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Role of Yoga for Improving Muscles Strength in Basketball Players

Gurpreet Singh[1]* Sanjeev Kumar[2]

[1,2] Lecturer in Physical Education: Jammu & Kashmir Government

Abstract – Basketball is a dynamic and fast-paced game that requires an excellent level of muscles strength of limbs and abdomen along with other fitness and skill indices. This study explicitly confined to see the impact of yoga on muscles strength of the basketball players. A parallel group pre-post design was implemented on randomly assigned two groups of male basketball players viz., experimental group (n = 30) and control (n = 30) group, age ranged from 16 to 18 years. Standard tests were administered to measure muscles strength of limbs (upper and lower) and abdomen to record pre- and post- test data. In between pre- and post- test, specific yoga training was imparted to the experimental group for 30 minutes daily in the evening, 5 days a week for a total eight weeks. On the contrary, the control group did not undergo any yoga training but were involved in some extracurricular activities for 30 minutes. Further all the groups underwent a 10-minute rest followed by 40 minutes of basketball training/practice session and 10 minutes of cooling down exercises. Thus, total involvement work bout was 90 minutes per day. Data was analyzed using paired 't' test. Results revealed that the basketball players of experimental group showed significant change (p<0.001) in arm muscles strength, leg muscles strength and abdominal muscles strength respectively. The findings showed that yoga training for eight weeks are effective in improving muscles strength needed to achieve success in competitive basketball.

Keywords: Yoga, Muscles Strength, Basketball

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INTRODUCTION

Although the basketball game was invented by James Naismith in 1891 as a recreational activity for the businessmen; it has become a highly specialized game played by worldwide nations. It is a game for old and young for women and men. In fact, it is an intermittent sport that combines active and passive phases of play and requires players to compete in frequent short bouts of high-intensity exercise, followed by periods of low-intensity activity. Therefore, the performance of players depends on well developed muscular qualities viz., muscular strength of leg muscles, arm muscles, abdominal muscles including agility, acceleration, flexibility and vertical jumping . In fact, a great amount of strength of the muscles of upper as well as lower limbs, abdominal and back muscles is essentially required in basketball players. Moreover, a number of studies reveal that muscle strength is critical to health and wellbeing too reveals that many strategies are available worldwide to improve performance in basketball, but potential effects of yoga exclusively for muscular fitness of basketball players is not known. However, many investigations indicate that yoga has numerous benefits for physical health and fitness. Moreover, yoga is essentially maintained an improved cardiovascular health. Scientific evidence also infers that yoga may be useful for musculoskeletal health in improving muscular strength. Psychologically, yoga may reduce hostility , improve mood and reduce stress that might help to improve different aspects of muscular strength. Traditional yoga theory also indicates that the effects of yoga are due to its combined impact on the mind and body. Despite yoga's wide popularity, the randomized controlled studies in sports person are meager. Hence, the present study was conducted with an objective to find out the effect of yoga training on muscular strength abilities among basketball players.

METHOD AND MATERIALS:

Participants:

Participants were sixty five elite male basketball players aged 16 to 18 years from a school located in District Jammu, J&K. Purposive sampling technique was applied to locate the basketball players. Out of sixty five elite players, sixty (n=60) were assigned into one experimental group (n1 = 30) and one control (n2 = 30) group considering the method of Fisher's random table sampling.

ETHICAL CONSIDERATION:

Signed informed consent was obtained from the parents of all the participants at the time of registration, in which they know that the experiment

involves noninvasive data collection methods and risks free intervention. However, prior to the experiment all procedures were reviewed and approved by the institutional ethical committee of Physical Education, J&K. It is important to note that the participation in this project was voluntary in nature and participants were not provided with any incentives for their participation. Moreover, they were free to discontinue participation at any point in time without consequence. This was oriented verbally to both the control and intervention groups during presentation to the subjects and school authorities. It was also restated in consent form.

RESEARCH DESIGN:

A parallel group pre-post design was implemented to conduct the experiment. Both experimental and control groups were assessed with three variables of muscular strength on the first day of experiment (as pre-test) and then the subjects of the experimental underwent a yoga training intervention for a total period of 8 weeks. On the contrary, the subjects of the control group did not undergo any yoga training. After completion of 8 weeks yoga training intervention, three variables were post tested.

ASSESSMENT OF VARIABLES:

Arm muscles strength, leg muscles strength and abdominal muscles strength were considered as three variables of muscular strength. They were assessed before (as pre-test) and after eight weeks of yoga interventions (as post-test). Standard tests were administered to measure muscles strength of limbs (upper and lower) and abdomen to record pre- and post- test data.

Arm muscles strength: of the basketball players was assessed by pull ups. The subjects were asked to grasp the overhead bar using either and overhand grip or underhand grip, with the arms fully extended. The subject then raises the body until the chin clears the top of the bar, then lowers again to a position with arms fully extended. The total number of pull ups correctly completed was recorded as score.

Abdominal muscles strength: was assessed by sit ups. The subject was asked to lie down in supine position with knees bend and feet on the floor with the feet more than 1 foot from the buttocks. The knee angle should not be less than 90 degrees. The fingers are interlocked and placed behind the back with the elbows touching the floor. A partner holds the feet securely. The subject then curls up to a sitting position and touches the elbows to the knees. 1 point was scored for each correct sit-up. The total number of sit-ups in 1 minute was recorded.

Leg muscles strength: was measured by vertical jump. A jump board marked with horizontal lines, one centimeter apart was fastened to the wall so that the lower edge was just below the standing height of the shortest player to be tested. The player was then instructed to jump to stand sideward against the wall, and heels together with his index finger of the hand nearest to the wall chalked with magnesium powder. Keeping the heels on the floor, he was then asked to reach upward as high as possible and make on the board with his chalked fingers. Then he was asked to jump again as high as possible to mark another mark on the board at the height of his jump. Three such jumps were permitted. The distance between the chalk mark of the standing reach and mark of the highest jumping reach was recorded as the score to the nearest half centimeter.

TRAINING INTERVENTION

After pre-test was over, the subjects of experimental group underwent a training of yoga intervention, under the overall supervision of a yoga expert, for thirty minutes a day in the evening at 5:00 p.m., excluding Saturdays, Sundays and holidays for a total period of 8 weeks; whereas the control group did not undergo any yoga training but were involved in extracurricular activities for the said thirty minutes. Both the groups were given a gap of 10 minutes to take rest and then they participated in volleyball training/practice session for 40 minutes followed by a 10 minutes of cooling down exercises. Thus, total involvement of work bout for both the groups was 90 minutes per day, 5 days in a week, for a total 8 weeks.

The experimental group practiced yoga asanas (postures) and pranayama (breathing techniques). Each asana was maintained for 15-30 sec initially, and for 1 minute in the later stages. Duration of pranayama was for 2-3 minutes initially and was gradually increased to 5 minutes. The asanas included for the experimental group were Shavasana, Naukasana, Sarvangasana, Bhujangasana, Dhanurasana, Paschimottanasana, Vajrasana, Bakasana, Chakrasana, Tikonasana, and Vrikshasana, whereas the pranayama practices were Ujjayi, Suryabhedan, and Anulom-Vilom pranayama. Every training session was ended with om chanting.

Standard methods were followed for the data extraction for each of the variables. Data analysis was done using statistical software (SPSS, Statistical Package for the Social Sciences, Version 20.0). Data were primarily analyzed using descriptive statistical method and further compared with the help of paired 't' test.

TABLE-I

DESCRIPTIVE STATISTICS AND T-TEST RESULTS FOR WITHIN GROUP COMPARISON IN MUSCLES STRENGTH OF BASKETBALL PLAYERS

Variable	Pre Mean ± SD	Post Mean ± SD	t value	Sig.
Yoga Group				
Arm muscles strength (Number)	9.77 (±0.43)	12.90 (±2.17)	7.88	0.001
Leg muscles strength (Cms)	42.50 (±2.0)	45.40 (±1.98)	8.28	0.001
Abdominal muscles strength (Number)	41.20 (±2.70)	45.83 (±2.45)	10.04	0.001
Control Group				
Arm muscles strength (Number)	9.26 (±1.25)	8.86 (±1.13)	1.83	0.07
Leg muscles strength (Cms)	42.26 (±1.87)	41.70 (±2.0)	1.26	0.21
Abdominal muscles strength (Number)	40.66 (±2.63)	40.06 (±2.50)	1.36	0.18

The results between group comparison revealed that experimental (yoga) group had significant superiority over the control group in arm muscles strength (t=7.34, df=58, p<0.001); leg muscles strength (t=7.20, df=58, p<0.001); abdominal muscles strength (t=8.01, df=582).

TABLE II

DESCRIPTIVE STATISTICS AND T-TEST RESULTS FOR BETWEEN GROUP COMPARISON IN MUSCLES STRENGTH OF BASKETBALL PLAYERS

Variable	Yoga (post-test) Mean ± SD (n=30)	Control (post-test) Mean ± SD (n=30)	t-value	Sig.
Arm muscles strength (Number)	12.90 (±2.17)	8.86 (±1.13)	7.34	0.0001
Leg muscles strength (Cms)	45.40 (±1.98)	41.70 (±2.0)	7.20	0.0001
Abdominal muscles strength (Number)	45.83 (±2.45)	40.06 (±2.50)	8.01	0.0001

These results indicate that yoga practices are effective in improving muscle strength of elite basketball players.

RESULTS:

Results of within group comparison indicate that experimental (yoga) group showed significant changes in arm muscles strength (t=7.88, df=29, p<0.001); leg muscles strength (t=8.28, df=29, p<0.001); and abdominal muscles strength (t=10.04, df=29, p<0.001) after yoga training intervention, whereas, the results of control group revealed no significant change in arm muscles strength (t=1.83, df=29, p>0.05); leg muscles strength (t=1.26, df=29, p>0.05); and abdominal muscles strength (t=1.36, df=29, p>0.05) respectively (Table 1).

DISCUSSION:

The findings of this eight week research study suggest, amply, the effectiveness of yoga training in improving abdominal muscles strength (t=8.01, p<0.001), leg muscles strength (t=7.20, p<0.001), arm muscles strength (t=7.34, p<0.001) of basketball players. In fact, all these types of muscles strength are required by the talented basketball players. The results indicate that improved strength of abdominal muscles is an essential factor for a basketball player while making the bodyarch prior to basket the ball. Moreover, abdominal strength is also vital for any movements while playing basketball. This is agreed by many of the earlier investigators who reported that proximal stability and strength of the abdominal and spinal muscles of the trunk are important in performance of many functions. Thus, appearance of improved abdominal muscles strength as a result of yoga for basketball players seems to be justified. In addition, skill of blocking and dribbling, in which a basketball player blocks and extends their hands up and down ,right and left to block or an attack by the opponent, is crucial to a team to get success . In fact, for success in blocking and basket the ball, a basketball player needs to have an excellent jumping ability as well as takeoff velocity, which are possible if the player possess higher state of leg muscles strength. The result of the present study finally supports the findings of earlier studies. The results also revealed that yoga training was found to be significantly effective in improving arm muscles strength. In reality, basketball game requires a comprehensive ability including physical, technical, mental, and tactical abilities, which can be achieved by the basketball players. The results of this study showed improvement in upper and lower body muscles strength as well as strength of abdominal muscles were improved after eight weeks of yoga training. These findings seem to be similar with the findings of earlier researches that showed yoga practices are effective in achieving top performance in sports. The appearance of such result may be due to the fact that asanas and pranayamas generally give gentle massage to the inner muscles and cleans their impurities. Regular practice of such yoga practices might have helped to improve overall performance of the muscles and joints and therefore results into the enhanced level of muscular strength of the basketball players.

CONCLUSION:

The findings of present study showed that yoga practices for eight weeks are effective in improving muscular strength needed to achieve success in competitive basketball game.

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Corresponding Author

Gurpreet Singh*

Lecturer in Physical Education: Jammu & Kashmir Government

gpsrainy@gmail.com