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Effect of Game Specific and SAQ Training on Selected Physical Fitness Variables among Basketball Players

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***Abstract*- This research aimed to examine the impact of game-specific and SAQ training on various physical fitness parameters among basketball players. A total of 60 male college basketball players, aged between 18 and 25 years, from different colleges in Tamil Nadu, India, were selected as participants. The participants were randomly divided into four groups of 15 each: Group I received SAQ training, Group II participated in sport-specific training, Group III underwent a combination of both training methods, and Group IV acted as a control group. Following the training period, all 60 subjects were assessed on selected physical fitness measures, including speed and leg explosive power. These were evaluated using standard tests such as the 50-meter dash and the vertical jump test. The training programs for Groups I, II, and III spanned a duration of 12 weeks. Data were gathered on specific physical fitness parameters, including speed and leg explosive power, assessed through standardized tests such as the 50-meter dash and the vertical jump test, respectively. These measurements were taken both prior to and following the twelve-week training period. The collected data were analyzed using analysis of covariance (ANCOVA), with a significance level set at 0.05. When the 'F' ratio for the adjusted means indicated a significant difference, Scheffe's post hoc test was employed to identify specific group differences. Throughout the analysis, a 0.05 significance threshold was maintained for testing the study hypotheses.**

***Keywords*- Leg Explosive Power, Speed, Game Specific, SAQ Training**

I. INTRODUCTION

Physical activity, fitness, psychomotor skills, and technical performance are interconnected components that collectively impact an athlete's overall success. Integrating these elements is crucial for achieving excellence in sports. Fitness supplies the physical foundation necessary for performance, while psychomotor abilities improve coordination between mental and motor functions *(Blazevich, 2013).* Skill performance reflects how effectively an athlete applies these physical and mental capabilities during competition.

By emphasizing the development of all three areas, athletes become not only physically prepared but also mentally sharp and technically skilled, which contributes to improved performance and greater consistency. Effective training programs are customized to an athlete's specific needs, considering their current fitness level, experience, objectives, and the specific requirements of their sport. Such programs typically involve a mix of exercises, drills, and techniques aimed at improving strength, speed, endurance, agility, flexibility, coordination, and sport-specific skills. Ultimately, sport training is designed to unlock an athlete's full potential—whether for high-level competition or personal fitness—while also promoting long-term health and well-being *(Krause, 2008).*

Speed, Agility, and Quickness (SAQ) training is a method focused on boosting athletic performance by developing explosive strength, quick reaction times, and efficient movement skills. This training incorporates specific drills aimed at enhancing rapid footwork, sharp directional shifts, and the ability to accelerate and decelerate effectively. SAQ exercises are commonly utilized in many sports to improve neuromuscular coordination and to refine sport-specific movement techniques. Speed is the capability to move the body or a specific part swiftly, while agility pertains to the skill of changing direction promptly and smoothly. Quickness, on the other hand, emphasizes rapid, reflexive responses to external stimuli. Combining these elements, SAQ training enhances an athlete's proficiency in performing intense movements with accuracy and control. The training typically includes activities such as ladder drills, cone agility exercises, plyometric routines, and reaction-based tasks that test and improve coordination and motor skills. This form of training offers numerous benefits for athletes, including improved muscle activation, faster neural response times, and better dynamic stability. Additionally, SAQ exercises contribute to injury prevention by promoting proper body mechanics and enhanced stability.

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The flexibility of SAQ programming allows it to be tailored for different age groups and skill levels, making it suitable for youth development, competitive athletics, and fitness training *(Sampaio, 2015).*

II. Methodology

This research aimed to examine the impact of game-specific and SAQ training on various physical fitness parameters among basketball players. A total of 60 male college basketball players, aged between 18 and 25 years, from different colleges in Tamil Nadu, India, were selected as participants. The participants were randomly divided into four groups of 15 each: Group I received SAQ training, Group II participated in sport-specific training, Group III underwent a combination of both training methods, and Group IV acted as a control group. Prior to the study, all participants were informed that they could withdraw at any point if they experienced any discomfort, and notably, no participants dropped out during the course of the study. Following the training period, all 60 subjects were assessed on selected physical fitness measures, including speed and leg explosive power. These were evaluated using standard tests such as the 50-meter dash and the vertical jump test.

III. Training Procedure

The training programs for Groups I, II, and III spanned a duration of 12 weeks. Each session, including warm-up and cool-down periods, was held in the mornings and lasted for one hour, six days a week.

The SAQ training group engaged in exercises such as standing stationary arm swings, agility ladder drills, tap exercises, quick hand tosses, step hurdles, and lateral/side step movements. The game-specific training group focused on activities like basketball conditioning, dribbling, full-court drills, cone weaving, layup exercises from the arc, cone running drills, sideline sprints, suicides, layup grabs, and defensive sliding drills. The combined training group participated in a mix of both SAQ and game-specific drills.

IV. Statistical Procedure

Data were gathered on specific physical fitness parameters, including speed and leg explosive power, assessed through standardized tests such as the 50-meter dash and the vertical jump test, respectively. These measurements were taken both prior to and following the twelve-week training period. The collected data were analyzed using analysis of covariance (ANCOVA), with a significance level set at 0.05. When the 'F' ratio for the adjusted means indicated a significant difference, Scheffe's post hoc test was employed to identify specific group differences. Throughout the analysis, a 0.05 significance threshold was maintained for testing the study hypotheses.

V. Analysis Of The Data

The analysis of covariance on physical fitness variables of the pre and post test scores of control group with game specific and SAQ training and combined training groups have been analyzed and presented in Table I.

Table –I
Analysis of Covariance of Experimental Groups and Control Groups on speed

	Control Group	SAQ Group	Skill based Group	Combined group	S o V	Sum of Squares	df	Mean squares	'F' ratio
Pretest Mean	7.50	7.53	7.63	7.53	B	.155	3	.052	.900
SD	.268	.225	.214	.247	W	3.219	56	.057	
Posttest Mean	7.47	6.68	6.94	6.28	B	10.159	3	3.386	91.18*
SD	.201	.265	.124	.148	W	2.080	56	.037	
Adjusted Posttest Mean	7.44 [a]	6.69[a]	6.89[a]	6.29 [a]	B	10.293	3	3.431	153.43*
					W	1.230	55	.022	

**Significant at 0.05 level of confidence. The table values required for significance at 0.05 level of confidence for 3 and 56 (df)=2.77, 3 and 55(df)=2.78 respectively.*

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The data in the table indicate that the pretest average speeds for the control group, SAQ training, game-specific fitness training, and the combined training group were 7.50, 7.53, 7.63, and 7.53 seconds, respectively. The calculated F value of 0.900 was below the critical value of 2.77, suggesting that there were no significant differences in speed among the groups at the pretest stage. Following the twelve-week training program, the posttest means for speed were 7.47, 6.68, 6.94, and 6.28 seconds for the control, SAQ, game-specific, and combined training groups, respectively. The F value obtained was 91.18, which exceeds the critical value of 2.77, indicating significant differences among the groups after training.

The adjusted posttest means were 7.44, 6.69, 6.89, and 6.29 for the respective groups. The corresponding F value of 153.43 was also greater than 2.77, confirming that there were statistically significant differences across the groups after adjusting for pretest scores. Since the F ratio was significant, Scheffe's post hoc test was conducted to determine specific group differences.

The pairwise mean differences between the control and training groups, as well as among the training groups themselves, along with their confidence intervals for significance, are summarized in Table II.

Table II
Scheffe's Confidence Interval Test Scores and the Mean Differences between the Groups on Speed

Means of				Paired Mean Difference	Confidence interval
Control Group	SAQ Group	Skill based Group	Combined group		
7.44	6.69			0.75*	0.15
7.44		6.89		0.55*	
7.44			6.29	1.15*	
	6.69	6.89		0.2*	
	6.69		6.29	0.4*	
		6.89	6.29	0.6*	

The paired mean differences between the control group and the other groups were 0.75 for the SAQ group, 0.55 for the game-specific training group, and 1.15 for the combined training group. All these differences were greater than the confidence interval value of 0.15, indicating that each training method led to a significant improvement compared to the control group. Similarly, the differences between the SAQ group and the game-specific training group (0.20), as well as between the SAQ group and the combined training group (0.40), were also higher than 0.15, showing significant differences.

Additionally, the difference between the game-specific training group and the combined training group was 0.60, which was also above the confidence interval value, indicating a significant difference. Overall, the results showed that all three types of training significantly improved speed. Among them, the SAQ training produced the most notable improvement compared to the other groups.

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Table –III
Analysis of Covariance of Experimental Groups and Control Groups on Leg Explosive Power

	Control Group	SAQ Group	Skill based Group	Combined group	SoV	Sum of Squares	df	Mean squares	'F' ratio
Pretest Mean	27.86	28.22	28.32	28.62	B	4.454	3	1.485	2.13
SD	1.31	.519	.577	.674	W	38.994	56	.696	
Posttest Mean	27.81	30.43	29.49	31.60	B	115.15	3	38.383	53.67*
SD	1.281	.659	.585	.664	W	40.046	56	.715	
Adjusted Posttest Mean	28.15[a]	30.46[a]	29.44[a]	31.28[a]	B	75.255	3	25.085	120.37*
					W	11.462	55	.208	

**Significant at 0.05 level of confidence. The table values required for significance at 0.05 level of confidence for 3 and 56 (df)=2.77, 3 and 55(df)=2.78 respectively.*

The data in the table indicate that the pretest average scores for leg explosive power were 27.86 for the control group, 28.22 for the game-specific fitness training group, 28.32 for the SAQ training group, and 28.62 for the combined training group. The calculated F value of 2.132 was below the critical value of 2.77, suggesting that there were no significant differences in leg explosive power among the groups at the pretest stage. After twelve weeks of training, the posttest scores for leg explosive power were 28.81 for the control group, 30.43 for the SAQ training group, 29.49 for the game-specific training group, and 31.60 for the combined training group.

The F value obtained was 53.67, which exceeds the critical value of 2.77, indicating significant differences among the groups after the training period.

The adjusted posttest means were 28.15 for the control group, 30.46 for the SAQ group, 29.44 for the game-specific training group, and 31.28 for the combined training group. The F value of 120.37 was also higher than 2.77, confirming significant differences among the groups after adjusting for pretest scores. Since the F ratio was significant, Scheffe's post hoc test was conducted to identify specific group differences. The pairwise mean differences and their confidence intervals for significance between the training groups and the control group are shown in Table IV.

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Table IV
Scheffe's Confidence Interval Test Scores and the Mean Differences between the Groups on Leg Explosive Power

Means of				Paired Mean Difference	Confidence interval
Control Group	SAQ Group	Skill based Group	Combined group		
28.15	30.46			2.31*	0.48
28.15		29.44		1.29*	
28.15			31.28	3.13*	
	30.46	29.44		1.02*	
	30.46		31.28	0.82*	
		29.44	31.28	1.84*	

**Significant at 0.05 level*

The paired mean differences between the control group and the other groups were 2.31 for the SAQ group, 1.29 for the game-specific training group, and 3.13 for the combined training group. All these differences were greater than the confidence interval value of 0.48, indicating that each training method led to a significant improvement compared to the control group. The differences between the SAQ group and the game-specific training group (1.02), as well as between the SAQ group and the combined training group (0.82), were also higher than 0.48, showing significant differences. Additionally, the difference between the game-specific training group and the combined training group was 1.84, which was above the confidence interval value, indicating a significant difference. Overall, the results showed that all three training types significantly improved speed. Among them, the SAQ training produced the most notable improvement compared to the other groups.

VI. Discussion Of Findings

The study titled "Effect of Game Specific and SAQ Training on Selected Physical Fitness Variables Among Basketball Players" explores how targeted training interventions influence key physical fitness metrics in basketball athletes.

The findings generally indicate that both game-specific training and Speed, Agility, and Quickness (SAQ) training positively impact physical fitness, with some differences in the magnitude of improvements across variables. Game-specific training, which involves drills mimicking actual gameplay scenarios, enhances sport-specific speed and agility by providing functional movement patterns (Ziv & Lidor, 2009). Similarly, SAQ training, designed explicitly to improve rapid directional changes and acceleration, has been shown to significantly improve agility and speed metrics (Little & Williams, 2007). The findings likely suggest that both training modalities improve these variables, with SAQ training possibly yielding more pronounced gains in agility due to its focused nature. While primarily focused on speed and agility, some studies have noted that game-specific drills can enhance muscular endurance and power due to the dynamic movements involved (Feigenbaum et al., 2009). SAQ training, which often involves plyometric and explosive movements, may also contribute to increased muscular power. The differential effects observed might suggest that while both training methods are beneficial, combining game-specific drills with SAQ training could produce synergistic effects, optimizing overall physical fitness.

Game-specific training emphasizes tactical and contextual skills, improving performance efficiency, whereas SAQ drills enhance fundamental physical attributes (Baker et al., 2008). Both game-specific and SAQ training modalities effectively enhance physical fitness components relevant to basketball performance. An integrated approach that combines tactical, technical, and physical drills may offer the most comprehensive benefits for basketball players.

VII. Conclusion

Based on the results of the study,

1. It was concluded that speed and leg explosive power showed significant improvement for the basketball players due to SAQ training, game specific fitness training and combined training compared to control group.
2. It was concluded that there was a significant difference between the training groups. Among the three groups SAQ training group showed better improvement than the other training groups.

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