

Research Paper

Impact of Yoga and Physical Exercise on Volleyball Performance: A Randomized Controlled Trial

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ABSTRACT

Volleyball started out as a recreational activity that was played without a net using a basketball. The ball would be passed from one group to another. Because of the weight of the basketball, a seven-foot-tall net was added. Originally, a soft cliff skin ball was employed, but it was not very strong. Although it is generally accepted that physical fitness is an essential component of a child's healthy growth and development, there is disagreement about what exactly constitutes physical fitness. The primary objective of the research is to evaluate how yoga and exercise affect physical, physiological, psychological, and skill-performance aspects in high school volleyball players. Sixty high school volleyball players, aged between fifteen and seventeen, were chosen at random, from a list of Anakapalli schools for the current research project. Participants were limited to those who had played volleyball for their school teams and had at least three years of experience. The findings show notable variations in speed between the Yoga Practice Combined with Physical Exercise Group (YPCPEG) and the Control Group (CG) as well as between the Physical Exercise Group (PEG) and the Control Group (CG). By conducting this study, researchers will gain valuable insights and highlights how yoga and its various components impact the well-being of athletes, paving the way for future research and interventions.

Keywords: *Yoga, Physical exercise, Volleyball players, Mental well-being*

When volleyball first became popular as a leisure sport, it was just a game in which teams would pass basketballs without nets amongst themselves. It took the usage of a heavy basketball and a seven-foot-tall net to create the need for a better ball, which ultimately resulted in the sport's debut at Spring Field School in 1896. The game's earliest published rules were written by William G. Morgan in longhand, and they were included in the first Athlete League guidebook of the YMCA of North America in 1897. Globalizing the sport was made possible in large part by the YMCA.

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J.H. Grey brought volleyball to India in the 1920s. It is a team sport that may be played in a variety of ways on a court that is divided by a net. The winning team in each rally receives a point, and the Rally Point System is used. In addition to receiving a point, the team that wins the rally gets to serve first, with their players switching positions clockwise. To compete well, volleyball players need to be proficient in a variety of abilities, such as serving, volleying, setting, spiking, and blocking.

In contrast, yoga provides an all-encompassing approach that addresses the cerebral, emotional, physical, psychic, and spiritual aspects of life. It is seen as a comprehensive approach that enhances quality of life and fosters excellent health. Yoga has its origins in the ancient history of India, which dates back around 5,000 years. It goes beyond the common physical postures and meditation techniques seen in the West. The word "yoga" means "union," and it comes from the same origin as the Old English word "yoke."

- Asana - Body Posture
- Pranayama - Breath Control and Regulation
- Pratyahara - Mind Withdrawal from External Stimuli
- Dharana - Focused Concentration
- Dhyana - Contemplative Meditation
- Samadhi - Spiritual Bliss and Oneness

Sports advertising may be greatly improved by using yoga poses. Three essential components are necessary for sports marketing to function such as, basic physical characteristics, sport-specific abilities, and psychological factors. The foundation of a balanced and contented existence is fitness. People who are in good physical shape also usually have a positive attitude on life. For young people, physical fitness is a basic need that promotes independence and mental acuity. Being physically healthy is crucial for both maintaining general mind-body balance and successfully adapting to one's surroundings. Although the need of physical fitness for a child's proper growth and development is widely acknowledged, there is disagreement on the exact definition of physical fitness. The many facets of physical fitness may be divided into two primary categories, according to research and scholarly analysis: fitness for skill development and fitness for health.

Because of the broad effects that physical activities have on the human body, they may be divided into three categories. Stretching and other flexibility exercises improve range of motion in the muscles and joints. Exercises for cardiovascular endurance, such as walking, running, cycling, trekking, and badminton, enhance lung and heart health. Sprinting, weightlifting, and functional training are examples of anaerobic exercises that concentrate on short-term muscular strength and power. Beyond the physical gains, exercising regularly offers a huge benefit for individuals well-being. It often acts as a potent stressbuster and goes even deeper, nurturing our moral and spiritual growth, fostering emotional stability, and elevating our overall psychological health. In essence, exercise is a holistic approach in our wellbeing, enriching individuals with both physical and mental aspects.

REVIEW OF LITERATURE

A study conducted by Chen and colleagues (2019), aimed to assess the results of a 24 week silver yoga fitness program and to investigate the possibility of condensing the program to fit the timetables of senior activity centers. The research employed a pre and post quasi-experimental design with baseline, 12 week, and 24 week evaluations. Eight senior activity centers provided a convenient sample of 204 participants, of whom 176 completed the study.

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Whether or not guided imagery meditation was used, participants in trials I and II showed a significant increase in physical fitness at the conclusion of the 24-week period. Moreover, at a confidence level of 0.05, every individual demonstrated greater physical fitness than the control group.

Pramanik et al. (2019) studied the immediate effects of a 5-minute session of slow-pace bhastrika pranayama (respiratory rate 6/min) on heart rate and blood pressure. They also evaluated the effect of the same breathing exercise, performed for the same period (5 minutes), following oral administration of hyoscine-N-butyl bromide (Buscopan), a parasympathetic blocker medication. A total of 39 volunteers, aged 25 to 40, had their heart rates and blood pressures tested using normal protocols. Individuals who took hyoscine-N-butyl bromide and then conducted the same breathing exercise for the same duration showed no significant changes in blood pressure or heart rate.

Bhargava et al. (2018) investigated the autonomic reactions to breath retention in twenty young boys in good health. At different respiratory stages, they monitored data like heart rate, galvanic skin resistance (GSR), systolic and diastolic blood pressure, and breath-holding duration. Following the baseline assessments, each participant practiced Nadi-Shodhana Pranayama for four weeks. The same parameters were then measured once more, and the outcomes were contrasted. Significant drops were observed in both systolic and diastolic blood pressure, which had previously tended to decline, following pranayamic breathing. All subjects had their GSR data taken, although the results were equivocal.

College hockey players' pre-competition anxiousness and ambitions for success were studied by Kaur et al. (2014). Comparing accomplishment motivation between groups with high and low levels of pre-competition anxiety was a secondary goal. Fifty male hockey players who competed in the 2007 All India Inter University Men Hockey Championship at Banaras Hindu University in Varanasi were chosen at random for the study. Among male university hockey players, the study found a strong relationship between accomplishment motivation and anxiety on competition day. Princy and Raj (2013) explored into how yoga positions affected college women's cholesterol levels. Random assignment was used to place the twenty female students, ages 18 to 22, in the experimental or control groups. Yogasana instruction was given to the experimental group, and no training activities were performed on the control group. Pre- and post-tests for cholesterol were given prior to and during a six-week training program. Training in yoga poses resulted in a substantial difference in mean cholesterol values, as demonstrated by the analysis of covariance.

The research objective of Elangovan et al. (2010) was to evaluate the impact of particular yoga poses and physical exercises on biochemical markers in female college students. Twenty female students from Queen Mary's College in Chennai, Tamil Nadu participated in the study and were split into two groups at random. While Group II engaged in physical activities, Group I received instruction in various yogic practices. The age range of the subjects was 18 to 23, and a pre-experimental and pre-posttest design was used. though there was found an improvement in the levels of Triglycerides, HDL, and LDL, there was a discernible drop in total cholesterol in the yoga-practicing group.

Research on the effects of yoga and exercise on physiological and physical characteristics of football players was carried out by Rajkumar (2007). the findings of the study, the football players' flexibility, resting pulse rate, breath-holding time, and peak flow rate all significantly improved in the yoga practice groups.

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The current study aims to investigate on the impact of yoga and physical activity on the performance of volleyball players.

METHODOLOGY

Research Design

Objective of the study: Focusing on high school volleyball players, this study seeks to understand how yoga and physical exercise impact their physical performance, bodily functions, mental health, and ability to play volleyball effectively.

Hypotheses:

- **H1:** Stronger physical training is expected to significantly improve physical fitness, bodily functions, mental well-being, and volleyball skills in high school players.
- **H2:** Combining yoga practice with physical training is hypothesized to significantly improve high school volleyball player's physical fitness, body function, mental wellbeing, and volleyball skills.
- **H3:** Adding yoga to physical training is anticipated to lead to greater improvements in high school volleyball players physical fitness, body functions, mental well-being, and volleyball skills compared to physical training alone.

Participants and data collection

Sixty high school volleyball players (15-17 years old) from Anakapalli were randomly selected for the study. All participants played for their school teams and had at least 3 years of experience. Three groups were formed: Physical Exercise Group (PEG), Yoga Practice and Physical Exercise Group (YPCPEG), and a Control Group (CG). Each group consisted of 20 players. Measurements were taken before and after training to assess the impact of yoga and physical exercise being the independent variable.

Variable Selection

Physical Variables:

- Velocity
- Lower Limb Explosive Power
- Cardiovascular Endurance
- Flexibility

Physiological Variables:

- Resting Systolic Blood Pressure
- Resting Diastolic Blood Pressure

Psychological Variables:

- Anxiety Levels
- Self-Confidence Levels

RESULTS AND ANALYSIS

Table 1: Analysis of Covariance for the Mean Speed Values in the Pre, Post, and Adjusted Post Tests of the Physical Exercise Group, Yogic Practice Combined with Physical Exercise Group, and Control Group.

Test	Experimental Group (Seconds)	Experimental Group (Seconds)	Control Group (Seconds)	Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	F Ratio
Pre Test	Mean SD	7.0360 7.0215 7.0310	Between Within	0.02	11.056	2	0.001	0.194
Post Test mean	SD	6.6365 0.36063	6.5925 0.33726	7.0685 0.47877	Between Within	2.740 3.373	2.57	1.384 0.158
Adjusted Post test mean	6.632 6.598 7.067	Between Within	2.740 3.373	2.56	1.370 0.060	22.48*		

*Significant at 0.05 level of confidence

Table 1 presents the mean values of the pre-test for three different groups: the Physical Exercise Group (PEG) with a mean of 7.0215, the Yoga Practice Combined with Physical Exercise Group (YPCPEG) with a mean of 7.0360, and the Control Group (CG) with a mean of 7.0310. The pre-test scores yielded an 'F' ratio of 0.006, below the critical table value of 3.15 for degrees of freedom (df) 2 and 57, which is necessary for significance at a 0.05 level of confidence in terms of speed. Continuing to with the post-test findings, the mean speed values for the Physical Exercise Group (PEG), Yoga Practice Combined with Physical Exercise Group (YPCPEG), and Control Group (CG) were 6.6365, 6.5925, and 7.0685, respectively. For df 2 and 57, the resulting 'F' ratio of 8.776 for post-test results was greater than the crucial table value of 3.15, indicating significance at the 0.05 level. The mean speed values in the modified post-test were 6.632, 6.598, and 7.067 for the Yoga Practice Combined with Physical Exercise Group (YPCPEG), Control Group (CG), and Physical Exercise Group (PEG), in that order. In terms of speed, the calculated 'F' ratio of 22.748 for the corrected post-test means was significant at the 0.05 level of confidence, surpassing the crucial table value of 3.16 for df 2 and 56.

Analysis of the study shows that there was a significant difference in the adjusted post-test speed averages between the Physical Exercise Group (PEG), Yoga Practice Combined with Physical Exercise Group (YPCPEG), and Control Group (CG).

Table 2: Scheffe's Test for the Differences between the Adjusted Post Test Paired Means on Speed

Experimental Group (Seconds)	Experimental Group (Seconds)	Control Group (Seconds)	Mean Difference	Confidence Interval
6.632	7.067	0.433*	0.192	0.192
	6.598	7.067	0.469*	
6.632	6.598		0.03	

*Significant at 0.05 level of confidence

Table 2 displays the mean difference values of 0.435, 0.469, and 0.03, respectively, for the Yoga Practice Combined with Physical Exercise Group (YPCPEG), Control Group (CG),

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Physical Exercise (PE), and Yogic Practice Combined with Physical Exercise Group (PEG). There were notable differences in the average speeds of volleyball players.

between the experimental and control groups that were statistically significant at the 0.05 level of confidence. Nevertheless, the two experimental groups' mean difference was just 0.03 at the 0.05 level of confidence, meaning it was not statistically significant. This indicates that comparable speed outcomes were obtained by the training methods used by the Physical Exercise Group (PEG) and the Yoga Practice Combined with Physical Exercise Group (YPCPEG).

The study's findings, in summary, show notable variations in speed between the Yoga Practice Combined with Physical Exercise Group (YPCPEG) and the Control Group (CG) as well as between the Physical Exercise Group (PEG) and the Control Group (CG). The Physical Exercise Group (PEG) and the Yoga Practice Combined with Physical Exercise Group (YPCPEG) did not, however, show any discernible differences in speed. In terms of speed, the mean results for the pre-test, post-test, and modified post-test were shown for all three groups: the Physical Exercise Group (PEG), the Yoga Practice Combined with Physical Exercise Group (YPCPEG), and the Control Group (CG).

DISCUSSION

Volleyball success requires a mix of skill, strategy, fitness, and training, all underpinned by a strong mind and body. To truly excel, players need both peak physical and mental well-being. Studies show that yoga can improve both, leading to better performance in various sports. This research specifically explores how combining yoga with regular training impacts high school volleyball players' physical fitness, body functions, mental state, and volleyball skills.

To conduct this research, the investigators recruited 60 high school volleyball players, aged 15-17, from schools across Visakhapatnam, Andhra Pradesh. All participants actively played on their school teams and had at least three years of experience under their belts. To ensure balanced representation, the researchers meticulously divided the players into three distinct groups. The first group, known as the Physical Exercise Group (PEG), focused solely on conventional physical training regimens. The second group, aptly named the Yogic Practice Combined with Physical Exercise Group (YPCPEG), engaged in a unique blend of yoga practice and physical exercise routines. Finally, the third group, designated as the Control Group (CG), served as a reference point and continued their regular activities without any additional training interventions. This meticulous selection and grouping process laid the foundation for a comprehensive investigation into the potential benefits of yoga, physical exercise, and their combined impact on volleyball players' performance and well-being.

The physical training program designed for the PEG group served as a dedicated platform to refine their physical capabilities and volleyball skills. Meticulously crafted to span twelve weeks, this program demanded unwavering commitment: one session per day, six days a week, each pushing the participants for a focused 45 minutes. In contrast, the YPCPEG group embarked on a distinct training journey, weaving together the ancient wisdom of yoga with the demands of physical exercise. Their unique program encompassed a blend of yoga asanas – physical postures designed to enhance strength and flexibility – pranayamas, or yogic breathing exercises, and meditative practices to cultivate focus and inner peace. These sessions, held on Mondays, Wednesdays, and Fridays, were carefully structured to last 45 minutes each, ensuring a balanced approach to their training regime. By employing these

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two distinctly different yet equally rigorous programs, the research aimed to illuminate the diverse paths players could take on their quest for athletic excellence.

Limitations

The current study is having limitations. The sample in the study comprised of 60 high school volleyball players which might not be generalized for a broader population among the players and in terms of age, gender, health status and socioeconomic status. Additionally, this also limits the ability to generalize the findings to other areas. This is because, it restricts the understanding of the cultural aspects influencing the results. Further research on this area is necessary to understand and draw broader conclusions. The cultural aspects influencing the findings can also add a in-depth understanding and give more insight to the research studies.

CONCLUSION

In the current study aimed to investigate on how yoga and physical exercise impact their physical performance, bodily functions, mental health, and ability to play volleyball effectively, the findings revealed that Both the Physical Exercise Group (PEG) and the Yoga Practice Combined with Physical Exercise Group (YPCPEG) showed clear improvements in the chosen measurements. PEG specifically focused on physical abilities, leading to better physiological, mental, and volleyball skill performance. YPCPEG, combining yoga and exercise, also saw significant advancements in all these areas. Further investigation is needed in this area with larger population and to comprehend the impact of yoga practice among the well-being of the individuals.

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Conflict of Interest

The author(s) declared no conflict of interest.

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