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Research Article

The lived experiences of faculty members participating in the school-based wellness programs among state universities and colleges in the national capital region

Sharmaine P. Bañadera

ABSTRACT

This study investigated the lived experiences of faculty members from State Universities and Colleges (SUCs) in the National Capital Region, Philippines, regarding their participation in school-based wellness programs. Recognizing that teacher wellness significantly impacts educational quality and institutional success, the research aimed to understand the benefits, motivations, and barriers related to faculty engagement in such initiatives. Despite the clear advantages, wellness programs remain limited in many schools, particularly in Metro Manila. Utilizing a qualitative interpretative phenomenological approach, data were collected through one-on-one, audio-recorded interviews using a validated researcher-developed questionnaire and were analyzed thematically. Findings revealed that faculty members perceive wellness programs as beneficial for enjoyment, social interaction, physical health, professional development, and stress relief. However, several barriers hinder participation, including time constraints, heavy workloads, limited resources, and unclear implementation policies. Motivations for participation ranged from improving personal well-being and a passion for sports to workplace requirements and advocacy for healthy living. Participants also recommended a variety of holistic physical activities – such as yoga, dance fitness, non-traditional sports, fitness and mobility training, aquatics, combative sports, and recreational activities – as part of an ideal workplace wellness initiative. Based on these insights, the study proposed a comprehensive wellness program intervention tailored for SUC faculty members. The study recommended that continuous and diverse health initiatives would enhance the effectiveness of SUC's wellness programs. Proper implementation and favorable workload distribution can be observed accordingly as well.

Keywords: Faculty wellness, Holistic health, Physical activity, School-based wellness programs, Teacher motivation

INTRODUCTION

Workplace wellness programs contribute to the United Nations Sustainable Development Goals by improving employee well-being, promoting inclusive economic growth, and strengthening sustainable communities. These programs improve physical activity, mental health, stress alleviation, and illness prevention, aligning with Goal 3: Good Health and Well-Being. Healthy employees boost productivity, reduce absenteeism, and contribute to SDG 8: Decent Work and Economic Growth, as stated by Begum (2024). According to Siegerink (2024), corporate wellness initiatives also help achieve SDG 11: Sustainable Cities and Communities.

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While in the Philippines, the Civil Service Commission has issued a Memorandum Circular No. 38, s. 2011, directing all government agencies, departments, corporations, and state colleges to implement the "Great Filipino Workout" physical fitness program to promote health and wellness among public employees. Key individuals involved include health professionals, community health workers, and physical education teachers. This memorandum directed all heads of national and local government agencies, departments, corporations, and state colleges and universities to carry out a physical fitness program aimed at promoting health and wellness among public employees in the Philippines.

A wellness program is essential for delivering outstanding education. The absence of wellness programs can impact the lives of both educators and students. It adversely affects learners' academic achievements due to educators being unable

to deliver optimal instruction in the teaching–learning process (Swathi *et al*., 2015).

Urban school teachers face major and particular professional issues that put them at risk for long-term stress, burnout, and attrition if not addressed through training or assistance (Camacho and Parham, 2019). According to the study by Elharake *et al*. (2022), teachers experienced higher rates of depression during the pandemic compared to before. In addition, rates of depression, stress, and asthma among teachers were greater than those of adults in general during this time. Given the vital role that teachers played during the pandemic, policymakers and public health officials should consider ways to support their physical and mental well-being.

The researcher was motivated to conduct this study since there is a dearth of literature in the Philippine context, particularly in the National Capital Region (NCR), which is composed of highly urbanized cities, that truly intends to address faculty well-being (Espinosa *et al*., 2024). Guilaran (2024) added that while there are systems in place to take care of student well-being, those measures intended for faculty well-being were left wanting. The study hopes to contribute to the existing body of literature on the present situation and the needs of educators.

Furthermore, given that everyone has now been affected by the recent pandemic with numerous abrupt changes in the learning and teaching environments, the researcher believed that it is essential to have an effective and efficient wellness program for faculty members. Furthermore, the researcher had an extreme desire to contribute to the innovation and development of the current wellness programs being implemented in the focused institutions.

This study explored on faculty members from the State Universities and Colleges (SUCs) in the NCR. The study focused on the faculty members of academic institutions because, according to Basarudin *et al*. (2016), their workloads and job specifications differ significantly from those of administrative employees. In higher education institutions in the Philippines, faculty members are responsible for teaching, extension activities, research, and production (Velasco, 2023). Therefore, responses from participants beyond the limited sample may impact the intended purpose of the study. This study specifically aims to understand the wellness programs implemented by SUCs in the context of the new normal. It also determined the motivation of the faculty members in participating in the programs provided by the institution. Furthermore, the study explored the experiences of faculty members in participating in the health initiatives. Moreover, this study aimed to determine the perceived benefits for the participants. Furthermore, this study revealed the barriers that the faculty members encountered and how they affected their participation in such wellness programs. Finally, this study identified the physical activity initiatives that faculty members would like to recommend for availability in their workplace.

The results of the study would significantly aid institutions in developing intervention programs, as well as health, wellness, and recreational activities for faculty members based on their feedback. Moreover, the findings of this study might also be utilized as tangible evidence that would help convince the administration of the universities and other neighboring institutions to further strengthen the human resource programs. Through this, an improved and empowered individual and organizational performance can be highly anticipated.

METHODOLOGY

The study utilized an interpretative phenomenological approach to have the needed information to achieve an in-depth understanding of the topic, as true as possible to the participants' own words and meanings.

One-on-one interviews were conducted by the researcher with the use of a validated interview questionnaire to gather data from the informants. This allows participants' experiences, opinions, and perspectives to be thoroughly investigated, which usually results in wealthier and more accurate information.

Before the selection of the participants, the research instrument and data collection procedure were approved by the University Research Ethics Committee (UREC). The use of the purposive sampling technique allowed the researcher to have a deliberate choice of participants due to the qualities the participants possess. The gathered data underwent the data saturation technique to determine the adequacy of data collection. Then, the themes were categorized using colorimetric codification, and the distribution of themes in charts was used to determine the theoretical saturation for each grouping.

The participants of this study consist of sixteen faculty members in state colleges and universities in NCR who are currently teaching during the new normal system of teaching and learning. Only 6 SUCs were included in the study as one of the seven universities denied the researcher to gain access to their academe to collect data.

The informants were interviewed through a researcher-made interview guide questionnaire which was validated by three faculty members of research, sports, and physical education, with a doctor of Philosophy and with doctorate degree in education management. The researcher utilized an audio recording and recorded a virtual conference to record the whole interview.

FINDINGS AND DISCUSSION

1. The study explored the lived experiences of faculty members regarding their engagement in wellness programs, yielding six major themes that highlight both the benefits and challenges of participation. Faculty members consistently described wellness programs as enjoyable and emotionally uplifting. The activities provided a break from academic duties, bringing joy, laughter, and amusement. The shared experiences, particularly with students and colleagues, fostered a light-hearted and engaging environment. The programs served as valuable platforms for building camaraderie, teamwork, and social confidence among faculty. Participants described developing interpersonal relationships, acquiring new friends, and improving their communication and collaboration skills through shared activities. Participants noted significant enhancements in their physical health, including increased endurance, energy levels, better sleep, and improved body aesthetics. Faculty recognized that wellness programs contributed to maintaining optimal physical functioning and vitality, even at later stages in life. Involvement in wellness initiatives was seen as contributory to professional growth. Faculty reported enhanced teaching quality, increased motivation, and a refreshed sense of instructional purpose. The experiences provided avenues for continued learning, recognition, and improved classroom engagement. Faculty members viewed participation in wellness programs as an effective stress management strategy. Activities served as a coping mechanism for anxiety and work-related pressures, with participants experiencing increased happiness, emotional regulation, and mental clarity. Despite the benefits, the study revealed significant barriers to consistent faculty participation. These included lack of facilities, limited resources, poor scheduling, and role-related constraints. Some faculties were only involved as event coordinators, while others lacked institutional support.
2. To keep their quality of life, preserve their well-being, and recharge themselves, faculty members engage in wellness initiatives at their respective universities. While memorandums from higher offices inspire some faculty members, others are driven by their passions – sports or dance choreography. The Dean, Sports Development Office, Human Resource, and Gender and Development Office lead the wellness initiatives altogether. Physical education instructors also contribute to participation in wellness programs, as they have a responsibility to maintain their abilities and skills.
3. Faculty members are motivated to participate in school-based wellness programs, but time constraints are a common barrier. Over half of the participants stated that they have to travel home instead of engaging in physical activities after work, and they must let go of others, including family responsibilities, to attend. Other employees leave at 5:00 PM, making it difficult for them to participate. Faculty members also struggle with proper time management and are asking for an official time allotment for wellness activities within office hours. Heavy workloads in the academe hinder young physical education majors from participating in school-based wellness programs due to conflicts with their schedules. Faculty members often prioritize finishing their work over participating in wellness activities, leading to neglect of exercise and hesitation to join after work. The study also found that a significant barrier to wellness programs in state colleges and universities is the lack of resources, particularly facilities and equipment. Nine out of sixteen participants reported that their institution lacks these resources, affecting their participation in wellness activities. Faculty members also reported inaccessible resources, budget insufficiency, and insufficient allowance support. This lack of resources, standard equipment, and support leads to a lack of confidence in competing and participating, affecting the overall success of wellness programs. The study revealed that the implementation and policies of the wellness programs in SUCs have not been effective, with participants not seeing the implementation. Some faculty members criticized inconsistent program implementation, with no specialized person assigned and no policy mandating all employees. Other participants criticized the lack of participation in wellness programs, while a faculty member mentioned that administration sometimes does not approve such initiatives. In addition, higher-ups who should manage implementation may not relate to wellness activities.
4. This study proposes a school-based wellness intervention program, focusing on health and wellness initiatives such as yoga as meditation, promoting mental stability, body movement, and holistic health. Faculty members also recommended Dance Fitness as a wellness initiative due to its minimal equipment and space requirements. However, some institutions struggle with consistency and strict implementation, with some advocating for stricter marketing and strengthening the implementation of Dance Fitness. Participants suggested wellness programs should incorporate sports promotion, particularly non-traditional sports, with some faculty members expressing interest in establishing sports clubs and others highlighting the emerging sport of pickleball in the Philippines. Faculty members also recommended fitness and mobility training as wellness initiatives in the workplace. One of the participants suggested an accessible weight room. It was also suggested to introduce specialized fitness programs for faculty members. Walking, jogging, running, step count challenges, jump rope programs, weights, and functional training have also been mentioned to be available in the workplace. Furthermore, it was suggested to conduct

research-based fitness assessments for employees to create an effective wellness program. Swimming was highlighted to be included in state colleges and universities' wellness programs, promoting fitness and health as well. It is beneficial for all, including risk reduction, and is a must-try cardio exercise. Likewise, some participants emphasized the importance of learning swimming as a life skill. Participants added to the list combative sports as part of physical activity initiatives, with martial arts and Arnis being mentioned as beneficial for stress release and combative sports. Finally, faculty members are encouraged to conduct recreational activities in the workplace to improve their mental health, with suggestions including hands-on activities, games, and outdoor activities, especially for older faculty members.

CONCLUSION

The wellness initiatives provide faculty members with several holistic advantages. Related to one another, several dimensions of wellness and fitness elements are being favorably impacted by such activities. Participants in physical activities gain mental relief. Stress and the underlying stress and pressure are being alleviated. Participating in wellness activities supports social well-being as well. They can have fun and enjoy time with colleagues and friends. These wellness programs help them to strengthen the foundation for teamwork as well. Moreover, by broadening their horizons, participation promotes professional growth. Their knowledge, abilities, quality of work, and confidence are also developing. These advantages extend beyond the professors, significantly benefiting the students, who are the primary recipients of these gains, and contributing to the overall enhancement of the institution. Despite these advantages, it can therefore be concluded that only one university, nevertheless, has a consistent policy and system implementation supported by the administration. Due to their uncertainties, others neglect their physical activities as a program. Most of them view their involvement as their own wellness initiatives. Regardless of their age range and job title, faculty members took part in wellness programs mainly to enhance their quality of life. Most of the participants work in the sports and physical education sector, so they appreciate the idea of the advantages of being fit and active. Especially for their students, they wish to be role models of having healthy mind and healthy body. Some are fortunate to be able to play with their sports specialization through their varsity teams; others can still follow their sports interests. Some of the attendees, nevertheless, are being driven to go to such wellness programs solely because the higher office has ordered them to do so and their attendance is being monitored for compliance.

Notwithstanding the benefits of participating in school-based wellness programs, the participants have faced barriers. First, time constraints. Most of the faculty members neglect other responsibilities, not just at work but also in their homes, to continue wellness participation. There is an inadequate allotment of time and opportunities for wellness programs, which hinders the participation of faculty members. This is also associated with a heavy workload. Some of the participants revealed that they sometimes prefer to finish their work or have some rest rather than doing physical activities. Therefore, it can be concluded that attaining wellness while being in the academe is inconceivable, especially if there are inadequate resources, such as limited spaces and a lack of standard equipment. Another conflict is the insufficient policies that serve as the backbone to the implementation of wellness programs. Personnel assigned to the promotion of such activities are incompetent as well. As a result, faculty members receive inconsistent, ineffective, and inefficient wellness initiatives.

To address the underlying barriers in the current implementation of school-based wellness programs among SUCs in the NCR, a holistic approach must be implemented. For meditation and mental stability, the participants suggested having yoga sessions. Dance fitness is also for fun and enjoyment, while focusing on cardiovascular endurance and body coordination. Non-traditional sports also align with the subject, facilitating the faculty members' engagement with the emerging sports. Personalized, assessment-driven fitness and mobility training has also been included on the list of priorities. Swimming, an essential skill, is also considered by the participants not just for the physical benefits it gives but also for its recreational benefits. Accordingly, recreational outdoor activities are suitable for the mental, emotional, and environmental benefits they offer. Proximity to nature, where individuals predominantly rejuvenate, would enhance their efficacy. Combative sports are beneficial for intervention, as they enhance stress relief and defensive survival abilities. Above all these, strengthened support through policies that will innovate the implementation is vital.

Recommendations

Wellness programs in SUCs might be more effective and efficient if it is continuous, with diverse health initiatives to offer so that more interests of faculty members could be catered; yet, more active participation can be anticipated. School-based wellness programs might provide health initiatives that cover all the dimensions of wellness which define the quality of life of the faculty members. Enhancing school-based wellness programs may be made possible by working together with nearby businesses, health agencies, and community groups to share resources and financial possibilities. Moreover, forming alliances with nearby health and fitness authorities may provide important resources and knowledge to help the implementation of all-inclusive wellness programs.

The use of technology, social media, and some other marketing strategies can be administered to inform and encourage more

faculty members to obtain their optimal health through wellness programs being provided by the institution. The administrators could also utilize incentives, gift cards, extra leave credits, and any other simple prizes as rewards for gaining a specific fitness goal or for outstanding participation in such programs.

Career development opportunities, flexible work arrangements, and workload distribution can be observed and highly supported in relation to the implementation of the school-based wellness initiatives. Furthermore, the wellness initiatives can be offered or accessible on a more flexible schedule to address the different needs and preferences of faculty members. All these proposed programs cannot attain their real objectives if there are barriers lying underneath.

To effectively address the identified lack of resources – specifically facilities and equipment – that limit participation in wellness programs, it is recommended to develop and implement an improved intervention program that focuses on optimizing resources and building community partnerships. This proposed intervention may include a phased plan for acquiring essential wellness equipment through budget reallocation, external funding, and sponsorships. In addition, collaborating with local government units, non-governmental organizations, and private sector stakeholders can provide access to shared facilities or co-financed resources. The intervention program could also utilize multipurpose spaces within the institution, which can be temporarily converted into wellness activity areas. To ensure sustainability, the establishment of a wellness committee responsible for managing, maintaining, and evaluating resource utilization should be included.

To address the lack of institutional policies and weak implementation of employee wellness initiatives, it is recommended to create a comprehensive wellness program supported by formal policy and administrative backing. This program should include a wellness policy approved by top management that outlines objectives, employee responsibilities, and participation incentives. By integrating wellness activities into the regular work schedule, the program can foster inclusivity and accessibility. A monitoring and evaluation component is also important to assess participation rates and program outcomes. Assigning wellness coordinators or committees in each department can enhance accountability. This alignment between wellness programming and official policies ensures a sustainable commitment to employee well-being across the organization.

Yoga as a form of meditation, dance fitness, non-traditional sports, combative sports, outdoor and recreational activities, fitness and mobility training, and individualized fitness assessments would complete the ingredients of a thorough school-based wellness program. By adding these health initiatives through a proposed enhanced intervention wellness program, in collaboration with various offices such as the medical and dental department, human resource department, sports development office, and colleges within the institution majoring in nutrition, medicine, nursing, psychology, and physical education, the optimal output of the school-based program can be expected.

The same study can be conducted, which includes the administrative employees and other staff of the institutions as well. The study could be done also in suburban or rural areas and in private institutions, which also regards the profiling of the participants, such as age, gender, and job title, since this study only focused on the SUCs in the NCR and disregarded the profile of the participants.

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Research Article

Effect of selected yogasanas pranayama and meditation on personality of high school girls

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ABSTRACT

The purpose of this study was to investigate the Effects of yogasana pranayama and meditation on the personality of high school girls. Eighty (80) subjects were the sample of this study. All were girls, selected through the simple random sampling technique from B.D.E Society School, Vijayapura, Karnataka. In this study, there were two groups, Yogic group "A" and the control group "B" 30 subjects in each group. Experimental performed yogasana pranayama and meditation training program for 12 weeks, one hour daily and 6 days in a week, and a control group acted as a control the collected data from both groups were taken before and after the experiment, and statistically analyzed by using *t*-test. The result of the study showed that certain personality factors, such as extraversion, neuroticism, and the lie of the experimental group, indicate significant positive changes through yogasana pranayama and meditation training in comparison with the control group.

Keywords: Meditation and personality, Pranayama, Yogasana

INTRODUCTION

Yoga is a physical, mental, and spiritual practice aimed at attaining permanent peace within. This practice for permanent inner peace originated in ancient India, and it also belongs to the six schools of Hindu philosophy or six "astika". Yoga is also considered as a form of exercise because of its physical forms and postures that have physical benefits to the body, and it is also considered as meditation because of the mental and emotional benefits. It gives, as well as it is also considered spiritual because it involves getting in touch with your spirit or beyond physical nature. This is why yoga is known as a combination of physical, mental, and spiritual exercise and development, or creating a union with your inner self, which can benefit life.

Personality is a characteristic way of thinking, feeling, and behaving. Personality embraces moods, attitudes, and opinions and is most clearly expressed in interactions with other people. It includes behavioral characteristics, both inherent and acquired, that distinguish one person from another and that can be observed in people's relations to the environment and to the social group.

The term personality has been defined in many ways, but as a psychological concept, two main meanings have evolved. The first pertains to the consistent differences that exist between people. In this sense, the study of personality focuses on classifying and explaining relatively stable human psychological characteristics. The second meaning emphasizes those qualities that make all people alike and that distinguish psychological man from other species; it directs the personality theorist to search for those regularities among all people that define the nature of man as well as the factors that influence the course of lives. This duality may help explain the two directions that personality studies have taken. On the one hand, the study of ever more specific qualities in people, and on the other, the search for the organized totality of psychological functions that emphasizes the interplay between organic and psychological events within people and those social and biological events that surround them. The dual definition of personality is interwoven in most of the topics discussed below. It should be emphasized, however, that no definition of personality has found universal acceptance within the field.

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Table 1: The analysis of covariance for pre-test and post-test on personality of control group and experimental group of high school girls

Type of test	Control group	Experimental group	Source of variance	Sum of the squares	df	Mean square	F ratio
Pre-test mean	58.2000	60.5000	Between	105.800	1	105.800	0.130
SD	7.13317	6.29204	Within	3528.400	78	45.236	
Post-test mean	59.9500	65.9750	Between	726.012	1	726.012	16.839
SD	6.66391	6.46683	Within	3362.875	78	43.114	
Adjusted post-test mean	61.011	64.914	Between	295.743	1	295.743	63.533
			Within	358.430	76	4.655	

*Significance, α=0.05, Table value=4.0. SD: Standard deviation

METHODOLOGY

The study was formulated as a simple random group design, consisting of pre-test and post-test the subject were (n = 80) randomly selected to equal group of school students age the age range from 14 to 16 years among the two groups, the control group was strictly under, without undergoing any yogic practices. The experimental group' yogic' group, had to undergo with the experimental treatments. Group A was provided yogasana pranayama and meditation to school girls for a period of 12 weeks and 6 days in 7 to 8 o clock A.M in the B.D.E Society School Vijayapura Karnataka. The control group was not allowed to participate in any of the training program except their daily routine works. The subjects were trend for a period of week, and after this period significant improvement was measured in the vital capacity of school students. The data were analyzed by applying *t*-test technique. The level of significance was set at 0.05.

RESULT OF THE STUDY

Table 1 Shows the pre-test means scores of personality of the control and experimental groups of high school girls students. It is observed that mean scores of pre-test of the control and experimental groups of high school girls students are 58.2000 and 60.5000, and their standard deviation are 7.13317 and 6.29204, respectively. The obtained 'F' Ratio value is (F = 0.130 1,78, α = 0.05).130 at 5% level of significance, which is less than the table value (F = 4.0), hence, the null hypothesis is accepted, it can be concluded that Personality level between the experimental group and control group found almost similar among the high school girls students.

Further, it is observed that the mean scores of post-test of control and experimental groups of girls high school students are 59.9500 and 65.9750 their standard deviation are 6.66391 and 6.46683, respectively. The obtained "F" ratio value is (F = 16.839 1, 78, α = 0.05) at 16.839 5% level of significance,

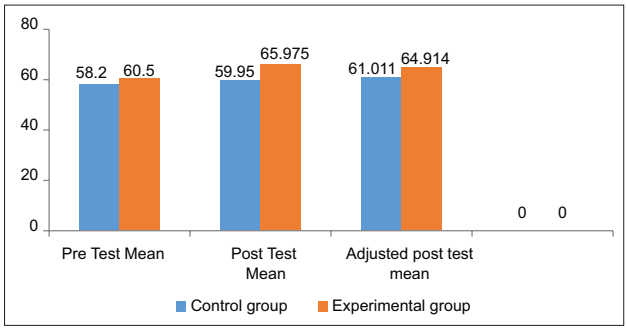

Figure 1: The graphical presentation on personality of pre-test and post-test, and adjusted post-test means of the control group and experimental group

which is much more than the table value (F = 4.0), hence, the null hypothesis is rejected and the alternative hypothesis is accepted. It can be concluded that there is a significant difference found between the experimental group and the control group with respect to personality level of girls high school students. This indicates that personality level is more among the control group when compared to the experimental group. Finally, it can be concluded that yogasanas pranayama and meditation training have made a significant impact on the control of personality level of the high school girls students.

The adjusted post-test means scores on the Personality of the control and the experimental groups are 61.011 and 64.914, respectively. The obtained 'F' Ratio value is (F = 63.533 1, 76, α = 0.05) 63.533 at 5% level of significance, which is much higher than the table value (F = 4.0), hence the null hypothesis is rejected and the alternative hypothesis is accepted. It can be concluded that there is a significant difference is found between the experimental group and control group with respect to personality level of high school girls students.

Figure 1 gives a clear picture of the adjusted means of two training groups. Thus, it is inferred that yogasanas pranayama,

and meditation training are more effective in increasing the Personality among the subjects experimental group in compare to the control groups.

DISCUSSION ON FINDINGS

The study shows that there is a significant difference in personality in the pre-test and the post-test of the experimental and the control groups. However, the 12 weeks of yogasanas pranayama, and Meditation training resulted in a significant difference in the adjusted post-test mean of personality.

The results, by and large, were in conformity with the findings of Dr. Akhileshwar.

CONCLUSION

The present study concludes that yogasana pranayama and meditation practice can be advocated to improve personality of the students, and yogasana pranayama and meditation practice are beneficial for overall health of people of all age groups, including high school girls students.

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Research Article

A comparative study of muscular power and cardio-vascular endurance between footballers and hockey players of Manipur

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ABSTRACT

Muscle power and cardiovascular endurance play a very important role in football and hockey. During the reason of the investigation, the subjects were picked randomly 50 ($n = 50$) subjects: 25 male hockey players and 25 for football players from state-level hockey players from a regular coaching center, Youth Affairs and Sports, and football players from the SAI centre (Takyel), Manipur state, which was ranging from 18 to 25 years. Power standing broad jump, vertical jump was used to measure muscular and the Harvard step test for cardiovascular endurance. It was found out that there was no significant difference of the standing broad jump at the test employed between football and hockey players. There was also no significant difference in the vertical jump between football and hockey players of Manipur state at the test employed. Finally, last there was also no significance differences between male football and hockey players of Manipur at the test employed. The suggestions that come next are provided based on the results collected from the study and may be relevant for future research works that the same type of study may be taken on the higher age level groups, and may also be undertaken on women players.

Keywords: Cardiovascular endurance, Endurance, Muscular power and power.

INTRODUCTION

Cardiovascular endurance and Muscle power are some of the most important aspects of fitness for achievement in numerous sports. In some sports, especially weightlifting, boxing, and weight throwing, the most crucial physical characteristics. In numerous additional sports, especially football, excellent power is a vital component of the total fitness profile.

Present sport competitions also require quick attention from coaches, instructors, and sports instructors to develop the cardiovascular endurance of an individual based on their needs. Cardiovascular endurance differs from individual. It is also affected by one's own age, sex, occupation, diet, exercise, and other environment factors. Cardiovascular endurance is determined by parameters, such as vital capacity, cardiac function, breath hold (Anaerobic metabolism power), blood pressure, rhythm of the heart, and duration of recovery, the requirement of these factors though essential to all types of competition, the proportion varies between sports and is determined by the type of activity.

With a view to bringing sports excellence, the coaches have developed different methods of conditioning, development of cardiovascular endurance of a sportsman according to the nature of the activity of his specialization and this is attended firstly by the coaches in conditioning their athletes. Different methods, such as isometric, isotonic, Fartlek training, and interval training, are employed various factors of cardiovascular endurance, which contributes to the higher performance of a player.

In this study, a research scholar intends to undertake the training through systematic standing Broad jump, vertical jump, and Harvard step exercise programmed for the development of cardiovascular endurance and muscular power of hockey and football players of Manipur.

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METHODOLOGY

For the purpose of the study, 50 (n = 50) state-level male players were selected from Manipur state. The subjects were selected randomly from state-level hockey players from regular coaching center, youth affairs and sports, and football players from SAI center (Takyel), Manipur state. Among the 50 subjects, 25 were selected from hockey players and 25 were selected from football players. Data were collected by administrating Muscular Power (standing broad jump, vertical jump, and Cardiovascular endurance (Harvard step test). For measuring the muscular criteria, the "Athletic Power" was administered for the muscular power. For testing the statistically significant of the difference between the means of football and hockey players, T–test (Analysis of variance0 was calculated. The level of significance was set at 0.05.

RESULT OF THE STUDY

After the collection of the student's data 't' test was used to know the significance variation between the two groups of the players and found the following results

According to the above Table 1, it is seen that the mean of standing broad jump score for the players of football and hockey players are respectively 7.4284 and 7.2524, with the respective standard deviation 0.559164 and 0.517182. The t-test calculation obtain a value of 0.253664 is less than the values found in Tables 2.704 (0.01 significant level) and 2.021 (0.05 significant level) combined. It means that there is no significance difference of Standing Broad Jump for leg power between the football players and hockey players of Manipur.

From the above Table 2, it is seen that the mean of vertical jump score for the players of football and hockey players are respectively 1.55 and 1.576, with the respective standard deviation 0.244796 and 0.183212. The t-test calculation obtains a value of 0.672617 for vertical jump leg power, is less than the values found in Tables 2.704 (0.01 significant level) and 2.021 (0.05 significant level) combined. It means that there is no significant difference of vertical jump leg power between the football players and hockey players of Manipur.

From the above Table 3, it is seen that the mean of Harvard step test in 300 s scores for the players of football and hockey players are respectively 67.5472 and 67.67, with the respective standard deviation 2.985993 and 1.820504. The t- test calculation obtain a value of 0.861371for aerobic endurance is less than the values found in Tables 2.704 (0.01 significant level) and 2.021 (0.05 significant level) combined. So, there is no significant difference of cardiovascular endurance between the football players and hockey players of Manipur.

Table 1: Comparison of standing broad jump leg power between the footballer and the hockey players

Groups	Mean of standing broad jump	Standard deviation	t-test
Footballer	7.4284	0.559164	0.253664
Hockey player	7.2524	0.517182	

*0.05 confidence level, **0.01 confidence level

Table 2: Comparison of vertical jump leg power between the footballers

Groups	Mean of vertical jump	Standard deviation	t-test
Footballer	1.55	0.244796	0.672617
Hockey player	1.576	0.183212	

*0.05 confidence level, **0.01 confidence level

Table 3: Mean comparison of the Harvard step test between the footballers and hockey players

Groups	Mean of the Harvard step test	Standard deviation	t-test
Footballer	67.5472	2.985993	0.861371
Hockey player	67.67	1.820504	

*0.05 confidence level, **0.01 confidence level

DISCUSSION OF FINDINGS

Data analysis based on student's 't' test showed that variations existed in the muscular power as standing broad jump, vertical jump, and cardiovascular endurance in the Harvard step test.

From the findings of Tables 1-3 it was observed that there was no significant difference in standing broad jump, vertical jump, and Harvard step test as a muscular power and cardiovascular endurance of football players and hockey players of Manipur.

From Table 1, there were no significant differences obtained on the standing broad jump between the state level of football players and hockey players, as it is shown in the Figure 1 means standing broad jump for the players of football and hockey players are respectively 7.4284 and 7.2524, with the respective standard deviation 0.559164 and 0.517182. The t-test value for testing is 0.253664. This means that the test is insignificant.

From the Table 2, there were no significant difference obtained on vertical jump between the state level of football players and hockey players, as it is shown in the Figure 2, that means standing broad jump for the players of football and hockey players are respectively 1.55 and 1.576, with the respective standard deviation 0.244796 and 0.183212. The t-test value for testing is 0.672617. This means that the test is insignificant.

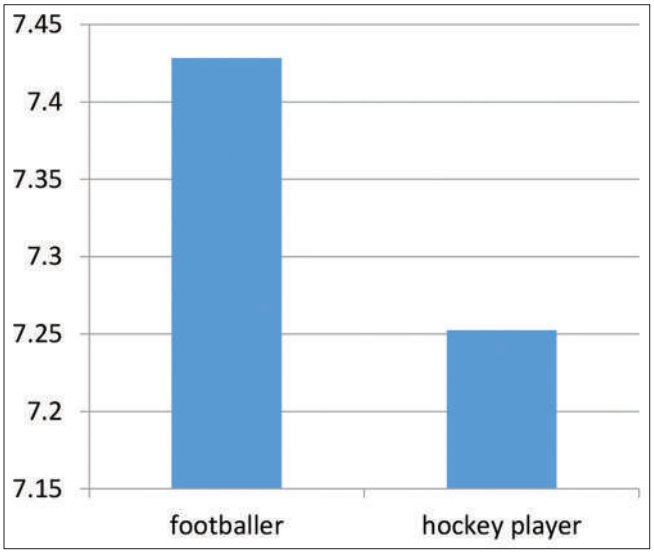

Figure 1: Comparison of mean of standing broad jump leg power between the football and hockey players

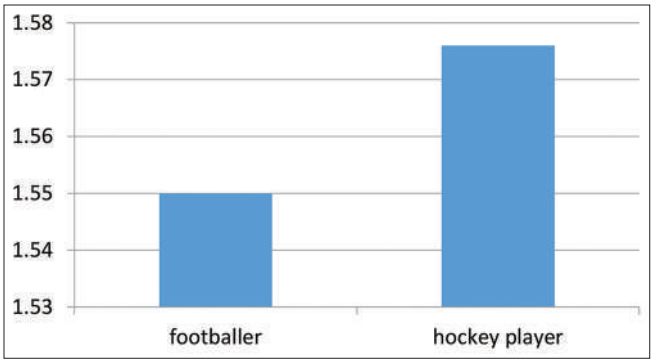

Figure 2: Comparison of mean of vertical jump leg power between the footballer and hockey players

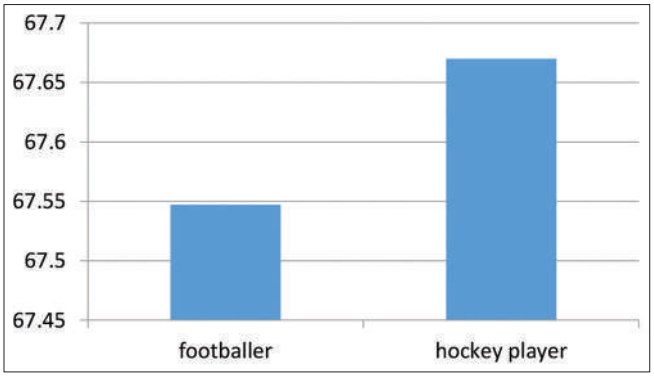

Figure 3: Comparison of mean of aerobic endurance between the footballer and hockey players

From the Table 3, there were no significant difference obtained on the Harvard step test between the state level of football players and hockey players, as it is shown in the Figure 3 that means standing broad jump for the players of football and hockey players are respectively 67.5472 and 67.67, with the respective standard deviation 2.985993 and 1.820504. The t-test value for testing is 0.861371. This means that the test is insignificant.

CONCLUSION

Based on the analysis of all of the collected data and during the study following conclusions are drawn up.

1. At the overall, the level of significant difference between the two selected players, namely, Football and hockey, there were no significant difference of standing broad jump at the test employed.
2. There was no significant difference in the vertical jump between football and hockey players of Manipur state at the test employed.
3. Finally, last there was no significance difference between male football and hockey players of Manipur at the test employed.

RECOMMENDATIONS

The recommendations below are based on the study's findings and may be relevant for future research work.

1. The same type of study may be taken on the higher age level groups.
2. A similar study may also be undertaken on women players.
3. Similar studies may be undertaken using subjects from basketball, handball, rugby, volleyball, swimming, and others.
4. A similar study may be conducted by comparing Manipur and other state's subjects of the same age and sex groups.
5. The study could be replicated with larger samples to improve its authenticity and validity.

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Research Article

Anxiety and sport performance of female athletes

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ABSTRACT

This systematic review examines the relationship between anxiety and sport performance in female athletes. Empirical studies published between 2018 and 2025 were identified through a comprehensive search of PubMed, Scopus, Web of Science, and Google Scholar using keywords such as "anxiety," "competitive anxiety," "female athletes," and "sport performance." Studies were included if they involved female athletes of any age or competitive level, measured anxiety with standardized instruments, and reported sport performance outcomes. Excluded were theoretical papers, reviews, non-English studies, and research focusing solely on male athletes or clinical populations. Data on sample characteristics, study design, anxiety measures, sport type, competition level, statistical analyses, and main findings were extracted and synthesized. Overall, findings suggest that competitive anxiety significantly influences sport performance, often impairing concentration, reducing confidence, and lowering performance outcomes. The review highlights the importance of psychological strategies and interventions to manage anxiety and enhance performance in female athletes.

Keywords: Anxiety, Female athletes, Sport performance

INTRODUCTION

Anxiety is a key psychological factor influencing athletic performance, particularly in competitive contexts. Competitive anxiety is typically divided into cognitive anxiety (worry, negative expectations) and somatic anxiety (physiological arousal such as tension and rapid heartbeat). While mild levels of anxiety can sometimes enhance alertness and readiness, excessive anxiety generally disrupts focus, reduces self-confidence, and impairs performance outcomes (Weinberg and Gould, 2019).

Female athletes often face unique anxiety-inducing challenges, including gender norms, body image concerns, hormonal fluctuations, and heightened social evaluation, making them especially vulnerable to performance-related anxiety. For example, Siwach and Jaipal (2018) found that female archers reported a negative correlation between anxiety and performance, although differences compared to males were not statistically significant. Similarly, Correia *et al.* (2019) reported that female athletes showed higher levels of competitive anxiety compared to males, with variations across individual and team sports.

Recent studies further highlight the performance implications of anxiety among female athletes. Gabrys *et al.* (2023) observed that fear of negative evaluation and stress were strong predictors of competitive anxiety among volleyball players, directly impairing their performance under audience pressure. Likewise, Beisecker *et al.* (2024) documented higher prevalence of anxiety symptoms among female student-athletes, which were associated with lower self-reported performance. These findings reinforce the need for systematic synthesis to understand how anxiety impacts female athletes across different competitive levels and sporting disciplines.

Given the growing but scattered body of research, this systematic review aims to integrate empirical evidence from 2018 to 2025, focusing on the relationship between anxiety and sport performance in female athletes. The review further explores contributing factors, effects on performance, and potential strategies to mitigate anxiety, with the broader goal of enhancing female athletes' psychological resilience and competitive outcomes.

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Objective

The primary objective of this systematic review is to examine and synthesize empirical studies conducted between 2018 and 2025 that explore the relationship between anxiety and sport performance in female athletes across various competitive levels and sport disciplines.

METHODS

Literature Search

A comprehensive literature search was conducted in PubMed, Scopus, Web of Science, and Google Scholar to identify relevant studies published between 2018 and 2025. The search strategy used combinations of the following keywords and Boolean operators: *"anxiety," "competitive anxiety," "sport performance," "female athletes,"* and *"self-confidence."* Additional manual searches of reference lists from eligible articles were also performed to ensure completeness.

Inclusion Criteria

Studies were included if they:

1. Focused exclusively on female athletes.
2. Examined the relationship between anxiety and sport or competitive performance.
3. Were published in peer-reviewed journals between 2018 and 2025.
4. Reported empirical findings using quantitative, qualitative, or mixed-method designs.

Exclusion Criteria

Studies were excluded if they:

1. Involved only male athletes or mixed samples without separate female data.
2. Focused on general psychological health without sport-performance outcomes.
3. Were review papers, meta-analyses, conference abstracts, or dissertations.
4. Were not published in English.

Data Extraction

From each included study, the following information was extracted: author(s), year, country, participant age and sample characteristics, research design, statistical methods, and key findings. These details were systematically summarized in a summary Table 1 to facilitate comparison across studies.

Data Synthesis

Given the heterogeneity of study designs, measures, and outcomes, a meta-analysis was not feasible. Instead, a narrative synthesis approach was employed. Findings were compared across studies and organized into thematic categories:

1. Factors influencing anxiety,
2. Effects of anxiety on performance, and
3. Intervention strategies.

RESULTS

Table 1: Summary of studies on anxiety and sports performance of female athletes

Author (s), Year	Country	Age/Mean	Sample (female)/ Design	Statistical method	Key findings
Siwach and Jaipal, 2018	India	18–25 (approx.)	Female national-level archers (cross-sectional)	Pearson correlation, t-test	Negative correlation between anxiety and archery performance; female archers had lower mean anxiety than males, but differences not significant.
Correia *et al*., 2019	Portugal	18–30 (varied)	Female athletes, mixed sports (cross-sectional, comparative)	ANOVA, t-tests	Female athletes reported higher competitive anxiety than males; differences across team vs. individual sports.
Terres-Barcala *et al*., 2022	Spain	Mean~21	*n*=120 female athletes, individual and team sports (cross-sectional)	Pearson correlations, regression	Impulsivity strongly predicted higher competitive anxiety; higher anxiety linked with poorer competitive outcomes.
Gabrys *et al*., 2023	Poland	Mean~20	*n*=98 female volleyball players (cross-sectional)	Correlation, regression models	Fear of negative evaluation and stress predicted sport anxiety; high anxiety impaired performance under audience pressure.
Lukova, 2023	Eastern Europe	Adolescents (~15–17)	*n*=85 female adolescent athletes (cross-sectional)	Correlation, t-test	State and trait anxiety negatively correlated with coach-rated performance.
Beisecker *et al*., 2024	UK/ USA	18–24	Female student-athletes (large-scale survey)	Logistic regression, Chi-square	Prevalence of anxiety symptoms significantly higher in female athletes; anxiety associated with reduced self-reported performance.
Boladeras *et al*., 2025	Spain	Elite (~18–25)	High-performance female volleyball players (longitudinal)	Repeated measures, regression	No significant relationship between anxiety and injury occurrence; injured players showed trends of higher cognitive anxiety and lower self-confidence.

DISCUSSION

This review highlights that anxiety is a significant barrier to sport performance in female athletes, shaped by biological, psychological, and sociocultural factors. Consistent evidence shows that heightened anxiety reduces focus, confidence, and outcomes, particularly in high-pressure settings. At the same time, strategies such as mindfulness, psychoeducation, and supportive coaching appear effective in mitigating its impact. The discussion addresses factors influencing anxiety, its effects on performance, and possible interventions.

Factors Contributing to Anxiety

The reviewed studies highlight multiple contributors to anxiety among female athletes. Biological factors, such as the menstrual cycle and injury status, were shown to heighten cognitive anxiety and reduce self-confidence (Boladeras *et al.*, 2025). Psychological traits, including impulsivity and fear of negative evaluation, emerged as strong predictors of competitive anxiety (Terres-Barcala *et al.*, 2022; Gabrys *et al.*, 2023). Social and cultural pressures, such as gender expectations and coach–athlete dynamics, were also linked with heightened stress levels, particularly in adolescent athletes (Lukova, 2023). Together, these findings suggest that anxiety is shaped by an interplay of personal, social, and sport-specific factors.

Effects of Anxiety on Sports Performance

Across studies, higher levels of state, trait, and competitive anxiety were consistently associated with impaired performance. Anxiety negatively influenced focus, decision-making, and motor execution, leading to decreased performance outcomes (Siwach and Jaipal, 2018; Correia *et al.*, 2019). Adolescent athletes, in particular, demonstrated significant negative correlations between anxiety and coach-rated performance (Lukova, 2023). Elite and university athletes also reported reduced self-reported performance under high anxiety (Beisecker *et al.*, 2024). Although Boladeras *et al.* (2025) found no direct causal relationship between anxiety and injuries, injured athletes displayed elevated anxiety and lower self-confidence, suggesting indirect performance effects.

Intervention Strategies

While few studies directly examined interventions, several findings suggest possible strategies for managing anxiety. Mindfulness traits mediated the impact of impulsivity on anxiety, indicating that mindfulness-based approaches may be beneficial (Terres-Barcala *et al.*, 2022). Psychoeducation and stress-management programs could also mitigate fear of negative evaluation and improve coping under competitive stress (Gabrys *et al.*, 2023). Moreover, gender-sensitive support systems that address body image, cultural stressors, and coach–athlete communication may help reduce vulnerability to anxiety and enhance performance in female athletes.

CONCLUSION

This review shows that competitive anxiety significantly impairs sport performance in female athletes by lowering confidence, focus, and ratings. Unique stressors such as body image, gender norms, and physiological cycles highlight the need for targeted psychological support. Future research should adopt longitudinal and cross-cultural approaches to clarify causal links and test intervention effectiveness.

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Research Article

Achievement motivation between male and female cricket players of Manipur – A comparative study

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ABSTRACT

The present research intended to determine the level of motivation for achievement among Manipur's male (M) and female (F) cricket players. To gather information for this investigation, the researcher chose 100 participants, 50 of whom were M and 50 of whom were F athletes who had competed in tournaments at the national and state levels. The participants were between the ages of 15 and 25. Using the achievement motive test created by Dr. V.P. Bhargava, the essential data for the current investigation were gathered, and the subjects' degree of achievement motivation was assessed. The corresponding questionnaires were scored by their manuals. To determine if a significant difference existed and which way the mean scores of the variables differed between Manipur's cricket players (M and F), with the help of a *"t*-test." The significance level is set at the 0.05 level. The calculated value (t = −2.423) is less than the tabulated value (t = 1.984), confirming that there is no significant difference in the achievement motivation of M and F cricket players.

Keywords: Achievement motivation, Cricket players, Female, Male, *t*-test

INTRODUCTION

Nowadays, athletes deal with certain particular difficulties. It's more competitive, the stakes are higher, and the standards are higher. Among the best, the psychological element is more crucial than ever, and the preparation is more thorough.

A person can use achievement motivation to grow or show great ability in two ways: by comparing themselves to others or by referencing their performance or mastery (Nicholls, 1984). Achievement motivation is the desired behavior to attain success in games and sports. Sports are not something that can be mastered quickly. To reach the highest level of athletic ability, years and years of practice are necessary. An athlete must overcome numerous challenges, including mental strain, exhaustion, stress, strain, and various psychological issues. We will ultimately gain from overcoming these obstacles. It has been discovered that athletes with a strong sense of motivation and a rigid psychological composition work hard and excel throughout their lives.

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Objectives

The "objective of the investigation was to compare the achievement motivation between male and female cricket players in" Manipur.

Hypothesis

It "was hypothesized that there would be no significant difference in achievement motivation between male and female cricket players of" Manipur.

METHODOLOGY

Selection of sample

One hundred cricket players were chosen for the study, fifty active members of the Manipur cricket team's M and F teams who competed at the state level. The players are between the ages of 15 and 25.

Tool

The achievement motive test questionnaire, created by Dr. V.P. Bhargava, was used to gather data on the achievement motivation of Manipur's M and F cricket players. The questionnaire contains 50 items, and each item consists of a score of 1 for each correct answer.

Table 1: Norms for achievement motivation score

Raw score range		Level of achievement motivation
Boys	Girls	
44 and above	45 and above	Extremely high
38–43	39–44	High
31–37	33–38	Above average
21–30	24–32	Average
14–20	18–23	Below average
08–13	11–17	Low
07 and below	10 and below	Extremely low

Table 2: Means and standard deviations of male and female cricket players on achievement motivation

Group	Mean	Standard deviation
Male	18.90	3.845
Female	20.94	4.546

Table 3: Comparison "of achievement motivation between male and female cricket players of" Manipur

Groups	*n*	Mean	Standard deviation	Degrees of freedom	*t*-test value	*P*-value (2-tailed)
Male	50	18.90	3.845	98	−2.423	0.017
Female	50	20.94	4.546			

Statistical analysis

Using the Statistical Package for the Social Sciences-16 version, a *t*-test is utilized for the determination "of a statistically significant difference between the mean values of cricket" players (M-F). The 0.05 level was chosen as the significance level.

RESULTS AND DISCUSSION

Table 3 makes it clear that, a level of confidence at the 0.05, the *t*-value for the means of the two-player groups on achievement motivation was −2.423. The "fact that the tabulated value (t = 1.984) is greater than the computed value (t = −2.423) suggests no discernible difference in achievement motivation between M and F cricket" players.

In addition, table showed that, in terms of the achievement motivation score norms, both players' levels of motivation are below average. The following graphic compares the mean accomplishment motivation scores of M and F players:

DISCUSSION

The investigation's objective is to compare the achievement motivation of Manipur's cricket players (M and F). The study's findings demonstrated that M cricket players have a higher mean score than F cricket players. There is no statistically significant difference in the achievement motivation of M as well as F cricket players, according to the *t*-test analysis. The null hypothesis was accepted in this regard. Dureha *et al*. (2010) also looked into the psychological characteristics of national and international hockey players; the study's findings revealed no discernible differences between the two groups. Furthermore, a study by Yadav and Sisodiya (2013) found no appreciable difference between M and F basketball players.

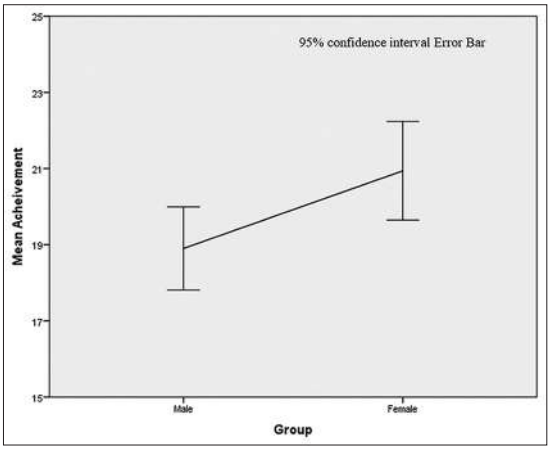

Figure 1: Line graph of mean "scores achievement motivation between male and female cricket players of Manipur" with error bar

CONCLUSION

When comparing means, outcomes of the current research showed that M players are more achievement motivated than F players. The accomplishment motivation of M and F cricket players has no significant difference. Accordingly, the null hypothesis was accepted.

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Research Article

Effect of circuit training and aerobic dance training on hand strength of tribal and non-tribal school girls: A study

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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 12–14 years of the Khammam district in the state of Telangana. The subjects chosen were not seriously involved in any type of serious practice of sports and games before this study. With no serious sports background were picked up randomly from Kasturba Gandhi Balika Vidyalaya (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, that is, circuit training group (CTG) 30, aerobic dance group (ADG) 30, and control group (CG) 30. Similarly, 90 girl students from KGBV School, Palvancha (Tribal) were selected at random and were assigned to three equated groups, that is, CTG 30, ADG 30, CG 30. They were tested before and after the training period to measure the hand strength applying the basket-ball throw test.

Keywords: Aerobic dance training, Circuit training, Hand strength

INTRODUCTION

Life is made up of physical movements. All living individuals have some degree of physical fitness and their degree may be interpreted in terms of their capacity for performance and their endurance in physical activities. Physical fitness of an individual depends on the co-ordinate functioning of various physiological systems. Playing is inherent in the child. Even the first yell of the child at birth is an expression of the need for movement or activity. Basically, this yell is meant to open his lungs and improve blood circulation, etc.

STATEMENT OF THE PROBLEM

The purpose of the study was to find out the "Effect of Circuit Training and Aerobic Dance on Motor Ability of Tribal and Non-tribal High School Girls"-A study.

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METHODS

The study under report considers a sample size of 180 high school girls in the age group of 12–14 years of Khammam district in the state of Telangana. The subjects chosen were not seriously involved in any type of serious practice of sports and games before this study. With no serious sports background were picked up randomly from Kasturba Gandhi Balika Vidyalaya (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 KGBV School, palvancha (Tribal) were selected at random and were assigned to three equated groups i.e., CTG 30, ADG 30, CG 30.

They were tested before and after training period to measure the Hand Strength applying the following test.

Hand Explosive Strength

It is the quality of a hand muscle to contract forcefully in the quickest possible time.

Basketball throw test.

RESULTS AND DISCUSSION

Descriptive Analysis of Hand Explosive Strength in Pre- and Post-Test of Non-tribal Girls in CG

Results and discussion

Table 1 shows the mean, standard deviation, and mean difference of hand explosive strength between pre- and post-test of non-tribal subjects in CG during the basketball throw test. The means and standard deviations are 6.11 ± 1.03, 6.14 ± 1.02, respectively. In the group, the hand explosive strength minimum and maximum values were found to be 4.30, 8.60, and 4.32, 8.61, respectively. It is clear that the mean difference of hand explosive strength between pre- and post-test of non-tribal subjects is 0.02 in CG.

Descriptive Analysis of Hand Explosive Strength in Pre- and Post-Test of Non-tribal Girls in CTG

Results and discussion

Table 2 gives an idea about the mean, standard deviation, and mean difference of hand explosive strength between pre- and post-test of non-tribal subjects in CTG during basketball throw test. The means and standard deviations are 6.78 ± 0.98, 7.05 ± 0.98, respectively. In the group, the hand explosive strength minimum and maximum values were found to be 5.25, 8.71, and 5.47, 9.00, respectively. It is clear that the mean difference of hand explosive strength between pre- and post-test of non-tribal subjects is 0.27 in CTG.

Descriptive Analysis of Hand Explosive Strength in Pre- and Post-Test of Non-tribal Girls in Aerobic Dance Training Group

Results and discussion

Table 3 represent the mean, standard deviation, and mean difference of hand explosive strength between pre- and post-test of non-tribal subjects in Aerobic dance training group during the basketball throw test. The means and standard deviations are 6.30 ± 0.82, 6.60 ± 0.84, respectively. In the group, the hand explosive strength minimum and maximum values were found to be 5.17, 8.15, and 5.37, 8.37, respectively. It is clear that the mean difference of hand explosive strength between pre- and post-test of non-tribal subjects is 0.30 in the Aerobic dance training group.

Hypothesis Test Onpaired Mean Difference of Hand Explosive Strength in Pre- and Post-Test of Tribal Girls in CG

Results and discussion on hypothesis

Results pertaining to the hypothesis, the null hypothesis is "there is no significant difference of hand explosive strength in pre- and post-test of Tribal school girls in CG.

Results and discussion

Table 4 reveal the mean, standard deviation, paired differences of mean, standard deviation, confidence interval (CI), "*t*" value, d.f, and *P*-values between pre- and post-test of Tribal school girls CG in relation to their hand explosive strength through basketball throw test.

The hand explosive strength was measured using the data of basketball throw pre- and post-training for the CG. The data were analyzed and the results are presented in Table 4.

The observed *t*-test value for the basketball throw test in CG on hand explosive strength between pre- and post-test was 1.55, which is less than the required statistical table value 2.093 at the 0.05 levels ($P = 0.133$).

Thus, the result indicates there is no significance in basketball throws of the pre- and post-test of CG. Therefore, the hypothesis is accepted.

Hypothesis Test Onpaired Mean Difference of Hand Explosive Strength in Pre- and Post-Test of Tribal Girls in CTG

Results and discussion on hypothesis

Results pertaining to the hypothesis, the hypothesis is "there may be a significant difference of hand explosive strength in pre- and post-test of tribal school girls in CTG."

Results and discussion

Table 5 reveals 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 CTG in relation to their hand explosive strength through the basketball throw test. The data were analyzed and the results are presented in Table 5.

The observed *t*-test value for the basketball throw test in the group on hand explosive strength between pre- and post-test was 11.75, which is more than the required statistical table value 2.093 at 0.05 levels ($P = 0.000$). Hence, the statistical hypothesis is accepted. Thus, the result indicates that the 12 weeks of circuit training produced a significant improvement on hand explosive strength. The impact of circuit training is clearly visible through significant improvement with respect to hand explosive strength.

Hypothesis Test Onpaired Mean Difference of Hand 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 a significant difference of hand explosive strength

in pre- and post-test of tribal school girls in Aerobic dance training group."

Results and discussion

Table 6 discloses 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 hand explosive strength through basketball throw test. The data were analyzed and the results are presented in Table 6.

The observed *t*-test value for the basketball throw test in the group on hand explosive strength between pre- and post-test was 8.10, which is more than the required statistical table value 2.093 at 0.05 levels ($P = 0.000$). Hence, the hypothesis is accepted. Thus, the result indicates that the 12 weeks of aerobic dance training produced a significant improvement on hand explosive strength through the test. The impact of aerobic dance training is clearly visible through significant improvement with respect to hand explosive strength.

Hypothesis Test Onpaired Mean Difference of Hand Explosive Strength in Pre- and Post-Test of Non-tribal Girls in CG

Results and discussion on hypothesis

Results pertaining to the hypothesis, the null hypothesis is "there may not be a significant difference of hand explosive strength in pre- and post-test of non-tribal school girls in CG."

Results and discussion

Table 7 reveals 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 CG in relation to their hand explosive strength through the basketball throw test. The hand explosive strength was measured using the data of basketball throw pre- and post-training for the CG. The data were analyzed and the results are presented in Table 7.

The observed *t*-test value for the basketball throw test in CG on hand explosive strength between pre- and post-test was 1.14, which is less than the required statistical table value 2.093 at the 0.05 levels ($P = 0.265$). Thus, the results indicate that there is no significant improvement in basketball throws of the pre- and post-test of CG. Therefore, the hypothesis is accepted.

Hypothesis Test Onpaired Mean Difference of Hand Explosive Strength in Pre- and Post-Test of Non-tribal School Girls in CTG

Results and discussion on hypothesis

Results pertaining to the hypothesis, the hypothesis is "there may be a significant difference of hand explosive strength in pre- and post- of non-tribal school Girls in CTG."

Results and discussion

Table 8 reveals 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 CTG in relation to their hand explosive strength through basketball throw test.

The hand explosive strength was measured using the data of the basketball throw test pre- and post-training for the CTG. The data were analyzed and the results are presented in Table 8.

The observed *t*-test value for the basketball throw test in the group on hand explosive strength between pre- and post-test was 9.09, which is more than the required statistical table value 2.093 at 0.05 levels ($P = 0.000$).

Hence, the hypothesis is rejected. Thus, the result indicates that with the aim of the 12 weeks of circuit training produced a significant improvement on hand explosive strength through the test.

The impact of training is clearly visible, an improvement in hand explosive strength through the circuit training method. Therefore, this data provide sufficient evidence that the basketball throw test performance of non-tribal school girls was significantly improved through circuit training.

Hypothesis Test on Paired Mean Difference of Hand 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 a significant difference of hand explosive strength in pre- and post-test of non-tribal school girls in aerobic dance training group."

Results and discussion

Table 9 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 aerobic dance training group in relation to their hand explosive strength through basketball throw test.

The hand explosive strength was measured using the data of the basketball throw test pre- and post-training for the aerobic dance training group. The data were analyzed and the results are presented in Table 9.

The observed *t*-test value for the basketball throw test in the group on hand explosive strength between pre- and post-test was 8.62, which is more than the required statistical table value 2.093 at 0.05 levels ($P = 0.000$).

Hence, the hypothesis is rejected. Thus, the result indicates that 12 weeks of aerobic dance training produced a significant improvement on hand explosive strength.

The impact of training is clearly visible with the improvement in hand explosive strength through the aerobic dance training method. Therefore, this data provide sufficient evidence that the hand explosive strength of non-tribal school girls was significantly improved through aerobic dance training.

Correlation Analysis of Hand Explosive Strength in Pre- and Post-Test in Control, Circuit Training, Aerobic Dance Training Group of Tribal School Girls

Results and discussion

Table 10 showing the correlation coefficient between pre- and post-test of tribal school on hand explosive strength on basketball throws-test.

The observed Pearson correlation coefficient "r" value in pre- and post-test of tribal school girls in control, circuit training, and aerobic dance training group were 0.997, 0.863, and 0.981, and the *P*-values are significant in relation to their hand explosive strength at 0.05 levels.

Obviously, the correlation coefficient "r" values of hand explosive strength are increased positively from pre- to post-training test of control, circuit training, and in the aerobic dance training group of tribal school girls.

Correlation Analysis of Hand Explosive Strength in Pre- and Post-Test in Control, Circuit Training, Aerobic Dance Training Group of Non-tribal School Girls

Results and discussion

Table 11 showing the correlation coefficient between pre- and post-test of non-tribal school girls on hand explosive strength on basketball throws-test.

The observed Pearson correlation coefficient "r" value in pre- and post-test of non-tribal school girls in control, circuit training, and aerobic dance training group were 0.125, 0.986, and 0.974, and *P*-values are significant in relation to their hand explosive strength at 0.05 levels.

Obviously, the correlation coefficient "r" values of hand explosive strength are increased positively from pre- to post-training test of control, circuit training, and as well in the aerobic dance training group of non-tribal school girls.

Analysis of Variation of Hand 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 hypothesis are there may be a significant difference on hand explosive strength in the post-test of tribal school among CG, circuit training, and aerobic dance training group.

Table 12 showing the mean, standard deviations between pre- and post-test of tribal school CG, CTG and aerobic dance Training group on hand explosive strength.

Table 12a reveals analysis of variance (ANOVA) of hand explosive strength in the post-test of tribal school girls among CG, circuit training, and aerobic dance training groups. F-ratio value, d.f, and *P*-values in post-training test in relation to their hand explosive strength were presented.

Using the single factor ANOVA test, F-ratio is computed and the obtained value of F-ratio for the post-test was 13.627 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 accepted at the 0.05 levels; since the computed value is more than the table value of the F ratio. Therefore, the significance was found in pre- and post-training tests among the control, CTG and ADG. As a result, the training is clearly visible with respect to hand explosive strength of circuit training and ADG.

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 12b.

Scheffe *Post Hoc* Multiple Comparison Tests of Hand Explosive Strength in Post-Test of Tribal Schools in Control, Circuit Training and ADGs

Table 13 showing Scheffe's and the least significant difference test for the differences between adjusted post-test means of tribal high school girls on hand explosive strength.

Results and discussion

From Table 13. It was observed that the difference of the adjusted post-test means of hand explosive strength between the CTG, aerobic dance training group with CG were significant, while the mean differences were found as 1.37, 0.76, and 0.60 circuit training, aerobic dance training, which were lie in the CI depicted at the 0.05 level.

Hence, it is concluded that the two training groups, CTG, aerobic dance performed far better performance in hand explosive strength than the CGs. Between these two training groups, the training is clearly visible the improvement with the circuit training method.

Therefore, these studies provide sufficient evidence that performance on hand explosive strength was significantly improved through CTG compared with aerobic dance training group.

Analysis of Variation of Hand 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 a significant difference on hand explosive strength in the post-test of non-tribal school girls among CG, circuit training, and aerobic dance training group.

Table 14 showing the mean, standard deviation difference between pre- and post-test of non-tribal school CG, CTG and the aerobic dance training group on hand explosive strength

Table 14a reveals ANOVA on hand explosive strength in the post-test of non-tribal school girls among CG, circuit training, and aerobic dance training groups. F-ratio value, d.f, and *P*-values in post-training test in relation to their hand explosive strength were presented.

Using the single factor ANOVA test, F-ratio is computed and the obtained value of F-ratio for the post-test was 6.887 against the required table (critical) value of F-test statistic is 3.15 and *P*-values are significant at the 0.05 level.

Thus, the hypothesis is accepted at the 0.05 levels, since the computed value is more than the table value of F ratio. Therefore, the significance was found in pre- and post-training tests among control, CTG and ADG. As a result, the training is clearly visible with respect to hand explosive strength of circuit training and ADG.

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 14b.

Scheffe *Post Hoc* Multiple Comparison Tests of hand Explosive Strength in Post-Test of Non-tribal School Girls in Control, Circuit Training, and ADGs

Table 15 shows the scheffe's and LSD test for the differences between adjusted post-test means of non-tribal high school girls on hand explosive strength.

Results and discussion

From Table 15. It was observed that the difference of the adjusted post-test means of hand explosive strength between the CTG, Aerobic dance training group with CG were significant, while the mean differences were found as 0.91, 0.46, and 0.44 circuit training-aerobic dance training is 0.44, which was lie in the CI describe at 0.05 levels.

Hence, it is accomplished that the two training groups, CTG, ADG improved the performance significantly on hand explosive strength than the CGs. Between these two training groups, the training is clearly visible the improvement with the circuit training method.

Therefore, these studies provide sufficient evidence that performance on hand explosive strength was significantly improved for CTG when compared with aerobic dance training group of non-tribal school girls.

Analysis of Covariance of (ANCOVA) Hand Explosive Strength in Pre and Post-Test of Tribal School Girls in Control, Circuit Training, and Aerobic Dance Training Group

Results and discussions

Table 16a and b reveal analysis of covariance of hand explosive strength in pre- and post-test of tribal school girls in control, CTG and aerobic dance training group. Using univariate analysis F-ratio is computed and the obtained value of F-ratio of 42.786 for the post-test was displayed. Required table (critical) value of F-test was 3.11 at 0.05 levels. The significance was found in the post-test for Tribal students among the control CTG and aerobic dance training.

Thus, the effect of circuit training and ADG's clearly visible with respect to hand explosive strength.

ANCOVA Hand Explosive Strength in Pre and Post-Test of Non-tribal School Girls in Control, Circuit Training and Aerobic Dance Training Group

Results and discussions

Table 17a and b reveal analysis of covariance of hand explosive strength in pre- and post-test of non-tribal school girls in control, CTG and aerobic dance training group. Using univariate analysis F-ratio is computed and the obtained value of F-ratio of 27.572 for the post-test was displayed. Required table (critical) value of F-test was 3.11 at 0.05 levels. The significance was found in the post-test for non-tribal students among the control CTG and aerobic dance training group.

Therefore, the effect of circuit training is clearly visible more performance with respect to hand explosive strength compared with ADG.

CONCLUSION

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

1. Two training methods, that is, CTG, aerobic dance training groups have shown significant improvement due to 12 weeks of training on hand explosive strength of tribal and non-tribal school girls and it is clear that the CG 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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Review Article

The role of sport in peace building at higher education for sustainable development

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INTRODUCTION

Sport builds peace by promoting tolerance, respect, and social inclusion through a universal language that transcends cultural and political boundaries. It serves as a tool for post-conflict reintegration, fostering discipline, teamwork, and leadership skills, and can be integrated into broader peace building strategies to encourage positive social change and youth empowerment. Organizations like the United Nations (UN) have officially recognized sport's contribution to sustainable development and peace goals, highlighting its role in bringing people together for common objectives.

The international day of sport for development and peace (IDSDP) is celebrated annually on April 6th to recognize the power of sport in fostering positive change, bridging barriers, and transcending boundaries. In 2025, the IDSDP will focus on the theme "Leveling the Playing Field: Sport for Social Inclusion," emphasizing the role of sport in promoting equal opportunities and fostering inclusive societies.

Objectives

- To know the importance of sports at higher education
- To understand the sports for peace building
- To understand the relationship of sports to peace building for sustainable development.

HOW SPORT CONTRIBUTES TO PEACE BUILDING

Promotes Social Cohesion and Inclusion

- Sport brings people together from diverse backgrounds, helping to break down social, cultural, and political barriers. It emphasizes shared values such as respect for rules, fair play, and teamwork, which builds trust between individuals and groups.

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Fosters Individual and Community Empowerment

- Sport can provide a positive outlet for youth, building self-esteem, discipline, confidence, and leadership skills. These skills are essential for transforming individuals into positive agents of change within their communities.

Aids in Post-Conflict Recovery

- Sport-based programs can help reintegrate children and youth who have been involved in armed conflict by changing their behaviors, drawing them out of violence, and helping them rebuild their lives.

Supports Development Goals

- Sport is an "important enabler" for sustainable development and is linked to goals such as good health, quality education, and gender equality.

Offers a Unique Platform for Peace

- Unlike many other forms of diplomacy, sport offers a platform where people can connect on a human level. For example, the Olympic Truce is based on an ancient Greek tradition of suspending conflict during the Games.

Develops Life Skills

- Through participation, people learn critical life skills such as pushing through setbacks, collaborating, negotiating, and respecting others. These skills are transferable to many areas of life, including conflict resolution and peaceful coexistence.

IMPORTANCE OF SPORTS FOR PEACE

Peace building through sports in higher education leverages the values of sports to teach crucial life skills such as empathy, discipline, and conflict resolution, fostering positive social change on campus and beyond.

Sports contribute to sustainable development by promoting health, education, equality, and peace, while also addressing environmental challenges. It acts as a low-cost tool to build resilient communities by teaching skills such as teamwork and fairness, empowering youth, and raising awareness for issues such as climate change and gender equality. Major partnerships are working to integrate sports into urban development and global agendas, though challenges such as accessibility and politicization must be addressed.

ENVIRONMENTAL SUSTAINABILITY

Promoting Eco-Friendly Practices

- Sports can raise awareness about environmental issues such as resource conservation and food waste and can promote eco-friendly transportation methods.

Sustainable Events

- Organizations can set examples for waste reduction, responsible sourcing, and other sustainable practices, especially during major sporting events.

Choosing Sustainable Sports

- Opting for sports that require less infrastructure and resources, such as running, cycling, and water sports, can have a lower environmental impact than those that do not.

GOVERNANCE AND PARTNERSHIPS

Cross-Sector Collaboration

- The Sport for Development and Peace (SDP) movement fosters collaboration between organizations to exchange knowledge and methodology for using sport to achieve development goals.

Mainstreaming Sport in Development

Initiatives like the collaboration between the IOC and UN-Habitat aim to integrate sport and physical activity into urban planning to advance development, health, and environmental outcomes. Sport is correlated with sustainable development in higher education through its ability to promote social well-being, environmental awareness, and economic opportunities, aligning with the UN's sustainable development goals (SDGs). Higher education institutions can leverage sport to foster these outcomes by integrating sports programs, conducting research on sustainability in sport, educating students on responsible sports management, and using sport to achieve social inclusion, health promotion, and climate action.

SOCIAL AND ECONOMIC IMPACTS

Promotes Social Inclusion and Well-Being

- Sport can help reduce inequalities, promote gender equality, and foster peaceful coexistence by teaching universal values such as respect and teamwork.

Improves Health

- It encourages healthy lifestyles, contributes to physical and mental well-being, and can be used to educate about health issues.

Drives Economic Growth

- Sport is an engine for development, creating job opportunities and contributing to local and national economies.

ENVIRONMENTAL IMPACTS

Raises Environmental Awareness

- Sport can be used as a tool to educate students about environmental sustainability and climate change through both direct participation and dedicated campaigns.

Encourages Sustainable Practices

- It promotes the adoption of sustainable practices in sports management and events, such as green initiatives and resource efficiency.

Supports Climate Action

Active travel, a form of physical activity, can contribute to reducing greenhouse gas emissions, benefiting both individual and planetary health.

The national education policy 2020 is a comprehensive plan to transform India's education system, replacing the 1986 policy and aiming to make education more holistic, flexible, multidisciplinary, and aligned with 21st-century needs. It is built on pillars of Access, Equity, Quality, Affordability, and Accountability and introduces changes like replacing the 10 + 2 structure with a 5 + 3 + 3 + 4 model, promoting foundational literacy, and reforming higher education through measures like the proposed higher education commission of India.

ROLE IN HIGHER EDUCATION

Educates Future Leaders

- Universities can train future sport managers and educators on sustainability principles to ensure a more responsible sport sector.

Provides Practical Learning Experiences

- Sport and physical education offer concrete and hands-on opportunities for students to learn about and engage with sustainability issues.

Conducts Research

- Higher education is a hub for research into the links between sport and sustainability, helping to identify challenges and develop solutions.

MAPPING SPORTS TO SUSTAINABILITY DEVELOPMENT

Mapping sports to sustainability goals involves identifying how sports can support the 17 UN SDGs, focusing on social inclusion, health economic growth, and environmental protection. For instance, support can promote SDG3 (good health and wellbeing) through physical activity, SDG 4 (quality education) by teaching values and skills, SDG 5 (Gender Equality) by empowering women, and SDG 11 (sustainable cities and communities) by creating inclusive public spaces. Environmental sustainability is addressed through measures to reduce the carbon footprint of events and facilities.

CONCLUSION

The UN has long recognized the contribution of SDP, talking about sport as a universal language that can be a powerful tool to promote peace, tolerance and understanding by bringing people together across boundaries and cultures.

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Review Article

Integrated scientific review in sports injury rehabilitation, exercise physiology, and performance optimization

Mohammad Darzinezhad

ABSTRACT

This paper presents an integrated review of essential scientific concepts in sports injury rehabilitation, exercise physiology, corrective exercise programming, cryotherapy applications, and athlete performance testing. It outlines evidence-based approaches used to enhance athletic performance and reduce the risk of injury across various training and clinical environments.

Keywords: Athletic performance, Cryotherapy, Rehabilitation etc.

INTRODUCTION

Athletic performance and injury prevention require a multidisciplinary understanding of human physiology, biomechanics, recovery science, and structured training load management. This review synthesizes foundational principles that guide effective rehabilitation protocols and performance-oriented training strategies.

EXERCISE PHYSIOLOGY FOUNDATIONS

Exercise physiology examines how the body responds to acute and chronic training stimuli. Core components include:

- Neuromuscular adaptation
- Cardiovascular conditioning
- Metabolic pathway utilization
- Recovery kinetics
- Periodization and programming

These principles enable the design of targeted interventions to improve athletic performance and physical conditioning.

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SPORTS INJURY MECHANISMS AND REHABILITATION

Sports injuries commonly arise from overuse, biomechanical dysfunction, insufficient recovery, or traumatic impact. Effective rehabilitation strategies involve:

- Restoring tissue integrity and mobility
- Re-establishing neuromuscular coordination
- Improving functional movement patterns
- Applying progressive and individualized loading
- Correcting biomechanical inefficiencies

This evidence-based approach ensures long-term recovery and reduces reinjury rates.

CORRECTIVE EXERCISE AND MOVEMENT OPTIMIZATION

Corrective exercise focuses on identifying dysfunctional movement patterns caused by muscle imbalances, joint restrictions, or compensatory strategies. Key elements include:

- Mobility enhancement
- Stability and activation training
- Integrated functional movement patterns
- Kinetic chain alignment

Corrective programming enhances movement efficiency and reduces injury risk during sport-specific performance.

CRYOTHERAPY: APPLICATIONS AND SCIENTIFIC EVIDENCE

Cryotherapy plays a significant role in both acute injury management and recovery from high-intensity training. Its benefits include:

- Reducing inflammation and swelling
- Modulating pain
- Supporting tissue recovery
- Enhancing readiness for subsequent training sessions

Scientific literature supports its controlled and targeted use within rehabilitation protocols.

PERFORMANCE TESTING AND ATHLETE MONITORING

Performance assessment provides measurable indicators for training design and progression. Common tools include:

- VO max and aerobic threshold testing
- Strength and power assessments
- Agility and functional movement screening
- HRV, RPE, and GPS-based workload monitoring

These tools help optimize training loads, prevent overtraining, and track athlete development.

CONCLUSION

A multidisciplinary and integrative approach – combining exercise physiology, rehabilitation science, corrective movement analysis, recovery strategies, and objective performance testing – is crucial for optimizing athletic performance. This framework enhances training outcomes while reducing the potential for injury.

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Research Article

Motivation and barriers to learning English among physical education students: A narrative review

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ABSTRACT

This article conducts a narrative review of motivation and barriers to English learning among physical education (PE) students. The review is based on a structured literature search of relevant studies from Google Scholar, Scopus, ERIC, Web of Science, and selected domestic sources, with particular attention to research focusing on non-English-major students, especially those in sports-related and PE programs. The findings synthesize a multidimensional framework of barriers, including psychological, institutional, curricular, socio-cultural, and learning strategy-related constraints, which interact dynamically and may progressively erode students' initial learning motivation. Building on this synthesis, the article identifies a clear research gap concerning PE students within the Vietnamese socio-cultural and educational context. Accordingly, the study highlights the urgent need for empirical research to systematically examine motivation and learning barriers among Vietnamese PE students learning English. Such evidence is essential to inform the design of contextually appropriate intervention frameworks and pedagogical solutions, aimed at enhancing the effectiveness of English teaching and learning among sport-related, particularly those in PE programs.

Keywords: English learning, Learning motivation, Learning barriers, Physical education, Students

INTRODUCTION

In the field of Physical Education (PE), the role of English has become increasingly significant. PE students, whose career trajectories commonly include becoming PE teachers, coaches, sport managers, or sport science specialists, are now required to engage more actively with international academic literature, keep abreast of contemporary training methodologies, and participate in regional and global professional development programs, workshops, conferences, and sport events (Prime Minister of Vietnam, 2019). These professional demands require not only strong disciplinary expertise in sport and PE but also sufficient English proficiency to read academic texts, communicate professionally, collaborate with international experts, and adapt to multicultural working environments. However, compared with students in many other academic disciplines, English language proficiency among PE students remains relatively limited, influenced by a combination of factors such as unstable learning motivation, learning environments that do not sufficiently support language development, and personal and discipline-specific barriers characteristic of this student population (Thuan *et al*., 2025; Cuong, 2019; Loc, 2022). In practice, PE is a highly specialized field of study, with curricula heavily weighted toward practical and performance-based courses, intensive training schedules, and frequent participation in competitions or professional internships. These structural characteristics substantially constrain the amount of time available for self-directed English learning and skill development. Moreover, the learning environment of PE students is largely situated in sports fields, gymnasiums, and training facilities, offering limited opportunities for everyday English use. English-language materials specifically aligned with sports and PE disciplines also remain insufficient and are not yet widely or systematically integrated into teaching practices (Nga and Tam, 2023).

Several studies further indicate that many PE students enter university with weak foundational English proficiency,

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experience communication anxiety, and lack confidence in their language ability. Their attitudes toward English are often shaped by a sense of obligation rather than intrinsic or self-determined motivation (Cuong, 2019; Thao, 2021; Vu and Habók, 2021). These characteristics contribute to a motivational and experiential profile that differs markedly from that of other non-English-major student groups. Although a substantial body of international and domestic research has examined foreign language learning motivation and barriers among non-English-major students in general (Brown, 2007; Krashen, 1982; Noels, 2001; Muilenburg and Berge, 2005; Nguyen, 2023), studies that specifically focus on students in sports-related disciplines, particularly PE, remain relatively scarce (Thuan *et al*., 2025). Existing evidence suggests that career-oriented motivation and positive attitudes toward English play a critical role in sustaining students' learning efforts, while barriers such as limited English-use environments, insufficient self-study time, and the lack of pedagogical approaches tailored to the characteristics of PE education significantly hinder the development of students' foreign language communication skills (Thao, 2021; Loc, 2022). Nevertheless, in Vietnam, there is still a lack of systematic and in-depth research that simultaneously identifies and explains the interrelationship between learning motivation and barriers in English learning among PE students, grounded in contemporary theoretical frameworks of second language motivation (Noels *et al*., 2000; Ryan and Deci, 2000).

Accordingly, the study aims to conduct a theoretical narrative review of motivation and barriers in English learning among PE students, through the systematic synthesis of relevant theoretical perspectives and empirical findings. This study expects that this review will contribute valuable scholarly evidence to support efforts to understand and enhance the quality of English teaching and learning in PE training institutions, in alignment with the current demands of international integration in education and sport.

METHODOLOGY

This article adopts a structured narrative review approach, while selectively drawing on key principles of integrative reviews. Relevant literature was primarily retrieved from Google Scholar, Scopus, ERIC, and Web of Science, with supplementary sources drawn from selected domestic journals and university digital libraries. The inclusion criteria focused on empirical and theoretical studies – including journal articles, master's theses, doctoral dissertations, and research reports – published in English or Vietnamese over the past 15–20 years, addressing learning motivation, barriers, and constraints encountered by university students in foreign language learning. The scope of the review places particular emphasis on students in PE and sport-related disciplines, as well as non-English-major university students. Studies involving other learner populations were included only for contextual reference, serving to support thematic analysis and the identification of research gaps.

RESULTS

Theoretical Frameworks of Language Learning Motivation

Self-determination theory (SDT)

SDT, developed by Deci and Ryan, constitutes one of the most influential theoretical frameworks for explaining motivation in educational contexts in general and in second/foreign language learning in particular (Deci and Ryan, 1985; Ryan and Deci, 2000). According to SDT, human behavior is driven by the satisfaction of three fundamental psychological needs: Autonomy, competence, and relatedness. When these needs are adequately fulfilled, learners are more likely to engage actively in learning activities, demonstrate sustained effort, and achieve more favorable learning outcomes (Reeve, 2012; Ryan and Deci, 2000).

In the context of English as a foreign language (EFL) learning, SDT distinguishes between autonomous motivation and controlled motivation. Autonomous motivation encompasses intrinsic motivation – learning driven by interest, enjoyment, and a sense of accomplishment – as well as internalized forms of extrinsic motivation, in which learners recognize and personally endorse the value and relevance of English use. In contrast, controlled motivation is characterized by behavior regulated by external pressures, such as family expectations, examination requirements, or institutional benchmarks, as well as by internal pressures including guilt or a sense of obligation (Noels, 2001; Noels *et al*., 2000; Ryan and Deci, 2000). A substantial body of SDT-based research in second language learning has consistently demonstrated that autonomous motivation is closely associated with higher levels of learner engagement, satisfaction, and sustained progress over time, whereas controlled forms of motivation are more often linked to emotional exhaustion, surface learning strategies, or early disengagement (Alamer, 2022; Alamer and Lee, 2021; Noels *et al*., 2000). In Vietnam, studies focusing on non-English-major university students have likewise highlighted the importance of intrinsic motivation and perceived value of English in maintaining learners' effort and persistence (Cuong, 2019; Loc, 2022; My, 2024).

For PE students, SDT offers a particularly useful analytical lens for examining motivational quality, moving beyond a simplistic distinction between the presence and absence of motivation. Instead, it foregrounds the critical question of why students learn English, and whether their motivation is predominantly autonomous or controlled. This distinction is especially meaningful for the design of motivational interventions aimed at enhancing English learning among PE students in a more

sustainable manner, by aligning language learning with their professional aspirations and genuine personal development needs, rather than short-term external demands (Vu and Habók, 2021; Vu and Habók, 2022).

L2 Motivational Self System

The L2 motivational self-system, proposed by Dörnyei (2005), represents a major advancement in second language motivation research by shifting the analytical focus from external determinants toward learners' future self-guides and self-related imagery (Dörnyei, 2005; Ushioda, 2011). The model comprises three core components:

- Ideal L2 Self refers to the learner's envisioned future self who possesses a high level of English proficiency – for example, communicating confidently with international partners, participating in international conferences, or teaching and coaching in English. This component functions as a powerful internal motivational driver, pulling learners toward a more competent and desirable version of themselves.
- Ought-to L2 Self represents the attributes learners believe they should possess to meet perceived social expectations and obligations, such as family expectations, institutional requirements, graduation benchmarks, or examination pressures. This component is typically associated with controlled forms of motivation.
- L2 Learning Experience encompasses learners' immediate and situated learning experiences, including teachers, course content, classroom climate, peers, and learning facilities. It serves as the primary interface between the classroom context and learners' motivational processes (Dörnyei, 2005; Taguchi *et al.*, 2009).

A growing body of empirical research has demonstrated that the Ideal L2 Self is often the strongest predictor of learners' sustained effort and intention to continue language learning (Kormos and Csizér, 2008; Papi and Teimouri, 2012; Taguchi *et al*., 2009). In the Vietnamese context, recent studies adapting or applying this framework to non-English-major university students have shown that learners' motivation is simultaneously shaped by the Ideal L2 Self, the Ought-to L2 Self, and their learning experiences. Nevertheless, the Ideal L2 Self consistently emerges as the central driver of long-term learning investment (Nguyen, 2023; Loc, 2022; My, 2024).

For PE students, the L2 Motivational Self System is particularly well suited to addressing a critical motivational question: How do students envision their future selves with or without English proficiency? The answer to this question is closely tied to their career trajectories, including roles such as PE teachers, coaches, sport managers, or international sport activity instructors, and, in turn, shapes their willingness to invest sustained effort in English learning during their university training (Thuan *et al.*, 2025).

The Relationship Between Motivation and Foreign Language Learning Outcomes

Within the socio-educational model, Gardner (1985) conceptualized motivation as a central determinant of learners' effort, persistence, and achievement in second language learning. He defined language learning motivation as a composite of (1) effort, (2) desire to attain language learning goals, and (3) positive attitudes toward learning the target language (Gardner, 1985; Gardner and Lambert, 1972).

Subsequent reviews and empirical studies have consistently reinforced the positive relationship between motivation and foreign language achievement. Brown (2007) identified motivation as one of the most critical psychological variables distinguishing successful from less successful language learners. Similarly, Kormos and Csizér (2008) demonstrated that learners with stronger motivation – particularly those characterized by a salient Ideal L2 Self and positive learning attitudes – exhibit significantly higher levels of motivated learning behavior, such as allocating more time to self-study, actively seeking opportunities to use English, and engaging in extracurricular activities. These behaviors, in turn, contribute to measurable gains in language proficiency.

In the Vietnamese context, recent studies have likewise documented a positive association between motivation and English learning outcomes among non-English-major university students. Research by Nguyen (2019), Loc (2022), Minh Tuyet Thi Le and Trang Huynh Nguyen (2023), as well as My (2024), indicates that students with higher levels of English learning motivation tend to achieve better academic results, demonstrate more positive attitudes toward English courses, and report a stronger sense of career readiness in increasingly globalized professional environments.

However, these findings also suggest that the relationship between motivation and learning outcomes is neither linear nor unconditional. It is mediated by a range of contextual and affective factors, including learning barriers, language anxiety, environmental constraints, and instructional practices (Horwitz *et al*., 1986; Muilenburg and Berge, 2005; Mai and Huy, 2018). When students encounter obstacles such as limited time for self-study, insufficient opportunities to use English, communication apprehension, or perceptions that English is weakly connected to their disciplinary field, even initially high levels of motivation may gradually erode over time (Indah, 2021; Thao, 2021; Trang and Phuc, 2022).

From this perspective, motivational frameworks such as SDT and the L2 Motivational Self System do more than explain why students choose to engage – or disengage – from English learning. They also provide a conceptual foundation for understanding why learners with comparable initial motivation levels may ultimately achieve markedly different learning

outcomes, particularly in the case of PE students, whose learning trajectories are shaped by discipline-specific curricular structures, learning environments, and limited opportunities for authentic English use.

English Learning Barriers among PE Students

Psychological barriers

Psychological barriers are among the most frequently cited factors in analyses of the difficulties and constraints faced by non-English-major university students, including those in PE, when learning English. Prominent among these barriers are foreign language anxiety, low self-confidence in language ability, and fear of negative evaluation. Horwitz *et al*. (1986) conceptualized foreign language anxiety as a context-specific form of anxiety arising in the foreign language classroom, manifested in apprehension about speaking in front of peers, fear of making mistakes, and concern over negative judgment from teachers or classmates. Such anxiety often leads learners to avoid oral communication in English. Krashen's (1982) work further suggests that a high affective filter – characterized by anxiety, stress, and low self-confidence – can significantly impede learners' ability to process and internalize new linguistic input.

In Vietnamese higher education, numerous studies have documented that non-English-major students, particularly those with weak foundational English proficiency, frequently experience fear and discomfort when required to use English, exhibit reluctance to speak in class, and develop negative attitudes toward English courses (Cuong, 2019; Loc, 2022; Ha and Thao, 2020). These psychological constraints are reflected in students' avoidance of communicative activities, a tendency to study English primarily for examination purposes, and a lack of sustained motivation for long-term self-directed learning (Tuyet and Nguyen, 2023; Chi and Thuy, 2023).

For PE students, psychological barriers are further intertwined with disciplinary identity. Many students self-identify as "sports-oriented" learners or perceive themselves as "not suited for foreign languages," which can foster negative self-beliefs regarding their capacity to learn English. Such beliefs may intensify anxiety, undermine self-efficacy, and increase the likelihood of disengagement when learners encounter difficulties in the learning process (Vu and Habók, 2021; Indah, 2021). At the same time, daily interaction patterns within environments that predominantly use Vietnamese or local dialects, coupled with limited exposure to English, make the act of "stepping outside one's comfort zone" to use English particularly stressful for this group of students.

Institutional barriers

Institutional and curriculum-related barriers are widely recognized as critical factors influencing university students' capacity and motivation to learn English. A growing body of research indicates that curriculum design, course duration, assessment practices, class size, and infrastructural conditions play a substantial role in either constraining or facilitating foreign language learning (Muilenburg and Berge, 2005; Dung and Anh, 2010; Minh and Thuy, 2016).

At a number of universities, English courses for non-English-major students remain heavily oriented toward grammar instruction and translation-based writing, with limited opportunities for listening and speaking practice. Assessment practices continue to rely predominantly on written examinations, encouraging students to adopt a "learning for tests" approach rather than focusing on the development of practical communicative competence (Ha and Thao, 2020; Hoa, 2020). Within PE programs, the strong emphasis on practical and performance-based disciplinary courses places pressure on credit allocation, resulting in a restricted number of credits devoted to English. Consequently, students may perceive English as a peripheral or subsidiary subject, rather than an integral component of their professional training (Nga and Tam, 2023).

In addition, infrastructural conditions – including the availability of language classrooms, audio-visual equipment, and online learning support systems – constitute a common source of barriers, particularly during periods of transition to online or hybrid learning modalities. Muilenburg and Berge (2005) categorized barriers in online learning into several domains, notably technological barriers, learning skills barriers, and time-management barriers. Research conducted in the Vietnamese context suggests that when technical support systems, internet connectivity, or digital learning resources are unstable or inadequate, students are more likely to experience demotivation, fatigue, and a sense of disengagement from English courses (Loan and Huyen, 2021; Hoa, 2020).

For PE students, these institutional and curricular constraints are further intensified by densely structured training schedules, including frequent practical sessions, competitions, and professional internships. When combined with limited instructional time and inflexible organization of English courses, such conditions may heighten students' perceptions of overload, leading them to prioritize disciplinary subjects and invest less effort in English learning.

Social and cultural barriers

Social and cultural barriers reflect influences stemming from the broader social environment, cultural norms, beliefs, and value systems that learners bring with them when engaging in English learning. From a socio-educational perspective, Gardner (1985) emphasized the role of learners' attitudes toward the English-speaking community, as well as the support they receive from family, peers, and the surrounding social context, in shaping both motivation and barriers in second language learning.

Empirical studies conducted in Vietnam indicate that university students are strongly influenced by social and familial perceptions of the role of English in career development. When the surrounding environment does not place a high value on English or lacks positive role models who successfully use English in professional settings, learners may question the practical value of investing effort in English learning (Bang, 2017; Cuong, 2019). Conversely, in families or communities where English is perceived as a meaningful resource and where individuals have benefited from English proficiency, positive attitudes may mitigate barriers and enhance motivation (Loc, 2022).

For PE students, social and cultural barriers are further manifested in the belief that sports-related careers do not necessarily require strong English proficiency, or in the prioritization of athletic performance over academic achievement. Some students perceive that professional competence and competitive success alone are sufficient for employment, while English is viewed merely as a supplementary requirement rather than a core professional skill (Vu and Habók, 2021; Ha and Thao, 2020). Such perceptions may reduce the priority assigned to English learning, contributing to a self-reinforcing cycle of barriers: because English is not seen as integral to professional identity, learners invest less effort, and reduced investment in turn reinforces the perception that English is distant or irrelevant to their disciplinary field.

In addition, the face-saving culture prevalent in classroom settings – characterized by reluctance to make mistakes and fear of peer ridicule due to incorrect pronunciation or lack of fluency – constitutes a significant barrier to the development of speaking and listening skills, which are already recognized as common areas of difficulty among Vietnamese university students (Horwitz *et al*., 1986; Mai and Huy, 2018).

Learning strategy barriers

Learning strategy barriers refer to difficulties arising from learners' limited awareness of, or ineffective use of, foreign language learning strategies. Oxford (1990) argued that successful language learners typically employ a wide range of strategies, including cognitive, metacognitive, social, and affective strategies. In contrast, learners with a restricted strategic repertoire often struggle to self-regulate their learning, become overly dependent on teachers and formal classroom instruction, and encounter persistent difficulties in sustaining progress.

Empirical studies conducted in Vietnam indicate that many non-English-major university students have not developed consistent self-directed learning habits and lack essential strategic skills for learning English, such as effective note-taking, systematic review, independent listening practice, strategic use of digital resources, or participation in learning communities (Cuong, 2019; Loc, 2022; Chi and Thuy, 2023). Moreover, insufficient guidance on goal setting, time management, and self-evaluation of learning progress often results in fragmented learning practices, weak planning, and a high likelihood of discontinuing learning efforts prematurely (Muilenburg and Berge, 2005; Loan and Huyen, 2021).

Among PE students, learning strategy barriers tend to be even more pronounced due to intense competition for time between English learning and disciplinary training demands. Without effective strategies for time allocation and for integrating English exposure into sport-related activities – such as watching professional training videos in English, listening to sport-related podcasts, or reading international sport news – students are likely to experience a strong sense of separation between English and their disciplinary field. As a result, English is often perceived as an isolated academic subject rather than a functional resource connected to sport practice and professional development (Thuan *et al*., 2025; Nga and Tam, 2023). This perception not only undermines motivation but also reinforces the view of English as a burdensome requirement rather than a valuable tool for future careers in sport and PE.

DISCUSSION

General Trends in the Literature

The synthesis of existing research on motivation and barriers in English learning reveals several relatively consistent overarching trends. First, the majority of studies converge on the central role of motivation in foreign language learning outcomes. Learners with higher levels of motivation – particularly autonomous forms of motivation and motivation grounded in a clearly articulated Ideal L2 Self – tend to invest more time and effort, demonstrate greater persistence, and achieve superior learning outcomes (Gardner, 1985; Brown, 2007; Kormos and Csizér, 2008; Papi and Teimouri, 2012). Consequently, theoretical frameworks such as SDT (Deci and Ryan, 1985; Ryan and Deci, 2000) and the L2 Motivational Self System (Dörnyei, 2005; Taguchi *et al*., 2009) have been increasingly adopted to explain foreign language motivation. These frameworks highlight the quality of motivation (autonomous vs. controlled) and learners' future self-imagery as competent L2 users as key predictors of motivated learning behavior.

Second, the literature consistently characterizes barriers to English learning as multidimensional, encompassing psychological barriers (e.g., anxiety, low self-confidence, fear of negative evaluation), institutional and curriculum-related barriers (e.g., course design, assessment practices, class size, infrastructure), social and cultural barriers (e.g., career-related beliefs, the perceived role of English within communities), and learning strategy barriers (e.g., limited self-regulation skills and

insufficient integration of English use into daily life) (Horwitz *et al*., 1986; Muilenburg and Berge, 2005; Dung and Anh, 2010; Minh and Thuy, 2016). These barriers interact dynamically and may gradually erode learners' initial motivation, even when students recognize the importance of English for academic and professional purposes.

Third, within the Vietnamese context, studies focusing on non-English-major university students reveal a recurrent paradox: While students generally express positive attitudes toward English and demonstrate high awareness of its relevance for future study and employment, they often struggle to sustain motivation, develop effective self-directed learning strategies, and overcome psychological and institutional constraints (Cuong, 2019; Bang, 2017; Loc, 2022). Recent research has therefore emphasized the need to align motivation more closely with concrete career needs, enhance classroom learning experiences, and build supportive learning environments, rather than relying primarily on increased output requirements or assessment pressure (Vu and Habók, 2021; Tuyet and Trang, 2023).

Fourth, within the sport and PE domain, research interest has begun to expand but remains comparatively limited relative to other academic fields. Studies adopting English for Specific Purposes (ESP) and needs-analysis approaches indicate that PE students increasingly acknowledge the importance of English for sport-related careers, including accessing training materials, participating in international professional development programs, and communicating with foreign coaches and athletes. These students also express a strong desire for English curricula that are more closely aligned with their disciplinary needs (Thuan *et al*., 2025; Nga and Tam, 2023). Nevertheless, existing studies tend to remain descriptive in nature, focusing primarily on needs and attitudes, and rarely offer in-depth analyses of motivational structures and learning barriers grounded in contemporary theoretical frameworks.

Research gaps identified by the present review

Based on the synthesis of prior studies, this article identifies several critical research gaps directly related to motivation and barriers in English learning among PE students. First, there is a notable scarcity of studies focusing specifically on PE and sport-related students. Most research on non-English-major students in Vietnam has concentrated on disciplines such as economics, engineering, tourism, teacher education, or health sciences. PE and sport students have appeared primarily in a limited number of ESP studies, often with a narrow thematic scope (Thuan *et al.*, 2025; Nga and Tam, 2023). However, the distinctive characteristics of PE programs, including practice-intensive curricula, high training loads, sport-specific career trajectories, and a professional identity closely tied to the body and physical performance, are likely to generate motivational structures and learning barriers that differ substantially from those of other student groups. To date, these distinctive features have not been examined in a systematic and theoretically grounded manner.

Second, there is a lack of measurement instruments tailored to sport and PE student populations. Existing scales used to assess English learning motivation and barriers in Vietnam are largely adapted from international instruments or designed for non-English-major students in general (Cuong, 2019; Loc, 2022; Huyen, 2023). Such instruments rarely capture sport-specific motivational drivers, such as aspirations related to international competition, access to coaching materials, or participation in professional development programs, nor do they adequately reflect barriers linked to training schedules and performance pressure. The absence of context-sensitive measurement tools limits the validity of motivation and barrier assessments for PE students and constrains the development of targeted pedagogical interventions aligned with their actual learning contexts.

Third, there is insufficient research examining the interrelationship between motivation and barriers. As discussed earlier, many studies have treated motivation and barriers as separate analytical domains: motivation-focused research often neglects a detailed examination of barriers, while studies on learning barriers rarely integrate contemporary motivational frameworks such as SDT, the L2 Motivational Self System, or classroom-based motivational models. As a result, the critical question of how motivation and barriers dynamically interact during the English learning process remains underexplored. This gap is particularly salient in the PE context, where institutional, environmental, and psychological constraints may rapidly erode students' initial motivation (Vu and Habók, 2021; Indah, 2021). There is a clear need for research designs that simultaneously examine both sets of variables within an integrated analytical model, thereby providing a more comprehensive understanding of the motivation–barrier relationship.

Fourth, culturally grounded research in the Vietnamese PE context remains limited. Although some studies have acknowledged cultural factors such as face-saving concerns, family influence, and societal perceptions of English, these factors are typically discussed at a general level for Vietnamese students and are rarely examined in relation to the specific socio-cultural dynamics of PE education. This context is characterized by a unique interplay of sport culture, performance orientation, collectivist values, and community expectations regarding the image of PE teachers and athletes (Bang, 2017; Ha and Thao, 2020). Addressing this gap requires research that places the Vietnamese socio-cultural context at the center of analysis, rather than uncritically importing theoretical

frameworks or measurement instruments developed in Western settings without appropriate contextual adaptation.

Collectively, these gaps not only illuminate current limitations in the existing literature but also provide a clear direction for future research on motivation and barriers in English learning among PE students. In particular, quantitative approaches employing context-appropriate measurement instruments, complemented by in-depth qualitative data, are essential for generating more robust evidence to inform policy-making and the design of English teaching and learning programs in PE universities.

CONCLUSION

This review synthesizes major theoretical frameworks of foreign language learning motivation, clarifies the roles of motivation and learning barriers in the English learning process, and analyzes the motivational characteristics and typical groups of barriers experienced by PE students, drawing on both international and Vietnamese research. The synthesis indicates that English learning motivation among sport-related students is shaped by a combination of intrinsic factors and strong career-oriented influences, while psychological, institutional–curricular, socio-cultural, and learning strategy barriers may substantially undermine both motivation and learning effectiveness if they are not appropriately identified and addressed.

Nevertheless, the current literature remains limited in several respects. There is a clear shortage of in-depth quantitative and mixed-methods studies focusing specifically on PE students, a lack of measurement instruments designed to reflect sport-specific learning contexts, and an absence of integrated research models that simultaneously examine the relationships among motivation, barriers, and learning outcomes within the Vietnamese socio-cultural context. These limitations suggest the need for further research that treats PE students as a distinct learner population, rather than subsuming them under the broader category of non-English-major university students.

Future research should therefore prioritize the development and validation of motivation and barrier measurement instruments tailored to PE students; the construction of analytical models integrating motivation, barriers, and learning outcomes; and the implementation of intervention-based studies to evaluate the effectiveness of strategies aimed at enhancing motivation and reducing learning constraints in English education for this group. Such directions would not only address existing theoretical gaps but also provide robust empirical foundations for curriculum development and policy adjustment in English language education within PE institutions, in response to the demands of international integration in contemporary sport and education.

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Research Article

Impact of different neuro-linguistic programming training durations on sports motivation

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ABSTRACT

Neuro-linguistic programming (NLP) is increasingly used in sports psychology to enhance athletes' motivation and performance. However, limited empirical evidence exists on how the duration of NLP training influences motivational outcomes. The present study examined the effect of different NLP techniques at varying training durations on the sports motivation (SM) of sports participants in schools of the Jaffna zone and identified the optimum training time duration. The study involved 50 male sports participants within the age range of 15–19 years who were randomly selected from the schools of the Jaffna zone, and they were randomly assigned into five groups (control group and experimental groups), consisting of 10 subjects in each. The experimental groups were provided with the Swish, Anchor, New behavior generator, and bad memories reduction methods of the NLP technique for 10 weeks, and the psychological component of SM was measured every 2 weeks using structured questionnaire. The results indicated that the changes in the SM over every 2 weeks of training were significant and they followed almost a similar trend for the four methods of NLP training. Moreover, 8 weeks time duration of NLP training resulted in significantly highest level of SM. Hence, 8 weeks of NLP training can be provided to have an optimum effect in the improvement of SM.

Keywords: Mental training, Motivation, Psychological training, Sports performance, Training time

BACKGROUND

The psychological trainings like neuro-linguistic programming (NLP) were found to improve the mental attributes of sports participants. However, it is important for any training to be provided at optimum conditions especially with regard to the time duration. During the application of psychological skills training, the time duration is also thought to be an essential factor in determining the effectiveness of the psychological training program (Kim *et al*., 2021). It has been argued that one-time or brief psychological skills training sessions are generally less effective than programs delivered continuously over a longer period, even though short programs may be implemented more efficiently. Researchers suggest that mental skills training typically requires about 3–6 months to be effectively implemented, as participants need sufficient time to learn unfamiliar psychological techniques and successfully apply them within practice and performance settings. Nevertheless, studies have also reported positive outcomes from mental training programs conducted over shorter durations of <3 months (Weinberg and Williams, 2006).

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It was found in a study that 6 weeks of training had not affected the psychological skills of the athletes (Wolfram and Mickle-Wright, 2011). In another study, 10 weeks of psychological training and this period was considered necessary for behavioral change and development. There results showed a significant increase in self-efficiency after undergoing 10 weeks of psychological skills training and it showed that 10 weeks training duration was long enough to have the positive effect of improving the psychological skills of the handball players, similar to other research with military pilots (McCrory *et al*., 2013), swimmers (Sheard and Golby, 2006) and female volleyball players (Zetou *et al*., 2012). Another study revealed that the average modeled time which would bring change in a habit or new behavior to be automatic in the real world was identified as 66 days which is nearly 2 months (Lally *et al*., 2009).

It was also indicated in a study that sportspersons who had stopped playing sports during the COVID-19 pandemic

suffered more psychological strain and the number of training sessions per week and the duration of each training session exhibited a significant inverse relationship with psychological strain. However, concern about progress and athletic burnout had a significant positive association with psychological strain (Azadi *et al*., 2024).

Moreover, it is important for a training especially the psychological training to be provided for optimum time duration to have optimum positive effect on the mental abilities of individuals. Hence, the optimum time duration for NLP training is needed to be studied in detail for the most efficient and effective application of NLP techniques.

Objectives

- To analyze the effects of selected NLP techniques on sports motivation (SM) when provided at different time durations
- To determine the optimum time duration of selected NLP training techniques.

Hypothesis

1. There was a significant difference in the SM of each experimental groups after every 2 weeks of NLP training
2. There was a significant difference among the experimental groups in the change of SM at every 2 weeks of NLP training.

METHODOLOGY

Study Design

In this study, the researcher used a longitudinal study. Further, the experimental approach used in the research is the quantitative experimental approach. Moreover, a randomized design was used to assign the subjects to the focus groups and to perform the experiments, which means that the subjects for each group were selected randomly, and the groups were subjected to the randomly selected types of experiment.

Selection and Setting of Subjects

The sample of subjects of the present study consisted of 50 male sports participants between the ages of 15 and 19 who were selected from the schools in the Jaffna zone. For this purpose, initially, the targeted 20 schools in the Jaffna zone (with nearly 600 male sports participants within the age range of 15–19 years) were clustered into four based on their participation and performance at national levels: High, moderate, low, and nil. Then, four schools were selected from each cluster and 50 sports participants were randomly selected from the four selected schools.

Thereafter, the sample of 50 students was systematically and randomly assigned into 5 groups (I, II, III, IV, and V) where each group consisted of ten subjects. Group I was the control group, and Groups II, III, IV, and V were the experimental groups.

Measuring Variable

The study variable selected for the present study was SM. The measurement and analysis of selected study variable were done at different time points during the study period before and after subjecting the samples to the selected methods of NLP training. The SM was also measured for control group which was not taught any NLP techniques during this period. Instead, they were let to engage in their routine sports practices. The control group was ensured to be at the emotionally neutral stage between the periods of filling out the questionnaire.

Instrumentation for Measuring the Selected Variable

SM was measured using a standard structured questionnaire – SM scale (SMS-28) comprised 28 items using a 7-point-rating scale anchored by does not correspond at all (1) and correspond exactly (7) as recommended by Pelletier *et al*. (1995). The questionnaire for motivation involved the measurement of intrinsic motivation – to know, to accomplish and to experience stimulation; extrinsic motivation identified, introjected, and its external regulation.

The standard SMS questionnaire also included some questions, which measured the amotivation which is a negative of motivation. The questions for amotivation were based on the feeling with lack of self-confidence and encouragement. However, the scores for the questions of amotivation were not included after checking validity and reliability.

Experimental Procedure – Provision of Training

The four experimental groups were provided with the selected NLP training such as Swish, Anchor, New behavior generator, and bad memories reduction as recommended by Bandler and Grinder (1975). The selected NLP training techniques were provided for 10 weeks on the basis of 1 h sessions for 2 days/week.

Swish method of NLP training

Swish method of NLP training involved the step by step transformation of a negative behavior into the positive one. The participants were asked to visualize a mental thought during the sports activity, specially a negative thought. Later, they were asked to decide the type of mood (positive) that they really needed at that situation and to fix it on their mind followed by creating it as images. The participants were asked to visualize it repeatedly and to feel the positive vibes while blurring the negative image and replacing it by the positive image.

Anchor method of NLP training

"Anchor" method involved the improvement of the positive vibration of a person by remembering the past happy moments

repeatedly. The participants were asked to decide a positive mental thought/feeling that they want to create in their mind. After that they were asked to anchor that feeling together with some body actions while recreating the past motivational experience. Then, they were asked to show their feeling through any of their facial or body expressions such as smile, spreading the cheeks, opening the chest, straightening the upper body, and increasing the inhale and exhale ratio of breathing, once they felt motivated. Finally, they could open their eye and relax.

New behavior generator method of NLP training

"New behavior generator" technique was given where the participants were promoted as achievers by imagining themselves as stars while visualizing a positive new behavior that they aspire for. Similar to the anchor method of NLP technique, the participants were asked to decide a positive mental thought, feeling, or emotion that they wanted to create in their mind. The participants were asked to recreate the auditory and visual item related to that feeling or thought of a specific role model that they have in the sports field. They were asked to recreate the specific item of role model repeatedly and deeply. Subsequently, the participants were asked to imagine themselves as that person (role model). Thereafter, they were instructed to act like their favorite role model by imitating the special actions or qualities of that role model.

Bad memories reduction method of NLP training

"Bad memories" method enabled a person to erase the memory that makes him/her feel bad through certain image blurring techniques. The participants were asked to recall a bad memory that much disturbed their performance in sports. Thereafter, the participants were asked to accept that bad memory and subsequently think in the other way around. For example, a cricket player could not perform well, because of the failure of facing short balls. Then he was asked to visualize the deep images for how he was getting out of the short balls and then imagine if he played back foot shorts how it would work or if he left the short ball what would happen. The participants were asked to visualize the positive side of the play instead of bad memory or fear. Thereafter, they were asked to visualize the bad memory as a small image than before, which will reduce the bad memory step by step. Finally, they were asked to visualize their start to end story of bad memory as a recorded video in fast forward mod, back forward mode, and finally blurring that particular bad memory.

Data Collection

The data were collected on SM before and after each type of training to analyze the effects of each kind of NLP technique. The pre-test and post-test values were obtained at six different instances of training period for each of the five research groups.

Data Analysis

Data analysis was done mainly using the Statistical Package for the Social Sciences software. The experimental data were analyzed using two-way analysis of variance (ANOVA) with repeated measures (Park *et al*., 2009) which were used to analyze the effect of each NLP training technique at every 2 weeks-time period of and to identify the optimum training period for each NLP training technique.

RESULTS AND DISCUSSION

It is important for a training to be provided at optimum training time to ensure the optimum effect on the expected response. Otherwise it will affect the expected training output in both ways where the provision of insufficient training will not result in the optimum output and the provision of excess training will result in the wastage of time and also may lead to the downfall of achieved optimum output. Hence, the present study had set its objective to analyze the change in psychological components over different time durations and to select the optimum time duration for each training method. The change in SM was evaluated at every 2 weeks time period from the beginning of NLP training.

Change in SM

The change in the SM of male sports participants at every 2 weeks of training for the control group and the four experimental groups is indicated in Figure 1. The results in Figure 1 indicate that the SM level of the sports participants increased gradually every 2 weeks and reached the optimum level on 8th weeks and remained unchanged (comparing to 8th weeks) at the end of 10th weeks training.

Further when comparing the change in SM level of sports participants over the training period and among the sample groups using two-way ANOVA with repeated measures,

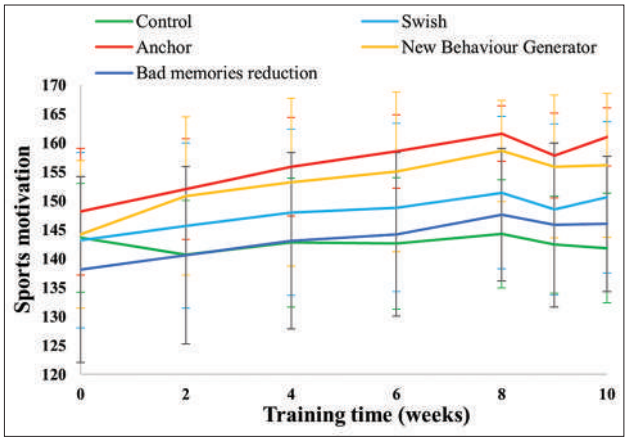

Figure 1: Change in the sports motivation level of the sample groups with the training time duration

results were obtained for within subject effects which compare the changes in the motivation level within each method of NLP training at different time durations and for between subject effects which compare the effects of different NLP methods on the psychological variable along different time durations of training. The results of within subject effects indicated that there were significant differences in the motivation level over the time durations of training (Greenhouse-Geisser F (3.264) = 43.642 and $P = 0.000$).

The change in SM of male sports participants as illustrated in Table 1 and the pair-wise comparisons of estimated marginal means using Bonferroni indicates that there is no significant change in the motivation level of sports participants until the provision of 4 weeks of three different methods of NLP training such as Swish, Anchor, and bad memories reduction, except new behavior generator (which increased from 2 weeks). The motivation level significantly ($P < 0.05$) increased from 4 weeks due to the provision of four NLP techniques. Thereafter after the motivation level continued to increase significantly after 6 weeks and reached a highest value after 8 weeks. The aforementioned trend after 4 weeks was similar for all the four methods of NLP training.

Means in the same columns within each NLP method that do not share the same letters are significantly different at ($P < 0.05$) within the particular NLP method.

However, when interpreting the changes in motivation level of control group who were not given with NLP training, even though it had *P*-value as 0.022 ($P < 0.05$), the pair-wise comparison of marginal means indicated that there were no significant changes ($P < 0.05$) in the motivation level of sports participants from the beginning up to the end of training period.

Hence, the present study indicated that the selected NLP training techniques should be provided at least for 4 weeks to have a significant change in the motivation level of sports participants and the motivation level reached the maximum level after 8 weeks duration of training. Thereafter, the motivation level remained unchanged when the training was extended to further 2 weeks.

Further, the results of testing the effects between subjects (NLP technique) revealed that the effects of different NLP training methods on the motivation level along different training time durations are slightly different significantly (F (4) = 2.712 and $P = 0.042$). However, the pairwise comparison of marginal means of applied NLP methods using Bonferroni analysis indicated that there is no significant difference ($P > 0.05$) in the effects of different NLP training methods on the motivation level over different time periods of training. It means that the change in motivation level over the training time duration due to four NLP training methods was almost similar. However,

Table 1: Marginal means estimated for sports motivation of each sample groups across the different time durations of training

NLP technique	Time (weeks)	Estimated marginal mean	Standard error	Multivariate test for marginal means	
				F-value	*P*-value
Control	Before	143.6[a]	4.138	2.822[a]	0.022
	2 weeks	140.7[a]	3.965		
	4 weeks	142.8[a]	4.111		
	6 weeks	142.6[a]	3.926		
	8 weeks	144.3[a]	3.134		
	9 weeks	142.4[a]	3.725		
	10 weeks	141.8[a]	3.394		
Swish	Before	143.2[a]	4.138	3.435[a]	0.008
	2 weeks	145.7[a]	3.965		
	4 weeks	148.0[b]	4.111		
	6 weeks	148.8[b]	3.926		
	8 weeks	151.4[b]	3.134		
	9 weeks	148.5[a, b]	3.725		
	10 weeks	150.6[b]	3.394		
Anchor	Before	148.1[a]	4.138	10.456[a]	0.000
	2 weeks	152.0[a]	3.965		
	4 weeks	155.9[b]	4.111		
	6 weeks	158.5[b, c]	3.926		
	8 weeks	161.6[b, c]	3.134		
	9 weeks	157.8[b, c]	3.725		
	10 weeks	161.0[c]	3.394		
New behavior generator	Before	144.2[a]	4.138	9.242[a]	0.000
	2 weeks	150.8[b]	3.965		
	4 weeks	153.2[b, c]	4.111		
	6 weeks	155.0[c]	3.926		
	8 weeks	158.6[c]	3.134		
	9 weeks	155.9[b, c]	3.725		
	10 weeks	156.1[c]	3.394		
Bad memories reduction	Before	138.1[a]	4.138	4.206[a]	0.002
	2 weeks	140.6[a, b]	3.965		
	4 weeks	143.1[b, c]	4.111		
	6 weeks	144.2[c]	3.926		
	8 weeks	147.6[c]	3.134		
	9 weeks	145.8[b, c]	3.725		
	10 weeks	146.0[c]	3.394		

NLP: Neuro-linguistic programming

it was proved in previous objectives, when comparing the initial and final levels of psychological components, some NLP methods had significantly different effects, and here, it shows that the trend over the time durations is almost same for four methods.

Selection of Optimum Training Period

It was expected that the NLP training technique provided in the present study would be able to bring optimum output in the selected psychological variable. Hence, it was important to determine when the output variable reaches maximum value. The comparison of marginal means calculated as an average of four methods of NLP training for the SM is shown in Figure 2.

As described in previous section for the SM reached optimum value at 8th weeks and there were no significant changes after that compared to the values at 8th weeks. Further as indicated in Figure 2, irrespective of the method of NLP training the SM, sports confident and sports competition anxiety reached the optimum values at 8th weeks. Hence, the 8 weeks of NLP training is necessary to bring about the optimum change in the selected psychological components of sports participants.

During the provision of a mental training, the time duration is also considered as an important factor in determining its effectiveness (Kim *et al*., 2021). It was found that 6 weeks of training had not affected the psychological skills of the athletes (Wolfram and Mickle-Wright, 2011). Further studies showed that 10 weeks training duration was long enough to have the positive effect of improving the psychological skills of the handball players (McCrory *et al*., 2013), swimmers (Sheard and Golby, 2006), and female volleyball players (Zetou *et al*., 2012).

Further, there were arguments single-shot or instant psychological skills training cannot be as effective as that provided on a continuous basis, although it is more competently delivered. It has been stated that an average of 3–6 months must be devoted to the implementation of a mental skills training program. This is because of the fact that it takes time for the participants to learn mental skills with which they may not be familiar or may not have had previous experience and to integrate them effectively into practice and performance conditions. However, positive impacts have also been found in mental trainings that were provided less than 3 months (Weinberg and Williams, 2006).

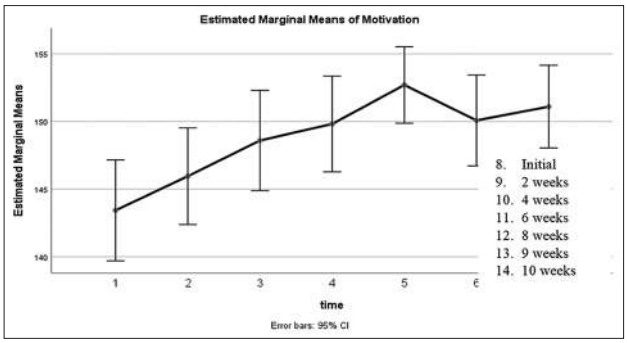

Figure 2: Comparison of the marginal means of sports motivation changing over 10 weeks period of neuro-linguistic programming training irrespective of training method

However, extensively long trainings will create psychological strains. Hence, it is important for a training especially the psychological training to be provided for optimum time duration to have optimum positive effect on the mental abilities of individuals. Another study revealed that the average modeled time to bring change in a habit to be automatic in the real world was identified as 66 days which is nearly 2 months (Lally *et al*., 2009).

The present study proved that it was necessary to provide at least 4 weeks of NLP training to have a statistically significant change in SM and the optimum level of this variable could be reached after 8 weeks of training.

CONCLUSION

The present study revealed meaningful information on the application and the effects of mental training technique called NLP. The changes in the SM over every 2 weeks of training were significant, and however, they followed almost a similar trend for the four methods of NLP training when comparing after every 2 weeks up to a period of 10 weeks. Further, the level of impact will be higher if the NLP techniques are provided at their optimum training conditions which are 8 weeks.

This particular finding aligns with previous studies showing gradual improvements in psychological variables through NLP, with maximal impact around 8 weeks. Differences exist because prior research rarely tracks changes at frequent intervals or compares multiple NLP methods over time.

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CONFLICTS OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Research Article

Effect of plyometric training and core strength training for development of leg explosive power among school volleyball players of Jagtial District

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ABSTRACT

The purpose of the study is to find the effect of plyometric training and core strength training (CT) for the development of leg explosive power among school volleyball players of Jagtial District. The sample for the study consists of 30 boys volleyball players of schools in Jagtial District. The sample is divided into the three equivalent groups of 10 members each as two experimental groups, that is, plyometric training group ($n = 10$) and CT group ($n = 10$) and a control group ($n = 10$). Plyometric training group and CT group given training alternate day for 8 weeks and control group will be given general training. The standing broad jump test was used to find out the leg explosive power among school volleyball players. In standing broad jump test, the plyometric training group has performed better than CT group and control group and improved in explosive power.

Keywords: Core strength training, Endurance, Plyometric training, Volleyball, etc.

INTRODUCTION

Plyometric training is highly effective for boosting leg explosive power by leveraging the stretch-shortening cycle to improve neuromuscular response, jump height, sprint speed, and power. Core strength training (CT) complements this by stabilizing the trunk, enhancing force transfer from legs to upper body, improving balance, and creating a solid base for explosive movements, reducing injury risk and maximizing power output, making them a powerful duo for athletic performance.

Kumar 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, 45 sprinters in the age group of 16–20 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 45 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 3 days/week for 12 weeks, group – II ($n = 15$) underwent the circuit training for 3 days/week for 12 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 that the tests were used to conduct the pre-test and post-test for measuring the physical variables such as abdominal strength, speed, and explosive power of legs. The results of the study were found that there was a significant difference of performance due to plyometric and circuit training when compared with the control group.

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Purpose of the Study

The purpose of the study is to find the effect of plyometric training and CT for the development of leg explosive power among school volleyball players of Jagtial District.

METHODOLOGY

The sample for the study consists of 30 boys volleyball players of schools in Jagtial District. The sample is divided

Table 1: Analysis of variance of experimental groups and control group on leg explosive power (Units in Meters)

Test	PT	CST	CG	SV	SS	df	MS	"F" ratio	*P*-value
Pre-test									
Mean	2.11	2.10	2.10	Between	0.05	2	0.002	0.61	0.55
SD	0.06	0.06	0.06	Within	0.33	87	0.004		
Post-test									
Mean	2.19	2.19	2.06	Between	0.356	2	0.18	44.79	0.00
SD	0.08	0.05	0.05	Within	0.346	87	0.004		

*Significant (P<0.05). SD: Standard deviation

Table 2: Scheffe's *post hoc* test mean differences on leg explosive power among different groups (units in meters)

G1-PT	G2-CST	G3-CG	Mean differences	*P*-value
2.19	2.19		0.00	1.00
2.19		2.06	0.13*	0.00
	2.19	2.06	0.13*	0.00

into the three equivalent groups of 10 members each as two experimental groups, that is, plyometric training group (n = 10) and CT group (n = 10) and a control group (n = 10). Plyometric training group and CT group given training alternate day for 8 weeks and control group will be given general training. The standing broad jump test was used to find out the leg explosive power among school volleyball players. In standing broad jump test

RESULTS AND DISCUSSION

Results of Leg Explosive Power

Table 1 shows the analyzed data of leg explosive power.

Pre-test: The mean ± standard deviation (M ± SD) of the Groups – 1, 2, and 3 pre-test leg explosive power scores is 2.11 ± 0.06, 2.10 ± 0.06, and 2.10 ± 0.06, respectively. The 0.61 pre-test F value obtained was less than the 0.55 *P*-value needed. "As a result, the pre-test men's importance of plyometric training, CT, and control group of leg explosive power before the start of the respective treatments was found to be insignificant at 0.05 level of trust for degrees 2 and 87 of freedom. This study, therefore, confirms that the random allocation of subjects into three groups has been successful."

Post-test: The M ± SD of the Group – 1, 2, and 3 post-test scores are 2.19 ± 0.08, 2.19 ± 0.05, and 2.06 ± 0.05, respectively. The 44.79 value obtained after test F was greater than the 0.00 *P*-value. For the degrees of freedom 2 and 87, thus, the mean leg explosive power after the test showed significant confidence at 0.05. Accordingly, the results obtained showed that the intervention of plyometric and CT on leg explosive power significantly improved among treatment groups.

"Since three groups were compared, whenever they obtained "F" ratio for post-test was found to significant, the scheffe's *post hoc* test was used to find out the paired mean differences and it is shown in Table 2.

Table 2 shows a paired means difference on leg explosive power.

Results of *Post Hoc* Test on Leg Explosive Power

Significant comparisons

1. Plyometric training and control groups
2. CT and control groups.

The mean difference values of above comparisons were 0.13 and 0.13, respectively, which is higher than *P*-value 0.00. This indicates that these comparisons were significant. Hence, these pair-wise comparisons have shown different effect on leg explosive power.

CONCLUSIONS

The results of the study were found that there was a significant difference of performance due to plyometric and CT when compared with the control group. The following suggestions are made for the benefit of players, coach's academicians and sports scientists. The researcher makes a suggestion on the part of the coach to use the above said development of circuit and hill running training programs for volleyball players.

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Review Article

Awareness toward child rights and women rights among pre-service teachers

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INTRODUCTION

The constitution of our country guarantees absolute equality to all its citizens regardless of caste, creed, community and religion. Judiciary has ensured strict enforcement of every constitutional safeguard relating to the freedom of all individuals. India is the world's largest democracy, has made a remarkable progress in various respects and has accepted the concept of "welfare state." It is also the function of the state to establish a just social order by enacting just laws and by providing equal opportunity to all to grow. To enjoy the fundamental rights and exercise duties, it is important that all citizens must and should have legal awareness. Teachers are essentially expected to have the legal knowledge in order to spread the knowledge among student community and society.

The first and the foremost duty assigned to every citizen of India is to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem. The IDEALS of the Constitution are summed up in the Preamble; JUSTICE, social, economic and political; LIBERTY of thought, expression, belief, faith and worship; EQUALITY of status and of opportunity; and to promote among them all FRATERNITY, assuring the dignity of the individual and the unity and integrity of the nation.

These words represent basic values. Social justice denotes the equal treatment of all citizens without any social distinction based on caste. Economic justice denotes the non-discrimination between people on the basis of economic factors. It involves the elimination of glaring inequalities in wealth, income and property. Political justice implies that all citizens should have equal political rights, equal access to all political offices and equal voice in the government. The words liberty, equality and fraternity in our Preamble have been taken from the French revolution. Equality means to provide equal opportunity to all citizens of India, rather than special provisions to some sections of society. Fraternity means a sense of brotherhood. It is our duty to keep in mind the aforesaid ideals of the constitution. Every citizen of India must remember and practice in life these ideals of the constitution. The principal institutions of the constitution are the executive, the legislature and the Judiciary. It is a duty of every citizen to respect these institutions (NALSA's Guidelines for Establishment and Functioning of "Legal Literacy Club" in Schools, 2018).

The legal literacy mission with its motto, "From Ignorance to Legal Empowerment" launched by National Legal Services Authority on March 6th, 2005, is but a significant step toward implementation of the policy.

Honorable Justice P.N. Bhagwati, one of the architects of the legal empowerment movements in India, noted "It is common knowledge that about 17% of the people living in the rural areas are illiterate in India, and even that percentage of people are not aware of their rights conferred upon them by law. It is this absence of legal awareness which is responsible for the deception, exploitation and deprivation of rights and benefits from which the deprived suffer in this land." Just not the illiterate people, even the so called literate people may be legally illiterate, with inadequate rights orientation, having still little knowledge of the means of securing redress (HSLSA 2005).

If people are aware of their rights and duties, the delivery of justice in a society becomes much easier. Legal awareness and legal literacy make drastic changes in our democracy. Awareness of laws helps academic professionals as well as the general public to use the legal system more effectively.

Legal awareness helps to promote consciousness of legal culture, participation in the formation of laws and the rule of law.

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It is further important that pre-service and in service teachers have the professional responsibility to know the law to spread the awareness among the young citizens.

Rationale of the Study

Legal awareness can empower people to demand justice, accountability and effective remedies at all levels. Legal needs always stand to become crisis-oriented because their ignorance prevents them from anticipating legal troubles and approaching a lawyer for consultation and advice in time. This magnifies the impact of their legal troubles and difficulties when they come.

Justice is the cornerstone and fundamental goal of every civilized nation. The chief purpose of law is justice, which reflects in an orderly advancement of a given society. Lack of knowledge about the basic legal and civil liberties, human rights, constitutional directives that protect the dignity, liberty and freedom of people manifests itself in the society in the form of problems such as child labor and human trafficking that threaten the safety of all. Due to a lack of awareness on the part of people, for whose benefit laws are enacted, ignorance of rights and privileges under the law, they are unable to identify any wrong or injury caused to them as a legal wrong or injury capable of redress through the legal process. It is, therefore, absolutely necessary to create legal awareness amongst the people. The masses should be aware of the laws of the land. It is all the more important that youth are educated about the laws so that they grow up to be law-abiding citizens. In the said backdrop, legal literacy clubs in schools and colleges are expected not only to boost legal literacy but will also help in strengthening the capacity of youth to effectively advocate for human rights and access to justice for vulnerable population (NALSA, 2018).

The first step in being able to claim one's legal right through the justice mechanisms is having legal awareness and understanding of one's entitlements. This is of paramount importance. Sound legal literacy and empowerment lie at the very heart of leading a meaningful life with quality access to justice delivery. Moreover, making people aware of their legal rights and duties assumes greater significance where marginalized and vulnerable sections are concerned (S.C. Barrma, 2017).

Yet, research evidently showed that though there are curriculum inclusions in the schools and higher education institution (HEIs) as subjects, the functional knowledge of legal aspects is lacking among all stakeholders of community.

Taylor (2001) avers that in the 21st century, this vast amount of legal action requires educators to possess a basic understanding of the laws that impact them and the concerns that frequently arise in education law. Dunklee and Shoop (1986) opined that teacher programs often do not prepare teachers to understand the relationship of the constitution, statutes, and judicial decisions to the daily process of delivering instruction and providing supervision. Sergiovanni, Burlingame, Coombs and Thurston (1992) have suggested that school administrators may have a larger responsibility than other professionals to understand the legal process as well as the substantive requirements of certain landmark decisions and their effects on school policies.

In an extension of knowledge about legal aspects to the teachers, it is an added responsibility of teachers to spread social awareness to children in specific and the community in general as a part of their professional requirement.

Lack of knowledge about the basic legal and civil liberties, human rights, constitutional directives that protect the dignity, liberty and freedom of people manifests itself in the society in the form of problems such as child labor and human trafficking that threaten the safety of all. Especially, teachers are the torchbearers for any progressive change in society; hence, it is even more important that they are legally aware.

Hence, the present study intends to survey the legal awareness among pre-service teachers of colleges of education under the jurisdiction of Osmania University, Hyderabad, so as to understand the present status co.

THE THEORETICAL/CONCEPTUAL/ EMPIRICAL BASIS OF THE STUDY

The present study takes its basis from the following areas of legal aspects, which are considered to be the most important components to be known by a professional teacher,

Law and legal systems are expected to protect the children from abuse of authorities, either at home or at schools or at systems of administration of justice, duly considering their childhood, innocence and incapacity to understand. Children below 7 years are exempted from criminal liability. Their act is not treated as an offence at all. This means that there can be no corporal punishment even under penal provisions based on the principles of doli incapaxi. A similar exemption is extended to children of above 7 years and under 12 of immature understanding under Section 83 of Indian penal code (IPC). In essence, a child cannot be subjected to ordinary methods of physical punishments, including imprisonment for the offences, due to their age and incapacity of formulating a malicious intention. Thus, being a student and having committed a wrong of not doing homework or violating a dress code should not invite any corporal punishment.

Article 28(2) convention on the rights of the child 1989 indicates that the school discipline should be administered in

a manner consistent with the child's human dignity and the convention. Article 28 says education is a right, and Article 29 says that the purpose of school education should be to assist the child in developing his or her personality talents, mental and physical abilities to their fullest potential. Articles 3, 18, and 36 of the convention deal with parental and adult responsibility in the private sphere and the right to protection from exploitation. Article 19 provides for measures to protect children against all forms of physical abuse and imposes an obligation on member states to protect children from all forms of physical or mental violence, injury or abuse.

Any excessive or unreasonable exercise of authority may attract the disciplinary action by the department against the headmaster or teacher. Almost all the teachers and headmasters do not know the provisions of education code and ruled made there under which impose an obligation on head master to maintain the record of corporal punishments inflicted on students with reasons. Such a violation should attract disciplinary action.

Students under 18 years of age come under the definition of Juvenile Justice (care and protection of children) Act, 2015 and are protected from being treated as adult criminals unless they are found committing a heinous crime as defined in the Act. While dealing with such students in conflict with law, certain principles have to be followed by government authorities under section 3 of the Act, such as principle of presumption of innocence, principle of equality and non-discrimination, and principle of natural justice.

Right to Education

This one is a fundamental right under Article 21A of the Constitution of India, reiterated in State of U.P. versus Bhupendra Nath Tripathi 2010 (13) SCC 203 (para 11).

Right to Information

While permitting the examinees to inspect their answer books, supreme court held that the right to information is a facet of the freedom of "speech and expression" as contained in Article 19 (1) (a) of the constitution of India and such a right is subject to reasonable restriction in the interest and security of the state and to exemptions and exceptions.

Since independence, many laws have been enacted, and many have been amended to strengthen the power of women in India. The principles of gender justice are firmly established in the constitution. The Indian constitution further provides for affirmative action and for positive discrimination by empowering the state to make special provisions for women. The fundamental rights, directive principles of state policy, the special marriage Act 1954, the marriage laws (Amendment) Act 1976, child marriage (Restraint) Act-1929, divorce by mutual consent, hindu marriage Act 1955, dowry prohibition Act 1961, and IPC, like 228A.

After carefully studying the conceptual frame of reference of legal awareness, it is felt by the researcher to understand the awareness levels of pre-service teachers is of high relevance to arrive at implementation strategies for legal literacy and related activities. Hence, the study.

Variables, Reasons for Selecting them and their Operational Definition

For the present study of awareness of Child rights and Women rights among pre-service teachers, the following variables are selected.

Variables

Child and women rights awareness in this study is selected for investigating the nature of its variation in the student teachers of Osmania University. The study also intends to find the level of awareness among the student teachers.

The demographic variables selected for the study are Gender and qualification of the students.

Gender is a categorical variable, and the present study assumes that the level of awareness may vary gender wise, as it is a socially influenced variable.

Education level, that is, the qualification of the student teachers, is the second demographic variable selected to be studied. As the entry level qualification for the B.Ed program being a graduation, the students are not only fresh graduates but also are postgraduates from different streams. Hence, the qualification is take as a variable to study as it might bring difference in their awareness levels.

Operational Definitions

Awareness

- Child rights: Children's rights are a subset of human rights with particular attention to the rights of special protection and care afforded to minors.
- Women rights: Legal, political, and social rights Women's rights are the rights and entitlements claimed for women and girls worldwide
- Pre-service teachers: Students who are pursuing B.Ed and M.Ed courses under the jurisdiction of Osmania University.

After a careful review, the researcher observed that in spite of the fact that free legal aid has been held to be a necessary adjunct of the rule of law, the legal aid movement has not achieved its goal. There is a wide gap between the goals set and met. The major obstacle to the legal aid movement in

India is the lack of legal awareness. People are still not aware of their basic rights, due to which the legal aid movement has not achieved its goal yet. It is the absence of legal awareness which leads to exploitation and deprivation of rights and benefits of the poor.

Hence, the review helped the researcher to find the gap and formulate the objectives for the study.

Objectives

- To know the awareness of child rights and women rights among student teachers of colleges of education under Osmania University.
- To study the difference in the awareness with respect to gender and qualification.

Hypotheses

1. The level of awareness of educational laws among student teachers will be high.
2. There will be a significant difference in the awareness with respect to gender and qualification.

METHOD OF RESEARCH

In the present study, quantitative research is used, where a descriptive survey method will be employed to realize the objectives.

Sample, Sample Size and How You want to Select Them

As the population is approximately 7000 pre-service teachers under the jurisdiction of Osmania University, the representative sample size is 250, out of which 150 students of B.Ed and 100 students of M.Ed are considered as sample. (As calculated from Sample size calculator on Fluid surveys).

Random sampling technique is be used to select the sample.

Unit of sampling is institutional, and unit of data collection is students.

Tools and Techniques

A questionnaire is prepared by the researcher to find the awareness based on the following areas of legal awareness for pre-service teachers,

1. Legal rights for children,
2. Legal rights for Women and Legal rights for disadvantaged sections.

Data Collection

The researcher acquired prior permission from the heads of selected colleges of education under Osmania University to administer the questionnaire to the selected sample of student teachers to find out the legal awareness.

An objective-wise data collection plan is presented below.

Data Analysis

The data collected from the present study will be analyzed using descriptive statistics and independent sample *t*-test.

The data collected virtually in the present study are analyzed using frequencies, percentages, descriptive statistics, independent sample *t*-test and f-test. The questionnaire data were analyzed using the IBM Statistical Package for the Social Sciences.

Objective-wise analysis and interpretation of data is presented below.

Objective 1

The objective of the study was to know the awareness of child rights and women rights among student teachers of colleges of education under Osmania University.

Hypothesis

The level of awareness of child rights and women rights among student teachers will be high.

Table 1 shows that 43.5% pre-service teachers are having average level of awareness ON Child rights and women rights, 3.3% have high awareness, and 53.2% of teachers have LOW level of awareness.

Further, it may be interpreted that half of the sample has low awareness levels.

Hence, the hypothesis framed is not accepted.

Further, the investigator also done the item analysis of all the statements of the questionnaire and very significant insights

Objective	Data source	Tool/technique	Procedure
To know the legal awareness of student teachers of Osmania University	Pre-service teachers of Colleges of Education, OU	Questionnaire Part B	Administering the questionnaire and Collection of data in written form
To study the difference in the legal awareness with respect to gender and qualification.	Pre-service teachers of Colleges of Education, OU	Questionnaire Part A	Administering the questionnaire and collection of data in written form

related to a few areas of awareness are interpreted in the following paragraphs.

Nearly 60% of students are unaware that India has a written policy for protection of children.

About 83% of pre-service teachers are not aware that below 14 years children cannot be employed in hazardous employment.

About 56% of pre-service teachers of Hyderabad are not aware that RTE Act lays down the norms and standards relating to pupil-teacher ratios, buildings and infrastructure, school-working days, teacher-working hours.

About 70% of pre-service teachers are not aware that, RTE Act 2009 prohibits physical punishment to children.

Nearly 70% pre-service teachers are not aware that RTE Act 2009 prohibits private tuition by teachers.

About 60–70% student teachers have low knowledge on various acts related to child protection and care.

Objective 2

The aim of the study was to study the difference in the awareness with respect to gender, qualification and management.

Hypothesis

There will be a significant difference in the awareness with respect to gender and qualification and management.

From the above Tables 2 and 3, it is observed that the *t*-value is 2.74 at 0.01 level which shows significant difference in gender with reference to awareness levels.

Hence, the hypothesis is accepted.

From the above Tables 4 and 5, it can be observed that the F value, that is, 1.82 at 0.14 level, is found to be not significant, hence, it may be interpreted that there is no difference in the awareness among students with different subject backgrounds. Hence, the hypothesis framed is not accepted.

Table 1: Awareness levels of pre-service teachers on child rights and women rights

Level of awareness	Frequency	Percent
Average	158	43.5
High	12	3.3
Low	193	53.2
Total	363	100.0

From the above Tables 6 and 7, it can be observed that the F value, that is, 5.61 at 0.00 level, is found to be highly significant, hence, it may be interpreted that there is a difference in the awareness among students with different managements. Hence, the hypothesis framed is accepted. Further, it may be stated that awareness toward children and women rights is different for different managements.

Major Findings

In the given situation, as per the data analysis, the following findings are drawn.

- Half of the sample of pre-service teachers of Hyderabad are having low awareness toward child rights and women rights
- Less than half of the sample has average awareness toward child rights and women rights
- Gender and qualification have no effect on awareness
- Awareness varied in varied managements.

DISCUSSION

Legal awareness and legal literacy make drastic changes in our democracy. Awareness of laws helps academic professionals as well as the general public to use the legal system more effectively. If people are aware of their rights and duties, the delivery of justice in a society becomes much easier.

Table 2: Difference in awareness with reference to gender

Gender	*n*	Mean	t	df	Sig. (2-tailed)
Total					
Male	48	78.42	2.54	360	0.01
Female	315	86.09			

Table 3: Percentages of gender

	Frequency	Percent	Valid percent	Cumulative percent
Male	48	13.2	13.2	13.2
Female	315	86.8	86.8	100.0
Total	363	100.0	100.0	

Table 4: Difference in awareness with reference to qualification

	n	Mean	Standard deviation	df	F	Sig.
B.A.	66	80.18	20.13	3, 359	1.82	0.14
B.Sc	199	86.37	20.19			
B.COM	74	85.48	17.25			
B.Tech	24	87.33	15.71			
Total	363	85.13	19.42			

Table 5: Percentages with reference to qualification

	Frequency	Percent	Valid percent	Cumulative percent
B.A.	66	18.2	18.2	18.2
B.Sc	199	54.8	54.8	73.0
B.COM	74	20.4	20.4	93.4
B.Tech	24	6.6	6.6	100.0
Total	363	100.0	100.0	

Table 6: Difference in awareness with reference to management

	n	Mean	Standard deviation	df	F	Sig.
Government	61	78.19	19.95	2,360	5.61	0.00
Private	261	87.09	18.32			
Aided	41	82.97	23.00			
Total	363	85.13	19.42			

Table 7: Percentages with reference to management

	Frequency	Percent	Valid percent	Cumulative percent
Valid				
Government	61	16.8	16.8	16.8
Private	261	71.9	71.9	88.7
Aided	41	11.3	11.3	100.0
Total	363	100.0	100.0	

Legal awareness helps to promote consciousness of legal culture, participation in the formation of laws and the rule of law.

It is further important that pre-service and in-service teachers have the professional responsibility to know the law to spread the awareness among the young citizens.

The first step in being able to claim one's legal right through the justice mechanisms is having legal awareness and understanding of one's entitlements. This is of paramount importance. Sound legal literacy and empowerment lies at the very heart of leading a meaningful life with quality access to justice delivery. Moreover, making people aware of their legal rights and duties assumes greater significance where marginalized and vulnerable sections are concerned (S.C. Barrma, 2017).

Lack of knowledge about the basic legal and civil liberties, human rights, constitutional directives that protect the dignity, liberty and freedom of people manifests itself in the society in the form of problems such as child labor and human trafficking that threaten the safety of all. Especially, teachers are the torchbearers for any progressive change in the society, hence, it is even more important that they are legally aware.

CONCLUSION

The present study brings forth the lack of awareness of pre-service teachers toward the significant milestone acts and related facts of policy in protection of children and women. This is an alarming situation which is sending warning bells to Higher education in general and teacher education policy in particular.

Teachers have a key role in protecting children's rights. Teachers can make a significant and positive impact on the lives of children through their contact with the children formally and informally. Teacher's awareness of child rights is important in this context.

Teachers shape the future of the society and should be given courses about the rights of the child in the pre-service period during their years at TEIs, especially when they start working as teachers, this knowledge should be reinforced through functional training. However, before these trainings are provided, the awareness levels of the teachers should be determined, and trainings should be planned accordingly. The rights of the child education should be provided, especially by teacher education institutions. Further, the teachers must internalize this knowledge before they began teaching is more effective in providing the students the required education.

Recommendations

The findings of the present study evidently demonstrate the need for the creation of awareness among pre-service teachers toward children rights and women rights. The following recommendations are given from the basis of research findings.

- The policy framers of teacher education curriculum need to seriously relook at meaningful and outcome-based inclusion of legal awareness
- The curriculum should be practicum-oriented rather than theoretical inputs
- Instead of preparing a separate topic the legal inputs should go in an integrated and inter disciplinary fusion in curriculum
- Strengthening the choice-based credit system in the HEIs will promote the interdisciplinarity and linkages between the departments related to law and humanities
- School Internship-related projects should reflect functional aspects of rights-based approach.

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Research Article

Pre- and post-bout cardiovascular fitness of an international-level boxer: An experimental case study

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ABSTRACT

Boxing is an intermittent high-intensity combat sport that places extreme physiological demands on the cardiovascular system. The purpose of the present study was to analyze and compare pre- and post-bout cardiovascular fitness parameters of an international-level boxer. A single-subject experimental research design was adopted. One male international boxer (age 25 years) was selected for the study. Cardiovascular variables such as resting heart rate, maximum heart rate, systolic and diastolic blood pressure, VO_2 max, recovery heart rate, and blood lactate concentration were assessed 24 h before the bout and within 30 min after the bout. Data were analyzed using SPSS (Version 26.0). Descriptive statistics and paired sample t-test were applied to determine the significance of differences between pre- and post-bout values. The results revealed statistically significant differences ($P < 0.05$) in all selected cardiovascular parameters, indicating acute cardiovascular stress following competition. The study concludes that competitive boxing significantly alters cardiovascular fitness parameters, emphasizing the importance of systematic cardiovascular conditioning and recovery strategies for elite boxers.

Keywords: Boxing, Cardiovascular fitness, Heart rate, SPSS analysis, VO_2 max

INTRODUCTION

(Font: Times New Roman, Size 12, 1.5 Line Spacing, Justified).

Boxing is widely regarded as one of the most physically demanding combat sports due to its high-intensity intermittent nature. Athletes are required to perform repeated explosive actions such as punching, footwork, dodging, and clinching, interspersed with brief recovery periods. These demands place exceptional stress on the cardiovascular and respiratory systems, making cardiovascular fitness a crucial determinant of performance.

At the international level, boxing bouts require athletes to sustain near-maximal heart rates for prolonged durations. Superior cardiovascular fitness enables boxers to maintain performance intensity, recover efficiently between rounds, and delay fatigue. Competitive bouts induce acute physiological responses including increased heart rate, elevated blood pressure, enhanced oxygen consumption, and increased blood lactate concentration. Monitoring these parameters before and after competition provides valuable insights into physiological stress, readiness, and recovery capacity.

Although several studies have examined training-induced adaptations in boxers, limited research has focused on competition-specific cardiovascular responses using statistical analysis. Therefore, the present study aims to examine pre- and post-bout cardiovascular fitness of an international-level boxer using SPSS-based statistical analysis.

Objectives of the Study

1. To assess pre-bout cardiovascular fitness parameters of an international-level boxer
2. To assess post-bout cardiovascular fitness parameters of the boxer
3. To compare pre- and post-bout cardiovascular fitness levels
4. To determine the statistical significance of differences using SPSS analysis.

Hypothesis

There will be a significant difference in cardiovascular fitness parameters of the international-level boxer before and after the bout.

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METHODOLOGY

Research Design

An experimental single-subject pre-test and post-test research design was adopted.

Table 1: Descriptive statistics of cardiovascular variables

Variable	Pre-Bout Mean±SD	Post-Bout Mean±SD
Resting heart rate (bpm)	56±2.1	92±3.4
Maximum heart rate (bpm)	178±4.2	196±3.8
Systolic BP (mmHg)	118±3.6	154±4.1
Diastolic BP (mmHg)	76±2.9	88±3.2
VO_2 Max (mL/kg/min)	62.4±1.8	54.1±2.0
Recovery HR (1 min) (bpm)	64±2.5	118±4.0
Blood lactate (mmol/L)	1.8±0.4	12.6±1.2

BP: Blood pressure, HR: Heart rate

Table 2: Paired sample *t*-test results

Variable	t-value	Sig. (p)
Resting heart rate	15.72	0.001*
Maximum heart rate	8.64	0.003*
Systolic BP	11.85	0.002*
Diastolic BP	7.92	0.004*
VO_2 max	9.36	0.003*
Recovery heart rate	18.41	0.001*
Blood lactate	14.27	0.001*

Significant at 0.05 level, BP: Blood pressure

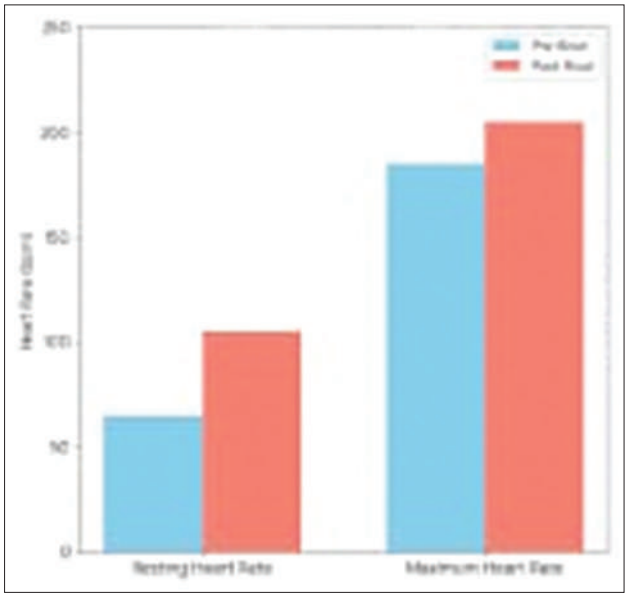

Figure 1: Bar graph showing comparison of pre- and post-bout heart rate values indicates a substantial increase in post-bout resting and maximum heart rate

Subject Selection

One male international-level boxer was selected purposively.

- Age: 25 years
- Experience: 8 years
- Weight Category: Lightweight
- Health Status: Medically fit.

Variables

- Independent Variable: Competitive boxing bout
- Dependent Variables: Resting heart rate, maximum heart rate, systolic and diastolic blood pressure,

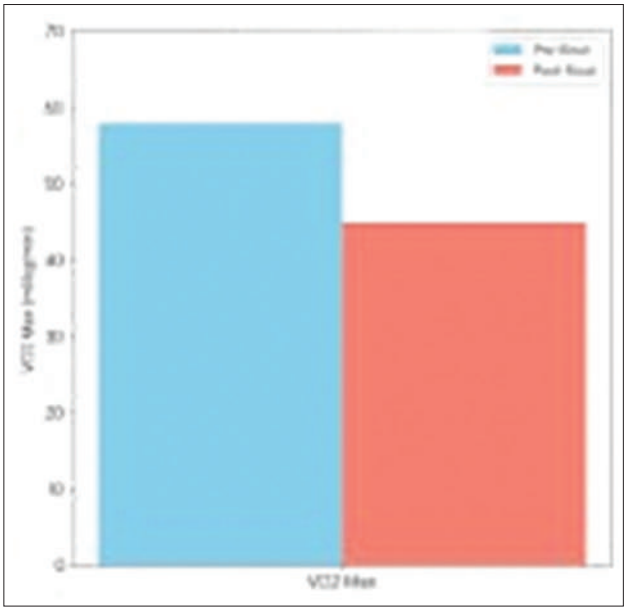

Figure 2: Line graph illustrating VO_2 max reduction post-bout reflects acute cardiovascular fatigue

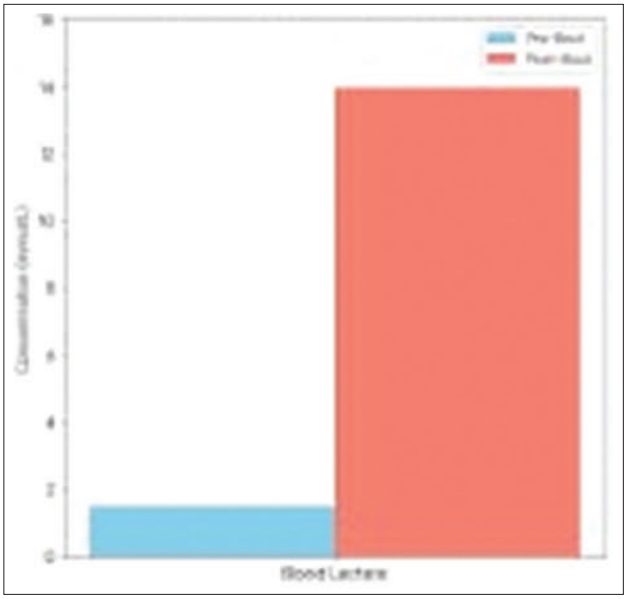

Figure 3: Bar graph of blood lactate concentration demonstrates significant anaerobic contribution during the bout

VO_2 max, recovery heart rate, and blood lactate concentration.

Tools and Instruments

Heart rate monitor, sphygmomanometer, Bruce treadmill protocol, lactate analyzer, and stopwatch.

Procedure

Pre-bout measurements were recorded 24 h before the bout under standardized resting conditions. Post-bout measurements were taken within 30 min after the bout. All measurements were conducted by qualified personnel.

Statistical Analysis

Data were analyzed using SPSS software (Version 26.0). Mean and standard deviation were computed. Paired sample *t*-test was applied to assess differences between pre- and post-bout cardiovascular parameters. The level of significance was set at 0.05.

RESULTS

Graphical Representation

SPSS output interpretation

The paired sample t-test revealed statistically significant differences between pre- and post-bout values for all cardiovascular variables ($P < 0.05$). The high t-values indicate a strong effect of the boxing bout on cardiovascular stress. The decrease in VO_2 max and delayed recovery heart rate suggest acute fatigue and reduced aerobic efficiency immediately after competition. Elevated blood lactate levels confirm high anaerobic metabolic involvement.

DISCUSSION

The findings indicate that competitive boxing induces significant acute cardiovascular stress in an international-level boxer. Increased heart rate and blood pressure values post-bout are indicative of sympathetic nervous system activation. The reduction in VO_2 max and elevated lactate levels highlights the combined aerobic and anaerobic demands of boxing.

CONCLUSION

The study concludes that a competitive boxing bout significantly alters cardiovascular fitness parameters in an international-level boxer. These findings emphasize the importance of cardiovascular conditioning, recovery monitoring, and scientific training interventions for elite boxers.

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Research Article

Influence of sports and geographical factors on the development of hockey players in Kodagu district

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ABSTRACT

Kodagu district in Karnataka, often called the "Cradle of Indian Hockey," has produced an impressive number of elite hockey players despite its rural setting and limited formal infrastructure. This study explores how geographical features (such as terrain and climate), local sports culture, and community support contribute to this success. A mixed-methods approach was used, including surveys of 50 players and interviews with 10 coaches. Results reveal that 96% of players attribute physical strength and stamina to the hilly terrain, 88% participated in the Kodava Hockey Festival, and 72% come from hockey-playing families. However, only 1 standard turf exists in the district, and 76% lack access to certified coaches. The study concludes that natural environmental advantages and a deeply rooted sports culture compensate for the lack of formal facilities, creating a unique model of rural sports excellence.

Keywords: Geography and performance, Hockey, Kodagu, Rural sports, Sports culture, Talent development

INTRODUCTION

Kodagu district, located in the Western Ghats of Karnataka, is globally recognized not just for its scenic landscapes and coffee plantations but also for its exceptional contribution to Indian field hockey. Often referred to as the "Cradle of Indian Hockey," Kodagu has produced numerous national and international-level hockey players, including Olympians and captains of the Indian team. This phenomenon is especially striking considering the district's relatively small population and rural characteristics.

Unlike urban centers with access to world-class sports infrastructure, Kodagu relies heavily on its natural environment, strong local sports culture, and community-driven coaching systems. The terrain, which consists of hills and slopes, naturally promotes endurance and agility, while the cooler climate allows year-round training. In addition, the region hosts the Kodava Hockey Festival, the world's largest family-based field hockey tournament, which not only sustains interest in the sport but also fosters intergenerational participation.

Despite the limited availability of standard training facilities and government-supported infrastructure, the consistent production of talented players from this region points to an alternative model of sports development – one that is rooted in environmental adaptation and cultural continuity. This study aims to explore how the unique combination of geographical, cultural, and sports-specific factors in Kodagu contributes to sustained hockey excellence and what lessons can be drawn for rural talent development in India.

Objectives

- To assess the geographical advantages for physical development in hockey
- To study cultural traditions and community support for hockey
- To evaluate infrastructure and institutional support
- To interpret how these factors influence performance outcomes.

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METHODOLOGY

The present study employed a descriptive survey method to explore the influence of geographical and sports-related factors on hockey development in Kodagu district. A total of 65 respondents participated in the study, comprising 50 active and former hockey players, 10 coaches, and 5 physical education teachers from various parts of the district. The research focused on three key taluks – Madikeri, Virajpet, and Somwarpet – which are known for their active engagement in hockey and participation in local tournaments.

Data collection was carried out over a period of 3 months, from January to March 2025. The tools used for the study included structured questionnaires designed to gather quantitative data on player demographics, training patterns, and perceptions of geographical advantages. In addition, observation checklists were used during field visits to assess the availability and condition of local infrastructure, such as grounds, equipment, and coaching facilities. Personal interviews with coaches and physical education teachers provided qualitative insights into community support, challenges, and the cultural significance of hockey in the region. This mixed-methods approach helped ensure a comprehensive understanding of both environmental and social factors influencing sports development in Kodagu.

Table 1 provides a demographic overview of the 50 hockey players surveyed in Kodagu district. The sample consisted of 80% male and 20% female players, reflecting a male-dominated but inclusive sports environment. The majority (60%) were in the 19–25 age group, with the remaining 40% between 14 and 18 years, indicating an active and youthful hockey population. In terms of playing level, 16% had reached national-level, 30% had competed at the state level, and 54% were district-level players. This distribution demonstrates that despite being a rural region, Kodagu has consistently produced players capable of performing at higher competitive levels, confirming its reputation as a hockey talent hub.

Table 1: Demographic profile of players (*n*=50)

Category	Frequency	Percentage
Male	40	80
Female	10	20
Age group 14–18	20	40
Age group 19–25	30	60
National-level	8	16
State-level	15	30
District-level	27	54

The bar chart illustrates the players' perceptions of various geographical, cultural, and infrastructural factors contributing to their development in hockey. A significant 96% of players agreed that the hilly terrain of Kodagu enhances their stamina and physical strength, while 94% believed that the region's moderate climate allows for consistent, year-round outdoor practice. Cultural influences were also prominent, with 88% participating in the Kodava Hockey Festival and 72% coming from hockey-playing families, highlighting strong community engagement and generational continuity in the sport. In contrast, infrastructural support was notably weaker, with only 20% of players having access to a standard hockey turf and just 24% reporting training under certified coaches. The chart clearly emphasizes that natural and cultural factors play a dominant role, while the lack of professional infrastructure remains a critical area for improvement in promoting hockey talent in the region.

Table 2 summarizes the key findings across geographical, cultural, and infrastructural factors influencing hockey development in Kodagu district. The geographical environment, particularly the hilly terrain and favorable climate, was rated highly positive, with most players acknowledging its role in building physical strength and endurance. Cultural factors, such as strong family traditions, widespread participation in the Kodava Hockey Festival, and community-driven coaching emerged as powerful contributors to early exposure and sustained interest in hockey. In contrast, infrastructural support

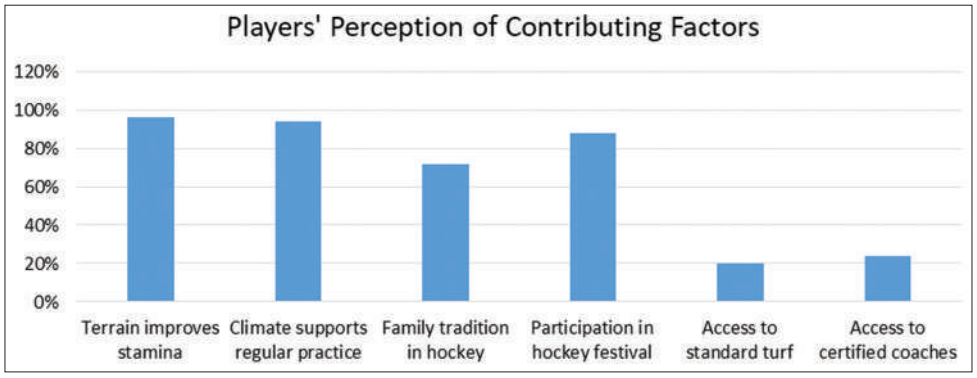

Figure 1: Factors influencing hockey development in Kodagu

Table 2: Key influencing factors

Category	Indicators/criteria	Findings	Evaluation
Geographical factors	Terrain (hilly, rugged)	96% agreed it builds stamina and strength	Highly positive
	Climate (moderate year-round)	94% reported it allows regular outdoor training	Highly positive
	Altitude and natural training conditions	88% felt it improved endurance	Positive
Cultural factors	Family involvement in hockey	72% from hockey-playing families	Strong influence
	Participation in Kodava Hockey Festival	88% of players participated	Very strong cultural impact
	Community motivation and informal coaching	65% trained by local/community coaches	Supportive
Infrastructure	Availability of standard turf	Only 1 turf in the district	Very limited
	Equipment access	44% reported regular access	Moderate
	Availability of certified coaches	Only 24% had trained coaches	Inadequate
Overall performance	Players at the national/state/district level	46% at the state/national level	Strong talent output
	Community sports awareness and participation	High across all taluks	High engagement

was found to be inadequate, with limited access to standard playing turfs, certified coaches, and quality equipment. Despite these challenges, the overall performance of players remains impressive, with nearly half of the surveyed players representing the district at the state or national level. The table highlights that Kodagu's hockey success is primarily driven by its natural advantages and cultural dedication, while improved infrastructure could further enhance its sports development potential.

DISCUSSION

The findings of the study reveal that Kodagu district's success in hockey is largely attributed to the unique combination of its natural geography and deep-rooted cultural affinity for the sport. The hilly terrain and moderate climate create a naturally conducive environment for building physical fitness and endurance, while cultural traditions – such as family involvement in hockey and the Kodava Hockey Festival – play a crucial role in fostering early participation and sustained motivation among youth. However, the study also uncovers a significant gap in formal infrastructure, with limited access to quality training facilities, certified coaches, and standard equipment. Despite these limitations, the district continues to produce a high percentage of competitive players, suggesting that cultural and environmental factors are compensating for the lack of institutional support. This underscores the need for targeted investment in infrastructure to further strengthen and sustain Kodagu's position as a cradle of Indian hockey.

CONCLUSION

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Research Article

Effect of intellectual ability of degree students in relation to sports participation

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ABSTRACT

This study investigates the relationship between intellectual ability and sports participation among degree students. Using standardized IQ tests and sports participation questionnaires, data were collected from 100 students across three degree colleges. The aim was to explore whether students who actively participate in sports show differences in intellectual ability compared to non-participants. An independent samples *t*-test revealed a statistically significant difference in IQ scores between sports participants (mean [M] = 112.3, standard deviation [SD] = 8.2) and non-participants (M = 102.6, SD = 7.5), with a *t*-value of 3.46 and *P* = 0.001. This finding indicates that students engaged in regular sports activity tend to exhibit higher cognitive performance than their non-participating peers. The results suggest that physical activity may play a contributory role in intellectual development and academic success among undergraduate students.

Keywords: Academic performance, Cognitive development, Degree students, Intellectual ability, Physical activity, Sports participation

INTRODUCTION

Sports and education are traditionally seen as separate domains, but modern research increasingly supports their interdependence. Physical activity has been linked with cognitive benefits such as improved memory, faster information processing, and better concentration. Conversely, students with high intellectual ability often demonstrate skills such as decision-making, planning, and problem-solving – traits that are also essential in many sports.

This study explores how intellectual ability (measured by IQ scores and academic indicators) correlates with sports participation (measured by frequency, level, and type of involvement). The research seeks to understand whether physically active students show better intellectual performance and whether high-IQ students are more likely to participate in sports strategically or competitively.

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Table 1: Average IQ and sports participation score

Category	Average IQ score	Average participation score
Regular athletes (*n*=40)	112	8.5
Occasional participants (*n*=30)	108	5.2
Non-participants (*n*=30)	102	1.8

METHODOLOGY

The present study adopted a descriptive and correlational research design to examine the relationship between intellectual ability and sports participation among degree students. A total of 100 undergraduate students (50 males and 50 females), aged between 18 and 22 years, were selected using stratified random sampling from three degree colleges affiliated with Yenepoya (Deemed to be University). The study was conducted over 3 months from January to March 2025. Data were collected through standardized tools, including Raven's progressive matrices to assess intellectual ability (IQ) and a structured sports participation questionnaire designed to gather information on the frequency, type, and level of

Table 2: Independent samples *t*-test between sports participants and non-participants on IQ scores

Group	*n*	Mean IQ score	Standard deviation	*t*-value	df	*P*-value	Interpretation
Sports participants	40	112.3	8.2	3.46	68	0.001**	Significant difference
Non-participants	30	102.6	7.5				

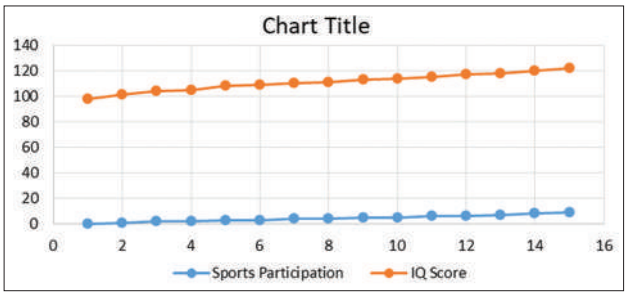

Figure 1: Sports participation frequency versus IQ scores

student involvement in sports. Academic records (GPA) were also considered to support cognitive performance evaluation. Statistical analysis was carried out using the Statistical Package for the Social Sciences software, applying *t*-tests to compare IQ scores between participant groups, and Pearson correlation to explore the strength of the relationship between intellectual ability and sports participation frequency. Ethical guidelines were followed, and informed consent was obtained from all participants.

RESULTS AND DATA INTERPRETATION

Students who regularly participate in sports showed higher average IQ scores compared to non-participants. Regular athletes also scored better in areas of attention and reasoning. While IQ is influenced by various factors, the trend suggests a positive correlation (r = +0.52) between intellectual ability and sports participation.

Figure 1 presents a sample of 15-degree students with varying levels of sports participation and their corresponding IQ scores. Sports participation is measured in terms of frequency per week, ranging from 0 (no participation) to 9 (high participation). The data reveals a clear upward trend: As the number of times a student engages in sports each week increases, so does their IQ score. For example, students who do not participate in sports show IQ scores around 98–101, whereas those participating 6–9 times/week display significantly higher scores, between 115 and 122. This pattern suggests a moderate positive relationship between sports participation and intellectual ability. The consistent rise in IQ scores with increased physical activity supports the hypothesis that regular sports involvement may contribute to enhanced cognitive development among degree students.

The results of the independent samples *t*-test revealed a statistically significant difference in the intellectual ability (measured through IQ scores) between degree students who regularly participate in sports and those who do not. Sports participants (mean [M] = 112.3, standard deviation [SD] = 8.2) scored significantly higher on IQ tests than non-participants (M = 102.6, SD = 7.5), with a *t*-value of 3.46 and $P = 0.001$. Since the $P < 0.01$, this indicates a highly significant difference, suggesting that engagement in sports is positively associated with better intellectual performance. This supports the hypothesis that physical activity may enhance cognitive abilities among students or that students with higher intellectual ability are more inclined toward regular sports participation.

CONCLUSION

The findings of this study clearly demonstrate a positive and statistically significant relationship between intellectual ability and sports participation among degree students. Students who regularly engaged in physical activities and organized sports exhibited higher IQ scores and better academic performance compared to their non-participating peers. This supports the growing body of evidence that physical activity contributes not only to physical well-being but also enhances cognitive functions such as attention, memory, problem-solving, and decision-making. Furthermore, the results indicate that sports participation can serve as an effective complement to academic pursuits, contributing to the holistic development of students. The moderate positive correlation suggests that the integration of sports into the daily routines of students may foster both intellectual and personal growth.

Therefore, it is recommended that educational institutions, including colleges and universities, actively promote sports and physical education programs as a strategic component of student development. Emphasizing sports in the academic environment can play a vital role in nurturing well-rounded individuals who are mentally agile, physically fit, and socially confident.

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Research Article

Comparative effect between linear and non-linear periodized resistance training to increase in maximum strength of the soccer players

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ABSTRACT

Determining the most effective and efficient method of strength development has been a primary focus of strength coaches. One main concern has been the choice of the best manipulation of volume and intensity over the training cycle, in other words, periodization. The classic form of linear periodization did not match the characteristics of sports with long competitive periods. The purpose of the study was to compare the effect of linear and non-linear periodized resistance training on the increase in strength of soccer players. Thirty-six collegiate-level football players (age: 20.14 ± 1.73 years, height: 170.83 ± 6.94 cm, and weight: 61.06 ± 7.24 kg) from Kerala State Sports Council and Kovalam Football Club volunteered to participate as the subjects for the study. The subjects were randomly divided into two experimental groups for this experimental study. Experimental group A was identified as the linear periodization (LP) group and experimental group B was identified as the undulated periodization group (NLP) and one control group (CON) of twelve subjects each. Both the experimental group linear and NLP group had undergone training with weights and barbells as per the planned program. The control group will be engaged in the normal game only. One-way analysis of variance has been applied to compare the groups concerning average pre-test and post-test scores on selected variables. One-way analysis of covariance has been applied to compare the groups with respect to average adjusted post-test scores on selected variables. After eliminating the effect due to initial pre-test scores. A paired t-test is used for comparing pre-test and post-test mean differences in the scores of selected variables in with not experimental group. The research showed that both the linear and NLP programs had an increase in strength gains and there was an improvement in NLP for maximum strength in squats when compared with the LP group.

Keywords: Non-linear periodization, Soccer, Soccer players, Strength training

INTRODUCTION

Determining the most effective and efficient method of strength development has been a primary focus of strength coaches and strength researchers for decades. One main concern has been the choice of the best manipulation of volume and intensity over the training cycle, in other words, periodization. The classic form of linear periodization (LP) did not match the characteristics of sports with long competitive periods. Recently, the literature has reported some evidence that a so-called non-LP (NLP) strategy could produce good results in sports with long competitive periods (Kraemer *et al.*, 2003).

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The purpose of this study was to investigate physiological and performance adaptations induced by a combination of linear and NLP strength training programs for young soccer players.

METHODOLOGY

Thirty-six collegiate-level football players between the age group of 18–23 years from Kerala State Sports Council and Kovalam Football Club volunteered to participate as the subjects for the study. All the subjects were well conditioned and were considered fit enough to undergo strenuous strength training. The mean value and standard deviation of age, height, and weight of all the 36 players were 20.14 ± 1.73 years, 170.83 ± 6.94 cm, and 61.06 ± 7.24 kg, respectively. The physical characteristics of all research groups are presented in Table 1.

Variable Assessed and Tests Conducted: Maximum Strength in Half Squat and Bench Press

Maximum strength is the ability to overcome or to act against maximal resistance. Maximum muscle strength is related to the force; a muscle group can exert in one maximal effort, and it can be quantified by the maximum weight that can be lifted once the 1-repetition maximum (1 RM) in exercise such as the half squat and bench press.

1 RM testing protocol

1. Instruct the athlete to warm up with a light resistance that easily allows 10 repetitions
2. Provide a 10 min rest periods
3. Estimate a warm-up load that will allow the athletes to complete 3–5 repetitions by adding
   - 10–20 lbs (4–9 kg) or 5–10% for upper body exercise or
   - 30–40 lbs (14–18) or 10–20% for lower body exercise.
4. Provide a 2 min rest periods
5. Estimate a conservative, near maximum load that will allow the athletes to complete 2-3 repetitions by adding
   - 10–20 lbs (4–9 kg) or 5–10% for upper body exercise or
   - 30–40 lbs (14–18) or 10–20% for lower body exercise.
6. Provide a 2–4 min rest periods
7. Make a load increase
   - 10–20 lbs (4–9 kg) or 5–10% for upper body exercise or
   - 30–40 lbs (14–18) or 10–20% for lower body exercise.
8. Instruct the athlete to attempt a 1 RM
9. If the athlete was successful, provide 2–4 min rest periods and go back to step 7. If the athlete failed, provide a 2–4 min rest period decrease the load by subtracting 200–10=190
   - 5–10 lbs (2–4 kg) or 2.5–5% for upper body exercise.

Or 15–20 lbs (7–9 kg) or 5–10% for lower body exercise and then go back to step 8.

Table 1: Physical characteristics of the subjects

Group subject	No	Age (years)		Height (cm)		Weight (kg)	
		Mean	SD	Mean	SD	Mean	SD
Control	12	20.92	1.80	170.17	5.74	60.67	4.37
LP	12	19.50	1.61	172.58	6.30	63.38	6.99
NLP	1	20.00	1.47	169.75	8.19	65.79	8.73
Total	36	20.14	1.73	170.83	6.94	61.06	7.24

Training Program

Statistical technique

Descriptive statistics such as measures of central tendency (arithmetic mean) and dispersion (standard deviation) are found to summarize idea of the data distribution. One-way analysis of variance (ANOVA) has been applied for comparing the groups with respect to average pre-test and post-test scores on all the variables. One-way analysis of covariance (ANCOVA) has been applied for comparing the groups with respect to average adjusted post-test scores on all the variables. After eliminating the effect due to initial pre-test scores. Paired t-test is used for

Table 2: Training program for linear periodization group

Week	Name of the exercise	Days	Percentage of 1 RM	Number of repetition	Number of set	Resting interval between the sets
1.	Half Squat and Bench Press	Monday	65	15	3	≤30 s
		Wednesday	65	15	3	≤30 s
		Friday	65	15	3	≤30 s
2.	Half Squat and Bench Press	Monday	65	15	3	≤30 s
		Wednesday	65	15	3	≤30 s
		Friday	65	15	3	≤30 s
3.	Half Squat and Bench Press	Monday	85	6	3	2–5 min
		Wednesday	85	6	3	2–5 min
		Friday	85	6	3	2–5 min
4.	Half Squat and Bench Press	Monday	85	6	3	2–5 min
		Wednesday	85	6	3	2–5 min
		Friday	85	6	3	2–5 min
5.	Half Squat and Bench Press	Monday	90	4	3	2–5 min
		Wednesday	90	4	3	2–5 min
		Friday	90	4	3	2–5 min
6.	Half Squat and Bench Press	Monday	90	4	3	2–5 min
		Wednesday	90	4	3	2–5 min
		Friday	90	4	3	2–5 min

Table 3: Training program for undulating periodization group

Week	Name of the exercise	Days	Percentage of 1 RM	Number of repetition	Number of set	Resting interval between the sets
1	Half Squat and Bench Press	Tuesday	65	15	3	≤30 s
		Thursday	90	4	3	2–5 min
		Saturday	85	6	3	2–5 min
2	Half Squat and Bench Press	Tuesday	65	15	3	≤30 s
		Thursday	90	4	3	2–5 min
		Saturday	85	6	3	2–5 min
3	Half Squat and Bench Press	Tuesday	65	15	3	≤30 s
		Thursday	90	4	3	2–5 min
		Saturday	85	6	3	2–5 min
4	Half Squat and Bench Press	Tuesday	65	15	3	≤30 s
		Thursday	90	4	3	2–5 min
		Saturday	85	6	3	2–5 min
5	Half Squat and Bench Press	Tuesday	65	15	3	≤30 s
		Thursday	90	4	3	2–5 min
		Saturday	85	6	3	2–5 min
6	Half Squat and Bench Press	Tuesday	65	15	3	≤30 s
		Thursday	90	4	3	2–5 min
		Saturday	85	6	3	2–5 min

Table 4: Data and test of significance (ANOVA and ANCOVA) of pre-test, post-test, and adjusted post-test scores on maximum strength in bench press between the LP group, NLP group, and CON group

Maximum strength in bench press	Group	Mean	SD	SV	SS	DF	MS	F	P
Pre-test ANOVA	CON	50.42	6.20	BG	1272.22	2	636.11	7.491	0.002**
	LP	46.25	9.80	WG	2802.08	33	84.91		
	NLP	60.42	10.97	T	4074.31	35			
Post-test ANOVA	CON	50.00	6.74	BG	2401.39	2	1200.69	14.789	0.000**
	LP	56.25	11.10	WG	2679.17	33	81.19		
	NLP	69.58	8.65	T	5080.56	35			
Adj. post-test ANCOVA	CON	51.29	1.96	BG	972.22	2	486.11	10.752	0.000**
	LP	60.30	2.09	WG	1446.73	32	45.21		
	NLP	64.24	2.19	T	2418.95	34			

**Significant at 1% level (P<0.01). LP: Linear periodization, NLP: Non-linear periodization, CON: Control, ANAVO: Analysis of variance, ANCOVA: Analysis of covariance, SD: Standard deviation, SV: Source of variation, SS: Sum of squares, DF: Degrees of freedom, MS: Mean square

Table 5: Data and test of significance of Scheffe's *post hoc* pair-wise comparisons on maximum strength in bench press

Group (i)	Group (j)	MD	Percentage improvement	*P*
CON	LP	9.013	17.57	0.003**
CON	NLP	12.951	25.25	0.000**
LP	NLP	3.938	6.53	0.239ns

**Significant at 1% level (P<0.01), ns: Not significant (P>0.05). LP: Linear periodization, NLP: Non-linear periodization, CON: Control

comparing pre-test and post-test mean difference in the scores of all variables in with not experimental groups.

RESULTS AND DISCUSSION

Discussion of Findings

Effect of LP group

- Six-week LP training results show that there is an improvement in maximum strength in bench press, maximum strength in squat, whereas statistically significant improvement was seen in maximum strength of bench press, maximum strength in squat, at 1% ($P < 0.01$) which is agreement with Prestes *et al.* (2009).
- The reasons for the improvement in maximum strength are changes in strength evidenced in the first few weeks of resistance training are more associated with neural

Table 6: Data and test of significance of pre-test and post-test scores on maximum strength in bench press between the linear periodization group (LP), nonlinear periodization group (NLP) and control group (CON)

Group	Pre-test	Post-test	Adj. post test	MD	t	DF	*P*
CON	50.42	50.00	51.29	0.42	0.32	11	0.754ns
LP	46.25	56.25	60.30	10.00	5.42	11	0.000**
NLP	60.42	69.58	64.24	9.17	3.19	11	0.009**

**Significant at 1% level (P<0.01), ns: Not significant (P>0.05). LP: Linear periodization, NLP: Non-linear periodization, CON: Control

Table 7: Data and test of significance (ANOVA and ANCOVA) of pre-test, post-test, and adjusted post-test scores on maximum strength in squat between the linear periodization group (LP), nonlinear periodization group (NLP), and control group (CON)

Max strength in squat	Group	Mean	SD	SV	SS	DF	MS	F	*P*
Pre-test ANOVA	CON	92.92	12.87	BG	559.72	2	279.86	1.137	0.333ns
	LP	89.17	18.32	WG	8120.83	33	246.09		
	NLP	98.75	15.39	T	8680.56	35			
Post-test ANOVA	CON	94.17	10.19	BG	3059.72	2	1529.86	6.146	0.005**
	LP	103.75	22.97	WG	8214.58	33	248.93		
	NLP	116.67	10.73	T	11274.31	35			
Adj. Post-test ANCOVA	CON	94.69	3.10	BG	2038.49	2	1019.25	8.857	0.001**
	LP	107.07	3.14	WG	3682.48	32	115.08		
	NLP	112.83	3.16	T	5720.97	34			

**Significant at 1% level (P<0.01), NS: Not significant (P>0.05). LP: Linear periodization, NLP: Non-linear periodization, CON: Control, ANAVO: Analysis of variance, ANCOVA: Analysis of covariance

Table 8: Data and test of significance of Scheffe's *post hoc* pair-wise comparisons on maximum strength in squat

Group (i)	Group (j)	MD	Percentage improvement	*P*
CON	LP	12.385	13.08	0.008**
CON	NLP	18.142	19.16	0.000**
LP	NLP	5.757	5.37	0.212ns

**Significant at 1% level (P<0.01), ns: Not significant (P>0.05). LP: Linear periodization, NLP: Non-linear periodization, CON: Control

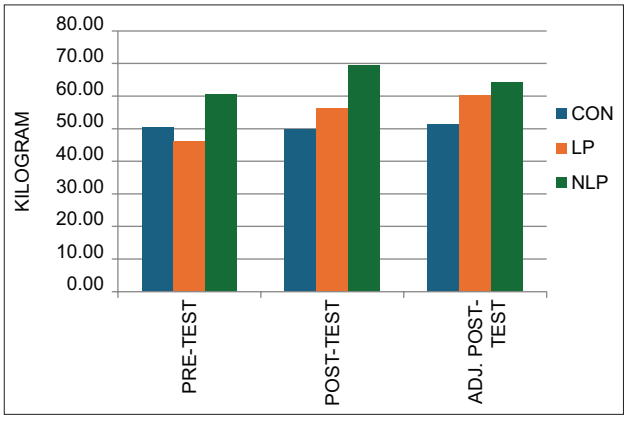

Figure 1: Comparative bar diagram of pre-test, post-test, and adjusted post-test scores on maximum strength in bench press between the linear periodization group (LP), nonlinear periodization group (NLP), and control group (CON)

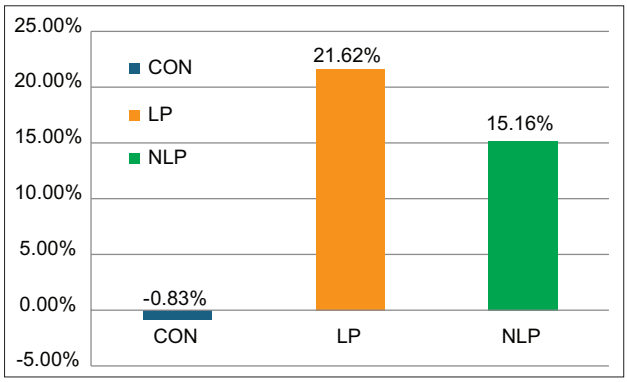

Figure 2: Percentage improvement/deterioration of maximum strength in bench press scores between pre-test and post-test scores of linear periodization (LP), nonlinear periodization (NLP), and control group (CON)

adaptations (Moritani and deVries, 1979; Narici, 1989) which encompass the development of more efficient neural pathways along the route to the muscle. The motor unit (motor nerve fiber and the muscle fibers it innervates) recruitment is central to the early (2–8 weeks) gains in strength. Collectively, the learned recruitment of additional motor units, which may respond in a synchronous (the coincident timing of impulses from 2 or more motor units) fashion, the increased activation of synergistic muscles, and the inhibition of neural protective mechanisms (Kraemer, 1996; 1998), all contribute to enhance the

Table 9: Data and test of significance of pre-test and post-test scores on maximum strength in squat between the LP group, NLP group, and CON group

Group	Pre-test	Post-test	Adj. post test	MD	t	DF	*P*
CON	92.92	94.17	94.69	1.25	0.58	11	0.571ns
LP	89.17	103.75	107.07	14.58	3.82	11	0.003**
NLP	98.75	116.67	112.83	17.92	5.03	11	0.000**

**Significant at 1% level (P<0.01), NS: Not significant (P>0.05). LP: Linear periodization, NLP: Non-linear periodization, CON: Control

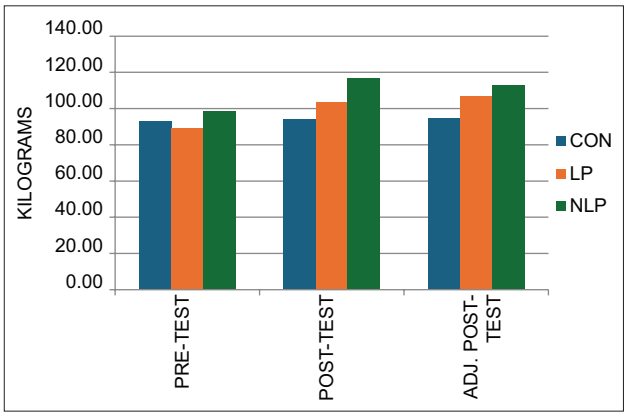

Figure 3: Comparative bar diagram of pre-test, post-test, and adjusted post-test scores on maximum strength in squat between the linear periodization group (LP), non-linear periodization group (NLP), and control group (CON)

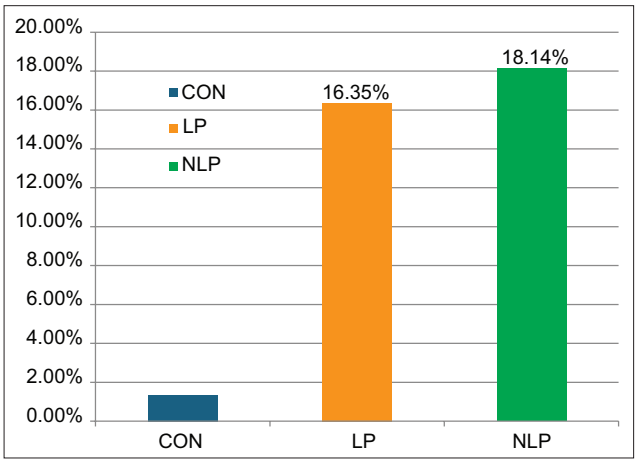

Figure 4: Bar diagram of percentage improvement/deterioration of maximum strength in squat scores between pre-test and post-test scores of linear periodization (LP), non-linear periodization (NLP), and control group (CON)

muscle's ability to generate more force. It is possible that two adjacent muscle fibers, with different motor nerves, could result in one fiber being activated to generate force while the other moves passively.

Effect of NLP group

- Six-week NLP training results show that there is an improvement in variables of maximum strength in bench press, maximum strength in squat, whereas statistically significant improvement at 1% was seen in maximum strength in bench press, maximum strength in squat (P < 0.01) which is agreement with Prestes *et al.* (2009).
- Reasons for more improvement in undulating/NLP could be attributable to changes in the quality of muscle protein during the first several weeks of a training program, increase in neural adaptation, i.e., a greater number of motor units was probably involved in muscle contract or motor units were greater in size, and their rate of firing was faster than before training.
- Other reasons could be fiber type transformation, increase in cross-sectional area of the muscles, architecture of the muscles, periodized strength training program and the absence of accumulated neural fatigue in undulating periodization.
- In undulating/NLP periodization, motor units that are not recruited during training sessions, when using a light training (e.g., 12–15 RM), are eventually recruited. This is the key to undulating periodization in that some lighter intensity training session rests the motor units that are used in the high intensity training sessions, providing for recovery.

Comparison of training effect between LP group, NLP group, and Control (CON) group.

- Six weeks of LP and NLP training result in the improvement of maximum strength in bench press, maximum strength in squat,
- Six weeks of strength training with LP and normal game have caused greater improvement of maximum strength in bench press than the NLP group and CON group when compared by analyzing tables of ANCOVA and adjusted post-test means.
- Six weeks of strength training with NLP and normal game have caused greater improvement of maximum strength in squat than the LP group and CON group when compared by analyzing tables of ANCOVA and adjusted post-test means.
- But when comparison was done to determine which training significantly improved better in maximum strength in bench press and half squat, LP showed better improvement in maximum strength in squat than NLP group and CON group.

- But NLP group after strength training for 6 weeks with normal game significantly improved in maximum strength in bench press and half squat with greater improvements observed in maximum strength in squat than the LP group.
- But LP group after strength training for 6 weeks with normal game significantly improved in maximum strength in bench press and squats. Hence, the hypothesis formulated that LP would improve maximum strength in bench press and squat is found tenable. The improvement could be attributed quality of muscle protein, increase in neural adaptation, fiber type transformation, cross-sectional area, architecture of the muscle, and it is supported by (Willoughby, 1993; Kraemer, 1997; Miranda, 2011; Staron, 2016; Lemmer, 2001).
- CON group was engaged in normal game only. CON group showed marginal improvements in the maximum strength of bench press and squat. No significant improvement was observed. No decrease in performance was also observed.

CONCLUSION

Based on findings, the following conclusions were drawn:

1. The research showed that both the linear and NLP programs had an increase in strength gains.
2. All training groups significantly increased maximum strength in bench press and squats over the course of 6 weeks.
3. The research showed that there is an improvement in LP for maximum strength in bench press, when compared with NLP group.
4. The research showed that there is an improvement in NLP for maximum strength in squat when compared with LP group.

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Research Article

Effects of running, Fartlek training, and interval training on selected motor ability and physiological variables among badminton players

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INTRODUCTION

Continuous training as the name implies, involves continuous activity, without rest intervals. This has varied from high intensity, Continuous activity of moderate duration to low-intensity activity of an extended duration, that is, long, slow distance, or "LSD" training. LSD training is probably the most widely used from of endurance conditioning for jogger who want to stay in condition for health-related purpose, the athlete who participate in team sports and endurance-trains for general condition, and the athlete who wants to maintain his endurance condition during the off-season Ajmer Singh *et al*., (2003).

Fartlek training is running with carious intensity according to requirement of the athlete and dictates of the terrain. The athlete will use a terrain which undulates and makes varying demands on him (for example, Hills, Woodland, Ploughed land, sand) like the alternating pace method, anaerobic period provides a sting stimulus for the improvement of VO_2 maximum. In addition, the demands of terrain stimulate strength endurance development and proprioceptive balance adjustment of ankle, knee, and hip (Dick, 1980).

Interval training is a form of progressive conditioning in which the intensity of the activity, the duration of each bout. The number of bouts, the time or kind of resting period between bouts, on the order of the bouts is varied Baby (1927). According to Mathews and Fox (1974), interval training as work or exercise followed by the property of prescribed relief interval.

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Statement of the Problem

The purpose of the study was to find out the effect of running, Fartlek, and interval training on selected motor abilities, physiological, and skill related performance variables of badminton players.

METHODOLOGY

The purpose of this study was to find out the influence of effect of running Fartlek training and interval training on selected motor ability and physiological variables, namely, coordination. To achieve the purpose of this study, 60 intercollegiate badminton players were selected at random from in and around the Rangareddy, Telangana. Their age ranged from 18 to 25 years. The subjects chosen for study was divided into four groups and designated as experimental group A, experimental group B, experimental group C, and control group D. Each groups consisted of fifteen players. Continuous running was given to group A, Fartlek training given to group B, and interval training given to group C and control group C was restricted to participate in any of the training program other than their regular activities. Training was given 3 days in a week for 12 weeks. The subject was tested on at the coordination beginning (Pre-test) and at the end of the experimental period (Post-test). To measure the coordination, Scott obstacle race test, respectively, due to their simplicity and availability of necessary facilities, instrument, and equipment's.

RESULTS AND DISCUSSION

The analysis of data on coordination has been examine by analysis of covariance (ANCOVA) for variables separately to determine the differences if any among the group at pre- and post-test when the differences were found to be significant by

ANCOVA, the Scheffe's *post hoc* test was applied to assess the significant differences between the adjusted mean.

Table 1 shows that the pre-test mean values on coordination for continuous running group (CRG), Fartlek training group (FTG), interval training group (ITG), and control groups (CG) were 15.62, 15.60, 15.66, and 15.46, respectively. The obtained "F" value of 0.398 for pre-test scores on coordination, which was lesser than the table value of 2.77 for significance with df 3 and 56 at 0.05 level of confidence.

The post-test mean values on coordination for CRG, FTG, ITG, and CG were 14.79, 14.59, 14.54, and 15.63, respectively. The obtained "F" value of 19.73 for post-test scores on coordination, which was greater than the table value of 2.77 for significance with df 3 and 56 at 0.05 level of confidence.

The adjusted post-test mean values on coordination for CRG, FTG, ITG, and CG were 14.77, 14.58, 14.48, and 15.73, respectively. The obtained "F" value of 138.50 for adjusted post-test scores on coordination, which was higher than the table value of 2.77 for significance with df 3 and 55 at 0.05 level of confidence.

The result of the study showed that there was significant difference among CRG, FTG, ITG, and CG on coordination.

Since four groups were involved, the Scheffe's *post hoc* test was applied to find out the paired mean differences if any, and it is presented in Table 2.

Table 2 Shows that the adjusted post-test mean differences of CRG and FTG, CRG and ITG, CRG and CG, FTG and CG, and ITG and CG were 0.19, 0.29, 0.96, 1.15, and 1.25, respectively. They were greater than the confidence interval value 0.19 at 0.05 level, which indicate that there is a significant differences among the group of CRG and FTG, CRG and ITG, CRG and CG, FTG and CG, and ITG and CG.

The adjusted mean difference of FTG and ITG was 0.10, respectively. Hence, it shows that it was lesser than the confidence interval value 0.19 at 0.05 levels, which indicate that there is no significant differences exist among the group.

The comparison of pre, post, and adjusted post mean values of coordination for CRG, FTG, ITG, and CG on coordination are graphically presented in Figure 1.

DISCUSSION ON HYPOTHESIS

The first hypothesis says that there will be a significant improved in coordination after the 12 weeks of continuous running, Fartlek training, and interval training as compared with the CG. The result of the study shows that there was significant improvement in coordination after 12 weeks of continuous running, Fartlek training, and interval training when compared with CG. Hence, research hypothesis has been accepted.

DISCUSSION AND FINDINGS

The result of the study reveals that there are no significant differences between pre-test experimental group and CG. However, 12 weeks of continuous running, Fartlek training, and interval training result in significant changes in the coordination for post-test experimental group than CG. "Coordination is the ability of the performer to integrate types of body movement into specific patterns" (Kansal 1996). It is performed pre-requisite and is primarily determined by mechanism involved in control and regulation of movement. It is dependent on the coordinative process of nervous system and functional capacity of sense organs (Uppal 2004).

Table 1: Analysis of covariance of data on coordination between pre- and post-test of continuous running group, Fartlek training group, interval training group, and control group

	CRG	FTG	ITG	CG	Sources of variance	Sum of square	df	Mean Square	"F" ratio
Pre-test									
Mean	15.62	15.60	15.66	15.46	B	0.330	3	0.110	0.398
SD	0.38	0.60	0.65	0.424	W	15.70	56	0.280	
Post-test									
Mean	14.79	14.59	14.54	15.63	B	11.65	3	3.88	19.73*
SD	0.38	0.45	0.51	0.41	W	11.01	56	0.197	
Adjusted post-test									
Mean	14.77	14.58	14.48	15.73	B	14.40	3	4.80	138.50*
					W	1.90	55	0.035	

*Significant at 0.05 level of confidence (The table value required for significant at 0.05 level with df 3 and 56 and 3 and 55 are 2.77 and 2.77, respectively)

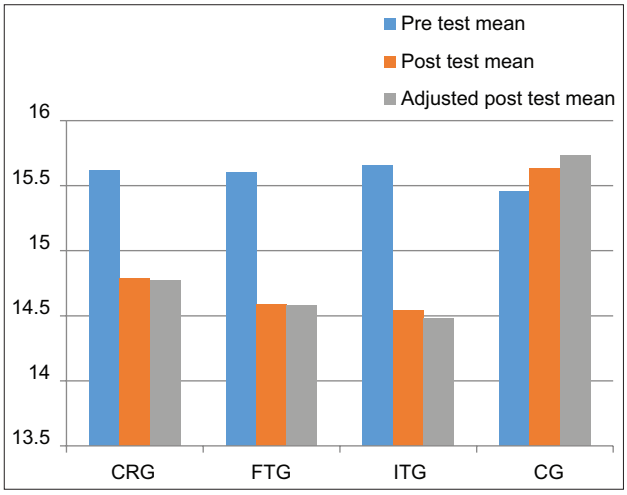

Figure 1: Bar diagram showing the pre, post, and adjusted post-test mean values of CRG, FRG, ITG, and CG on coordination

Table 2: Scheffe's *post hoc* test for the differences between paired adjusted post-test means of coordination

CRG	FTG	ITG	CG	MD	CI
14.77	14.58	-	-	0.19*	0.19
14.77	-	14.48	-	0.29*	
14.77	-	-	15.73	0.96*	
-	14.58	14.48	-	0.10	
-	14.58	-	15.73	1.15*	
-	-	14.48	15.73	1.25*	

*Significant at 0.05 level of confidence

CONCLUSIONS

1. Coordination was significantly improved by the CRG, Fartlek running group, and ITG when compared with CG
2. Coordination was significantly improved by interval running group when compared the CRG and FTG
3. Coordination was significantly improved by FTG when compared with CRG.

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