI -5.61 to -5.17). ²

Yoga Improves Mental Health: A systematic review of 25 studies found that yoga improves mental health and well-being among nursing professionals and students, reducing stress, anxiety, burnout, and depression. ³

Yoga and Acupressure for Stress: Research suggests that yoga and acupressure can reduce stress and anxiety by activating the parasympathetic nervous system, promoting relaxation, and reducing cortisol levels. ⁴

Yoga for Anxiety: A systematic review of 7 studies found statistically significant results for the beneficial effect of yoga on anxiety. ⁵

Acupressure for Anxiety Relief: Acupressure demonstrated effectiveness in providing instant relief from anxiety related to multiple diseases with a medium effect size.

Yoga Reduces Work-Related Stress: A systematic review of 6 studies found that yoga had a significant effect on work-related stress.

Yoga Improves Quality of Life: Yoga improves quality of life, with moderate-quality evidence for short-term effects compared to passive control groups (SMD=0.86, 95%CI=0.72-1.00).

Yoga and Mindfulness: Yoga promotes mindfulness, increasing awareness of negative thoughts so that they can be recognized and managed more effectively.

Acupressure and Anxiety Management: Acupressure is a simple, non-invasive, and cost-effective therapy for managing anxiety, with potential benefits for patients with COVID-19.

4.0 Objective of the Study

1. The study would bring out the effect of specific yoga based training on reducing stress of high school students
2. The study would bring out the effect of specific yoga based training on reducing anxiety of high school students
3. The study would be useful to understand more about the combined specific acupressure based yoga training on reducing stress of high school students
4. The study would be useful to understand more about the combined specific acupressure based yoga training on reducing anxiety of high school students

5.0 Methodology

The purpose of the study was to find out the effect specific yoga practice with and without acupressure on stress and anxiety high school students. At the initial stage 120 High school students representing four high schools of Kozhikode district Kerala State were randomly selected as subjects. After the Pretest data collection, 30 male and 30 female students were finally selected as subjects for the study. There were two experimental groups namely Yoga with acupressure and Yoga without acupressure and one control group. Each group had 10 male and 10 female students. The age of the subjects ranged between 14 to 15 years. The variables selected for the study were stress and anxiety. Self made stress and anxiety questionnaire was used for the study. The experimental groups underwent the experimental training programme for a period of twelve weeks with three training sessions in a week. Analysis of Co-variance was used to find out the significant differences in means among the two experimental and control groups. The level of significance chosen for the study was 0.05.

5.1 Selection of Subjects

Initially 120 high school students representing four high schools of Kozhikode District of Kerala State were randomly selected as subjects. After the Pretest data collection, 30 male and 30 female students were finally selected as subjects for the study. There were two experimental groups namely Yoga with acupressure and yoga without acupressure and one control group. Each group had 10 male and 10 female students and their age ranged between 14 to 15 years

5.2 Selection of Variables and Tools

The variables selected for the study were stress and anxiety. Self made stress and anxiety questionnaire was used for the study. Questionnaire consist of 15 MCQ stress and anxiety based questions which have four choices. The subjects were asked to choose any appropriate choice among the given four choices. Choices have represented by scoring points from 3 points to 0. Higher the score more will be the stress and anxiety.

5.3 Training Programme on yoga and acupressure

Training programme consists of a combination of asanas, pranayamas and acupressure. Seven *asanas* such as Tadasana, Ardhakati Chakrasana, Pada Hasthasana, Ardha Chakrasana, Vajrasana, Sasankasana and Savasana and pranayamas such as Surya bedana, Chandra bedana and Nadisudhi pranayama with and without acupressure were selected for the study. Total duration of training session was one hour.

6.0 Analysis of Data and Results of the study

The pre and post test means of psychological variables such as stress and anxiety of experimental and control group were statistically analyzed by SPSS based Analysis of Co-variance to find out the significant differences in means among the two experimental and control groups. The level of significance chosen was 0.05.

6.1.0 Statistical analysis on Stress and Anxiety

Table-6.1.1

**ANALYSIS OF VARIANCE OF STRESS AMONG YOGA WITH ACUPRESSURE
AND YOGA WITHOUT ACUPRESSURE AND CONTROL GROUP**

Sources	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1783.216 ^a	3	594.405	158.721	.000
Intercept	3.923	1	3.923	1.047	.310
PRE	1503.582	1	1503.582	401.495	.000
GROUP	227.898	2	113.949	30.427	.000
Error	209.718	56	3.745		
Total	70810.000	60			
Corrected Total	1992.933	59			

* Significant at 0.05

Table 6.1.1 of general linear model uni variate analysis of variance on stress indicates a significant value of 0.310 and F value of 30.427 at the 0.05 level of significance.

Table-6.1.2

**ANALYSIS OF VARIANCE OF ANXIETY AMONG YOGA WITH ACUPRESSURE
AND YOGA WITHOUT ACUPRESSURE AND CONTROL GROUP**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1537.603 ^a	3	512.534	103.122	.000
Intercept	12.473	1	12.473	2.510	.119
PRE	1359.570	1	1359.570	273.546	.000
GROUP	211.578	2	105.789	21.285	.000
Error	278.330	56	4.970		
Total	68616.000	60			
Corrected Total	1815.933	59			

* Significant at 0.05 level

Table 6.1.2 of general linear model uni variate analysis of variance on Anxiety indicates a significant value of 0.119 and F value of 21.285 at the 0.05 level of significance.

Table-6.1.3

**POST HOC TEST TO ANALYSIS THE SIGNIFICANT DIFFERENCE ON
STRESS AMONG EXPERIMENTAL GROUPS YOGA WITH ACUPRESSURE AND
YOGA WITHOUT ACUPRESSURE AND CONTROL GROUP**

GROUPS		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
YOGA	ACUPRESSURE	.6000	1.73372	.731*	-2.8717	4.0717
YOGA	CONTROL	-4.2500*	1.73372	.017*	-7.7217	-.7783
ACUPRESSURE	CONTROL	-4.8500*	1.73372	.007*	-8.3217	-1.3783

*. The mean difference is significant at the 0.05 level.

Table-6.1.4

**POST HOC TEST TO ANALYSIS THE SIGNIFICANT DIFFERENCE ON
ANXIETY AMONG EXPERIMENTAL GROUPS YOGA WITH ACUPRESSURE
AND YOGA WITHOUT ACUPRESSURE AND CONTROL GROUP**

GROUPS		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
YOGA	ACUPRESSURE	.7000	1.74180	.689*	-2.7879	4.1879
YOGA	CONTROL	-4.2500 ^a	1.74180	.018*	-7.7379	-.7621
ACUPPRESSURE	CONTROL	-4.9500 ^a	1.74180	.006*	-8.4379	-1.4621

*. The mean difference is significant at the 0.05 level.

7.0 Result and Discussions

7.0.1 Finding on Stress

On the basis of the results of the study the following conclusions were drawn. Training of Yoga with acupressure and without acupressure showed significant improvement and change from pretest to post test means on psychological variable stress. Table 6.1.3 of LSD Post hoc test on Stress for differences in paired final means among the different Experimental and Control groups indicate significant values of .731 between Yoga without Acupressure and Yoga with Acupressure, 0.17 between Yoga and Control and 0.07 between Acupressure and Control. The findings indicate that the Yoga with Acupressure training programme is a more effective than Yoga without Acupressure.

7.0.2 Finding on Anxiety

On the basis of the results of the study the following conclusions were drawn. Training of Yoga with acupressure and without acupressure showed significant improvement and change from pretest to post test means on psychological variable anxiety. Table 6.1.4 of LSD Post hoc test on Anxiety for differences in paired final means among the different Experimental and Control groups indicate significant values of .689 between Yoga without Acupressure and Yoga with Acupressure, 0.18 between Yoga and Control and 0.06 between Acupressure and Control. The findings indicate that the Yoga with Acupressure training programme is a more effective than Yoga without Acupressure.

8.0 Recommendations

On the basis of the results of the study and the following recommendations are made.

Since this study was useful to found out the effect of yoga and acupressure practices for reducing the stress and anxiety of High school students, it is also recommended that yoga and acupressure practise can be incorporated in the curriculum of High school. It is also recommended that further study may be conducted to find out the effect yoga and acupressure training programme on various psychological variables of teaching as well as non teaching staff of schools and colleges as a coping strategy to overcome the stress and anxiety of occupational scenario.

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