Effects of SAQ training on selected physiological variables among basketball players

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ABSTRACT *The present study explores the impact of 12 weeks SAQ training on the various physiological variables among basketball players. Twenty basketball players were randomly selected from The New Public School, Sec-18,and Sri Guru Harkrishan Model School, Sec-38 of Union Territory Chandigarh. The age of the students ranged from 16-19 years. The players were randomly divided into two groups, SAQ training group (N=10) and control group (N=10).Random group design has been used in the study. The training programme was scheduled for one and a half hour, i.e., 4:00-5:30pm per day for twice a week (Monday and Thursday) for SAQ training group. The control group was prohibited to participate in any of the training programmes except for their daily routine practice. The selected physiological variables for the study were resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate and peak expiratory flow rate. To compare the mean difference between pre-test and post-test,'t' test was computed with the help of SPSS software and level of significance chosen was 0.05. Significant differences were found with pre-test and post-test results with respect to pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate, etc. it can be therefore inferred that SAQ training indeed affects the physiological variables and rather improves them. No significant was found between pre-test and post-test of control group on physiological variables. Therefore, this training should be an integral part of the overall training programmes for athletes.*

Keywords: *Speed, Agility and Quickness, Basketball players*

1. Introduction:

A sports training is an essential kind of preparation for a refined performance through physical exercise. It is constituted of scientific principles that aim at knowledge and performance enhancement. Sports activities are comprised of motor movement and action, while their success depends to a huge extent on how methodologically and correctly they are performed. Techniques of sports-training and improvement of tactical efficiency are of great importance in a training process (Fox, 1984).Training and conditioning are the best known techniques to prepare the athletes/players for a better and efficient performance, and for a healthy living as well. Efficient performance is possible only when a carefully planned programme of regular practice is implemented, which shall perfect the co-ordination, obliterate the unnecessary movements and provide the required result at the cost of minimum energy. It will also condition the muscle structure and the circulation to endure without fatigue the intensive demands made upon them (Koubova and Guarente, 2003).Sports training is a planned programme ofexercises designed in order to improve the sporting skills, and to enhance the energycapacities of an athlete for a particular game or event. These basic trainingprocedures will serve better when utilized with modifications suited toindividuals or a group dealt with. The training programme shouldlook into improving the performance of the athletes and at the sametime should prevent injury from taking place(Fox1984).

Basketball players are essentially supposed to have skillfulness, change of speed, an acute sense of direction, accurate passing ability, and quick rebounding ability. The shot must be carried out with the ball with proper handling. In order to achieve this, a high degree of motor abilities like, strength, anaerobic and aerobic endurance, agility, speed of movement, reaction time, explosive power, flexibility etc. are the essential qualities. These should be developed by all basketball players. Moontsir (1978) has expressed that the basketball game requires highly skilled players with a refined physical conditioning and maximum training. Nowadays, basketballers put themselves under rigorous training programs it order to meet the demands of the game.

Speed-Agility-Quickness (S.A.Q.) training has become a special and common way to trainthe athletes. It is adopted by all kind of subjects like school children on a soccer field or all kinds of professionals in training camp. It can provide you variety of benefits. Thisparticular method has been there in this discipline for several years now, but it was not used by all athletes, the reason being lack of education regarding the drills. Thistraining can be used to increase speed or strength, or the ability to exert paramount force during high-speed movements. Some benefits of speed, agility, and quickness training include: desired increase in

muscular power in all multi planar movements; efficiency of brain signal; kinesthetic or body spatial awareness; motor skills; and reaction time.

SAQ training encompasses a complete spectrum of training intensity, from low to high. Every individual will fall into a different levelof training programme; therefore training intensity must coincide with the individual's abilities. However, low intensity speed, agility, and quickness drills may be used by anyone for different objectives.SAQ drills can also be adopted to teach movements, to warm-up, or for the conditioning of an athlete. Noparticular preparation is needed to participate at this level of speed, agility, and quickness training. Higher intensity drills however demand a significant level of preparation. A basic approach to safe participation and enhanced effectiveness begins with a concurrent strength-training program ***(Brown et al.,2005)***.

Exercise physiology can be defined as the scientific study of the physiological changes in the body of the athletes that come as a result of exercise. They can be long term or short term depending on the mode of exercise and the desired changes. Environmental changes such as altitude, climate, temperature, humidity, nutritional status etc., apparently have some close connection with the optimal or best performance of an athlete. (Clarke and Clarke, 1987). In order to develop specific physiological systems of the body or to make them fit, they must function specifically in order to support a particular game. Different games have different demands, which are related to an organism's neurological, respiratory, circulatory and temperature. Forthe regulation ofthese functions, physiological fitness is specific to the activity. Physiological systems are naturally adaptable to exercise. (Gianetti, G et.al. 2008)

2. Method and procedure

The present study is a kind of analytical research which uses experimental method. A random group design, which was experimental in nature, was implemented for this study. The sample of the study comprises twenty(20) basketball players from The New Public School, Sec-18,and Sri Guru Harkrishan Model School, Sec-38 of Union Territory Chandigarh. The age of the students ranged from 16-19 years. The players were randomly divided into two groups, SAQ training group (N=10) and control group (N=10).The training programme was scheduled for one and a half hour, i.e., 4:00-5:30 PM per day for twice a week (Monday and Thursday) for SAQ training group.The control group was prohibited to participate in any of the training programmes except for their daily routine practice. After transmuting the data into statistical analysis, the study was concluded. Measurements for variables were taken at the initial (pre-test) and at the end of experimental training period after 12 weeks (post-test).

Fig-1 SAQ Training Group

Fig-2 Control Group

The selected physiological variables were resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate and peak expiratory flow rate of the study were measured in the units of beats/minute, mmhg, mmhg, breath/minute and liters respectively. To compare the mean difference between pre-test and post-test,'t' test was computed with the help of SPSS software and level of significance chosen was 0.05.

3. Data Analysis and Results

For the variables, the statistical analysis between the pre-test and post-test of experimental group and control group regarding resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate and peak expiratory flow rate among basketball players has been given in table 1 and 2. There were significant differences between the pre-test and post-test results.

Table 1: Comparison of pre-test and post test of SAQ training group with regard to selected physiological variables among basketball players (Experimental Group)

variables	Test Condition	N	Mean	Std. Deviation	Mean difference	t-value	p-value
Resting Pulse Rate(Beats/Minute)	Pre-test	10	72.4	6.7	4.9	6.648	0.0001**
	Post-test	10	67.5	5.2			
Systolic Blood Pressure (mmhg)	Pre-test	10	120.3	5.2	6.0	12.136	0.0001**
	Post-test	10	114.3	4.1			
Diastolic Blood Pressure(mmhg)	Pre-test	10	80.8	5.8	6.4	6.532	0.0001**
	Post-test	10	74.4	5.4			
Resting Respiratory Rate(Breath/Minute)	Pre-test	10	19.9	1.8	5.1	10.583	0.0001**
	Post-test	10	14.8	1.5			
Peak Expiratory Flow Rate(Litters)	Pre-test	10	433.0	52.1	77.0	16.293	0.0001**
	Post-test	10	510.0	49.7			

A perusal of contents of table-1 pertaining to pre-test, post test and post-test SAQ training group on the resting pulse rate would show that pre-test group had secured mean 72.4 and standard deviation 6.7. Whereas post group had secured mean 67.5 and standard deviation 5.2. The t-value for pre-test and post-test of resting pulse rate was found to be statistically significant as the value obtained was 6.648 with p-value 0.0001 (<0.001) which is less than 0.001 level of significance. Thus, it means that there is a highly significant difference between pre-test group and post group for the resting pulse rate variable.

A paired sample 't' test showed that the SAQ training group difference with regard to systolic blood pressure for the pre-test group M = 120.3 and S.D. = 5.2 and the post group M = 114.3, S.D. = 4.1 which were statistically significant with t-value 12.136 and p-value 0.0001 (<0.001). Thus, it means that there is a highly significant difference between pre-test group and post group for the systolic blood pressure variable.

It is shown that mean and SD values with regard to pre-test for SAQ training group on the basketball players diastolic blood pressure were 80.8 and 5.8 and post group had obtained the mean 74.4 and standard deviation 5.4. The 't'-value for pre-test and post test on the basketball players diastolic blood pressure was 6.532 with p-value 0.0001 (<0.001). Thus, there is a highly significant difference between pre-test and post group for the basketball players diastolic blood pressure.

On the variable resting respiratory rate, pre-test and posttest SAQ training group revealed M = 19.9 and S.D. = 1.8 for pre-test, M = 14.8 and S.D. =1.5 for post test. The t-value for pre-test and post test was found to be statistically significant as the value was obtained 10.583 with p-value 0.0001(<0.001).Thus, it means that there is a highly significant difference between pre-test group and post groupfor the resting respiratory rate variable.

In case of pre-test peak expiratory flow rate the mean score, standard deviation of SAQ training group were M = 433.0 and S.D. = 52.1 and in case of post-test peak expiratory flow rate the mean score, standard deviation of SAQ training group were 510.0 and 49.7. The t-value for pre-test and post test on the basketball players peak expiratory flow rate was found to be statistically significant as the value was 16.293 with p-value 0.0001 (<0.001).Thus, it means that there is a highly significant difference between pre-test group and post groupfor the peak expiratory flow rate variable.

Table 2: Comparison of pre-test and post test of control group with regard to selected physiological variables among basketball players

Variables	Test Condition	N	Mean	Std. Deviation	Mean Difference	t-value	p-value
Resting Pulse Rate(Beats/Minute)	Pre-test	10	73.1	6.6	0.7	1.769	0.111^{NS}
	Post-test	10	72.4	6.5			
Systolic Blood Pressure(mmhg)	Pre-test	10	120.0	2.8	0.9	0.797	0.446^{NS}
	Post-test	10	119.1	3.9			
Diastolic Blood Pressure(mmhg)	Pre-test	10	77.5	3.3	0.6	1.203	0.260^{NS}
	Post-test	10	78.1	3.6			
Resting Respiratory Rate(Breath/Minute)	Pre-test	10	19.4	1.2	0.3	0.580	0.576^{NS}
	Post-test	10	19.7	1.8			
Peak Expiratory Flow Rate(Liters)	Pre-test	10	445.0	49.7	3.0	0.818	0.434^{NS}
	Post-test	10	448.0	50.1			

Table- 2 depicts the descriptive statistics and paired t-ratio for Pre-test and post test of control group with regard to physiological variables like resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate and peak expiratory flow rate among basketball players. It is shown that mean and SD values with regard to pre-test of Control group on the basketball players resting pulse rate were 73.1 and 6.6 as compared to these values post group had obtained the mean 72.4, standard deviation 6.5. The 't'-value for pre-test and post test on the basketball players resting pulse rate was 1.769 with p-value 0.111 which was found to be non-significant at 5% level of significance.

Pre-test and post test of control group on basketball players systolic blood pressure, concluded the mean score of 120.0 and SD 2.8 for pre-test and mean score 119.1 and SD 3.9 for post test. The t-value for pre-test and post test was found to be statistically non-significant as the value was obtained 0.797 with p-value 0.446 (>0.05).

Diastolic blood pressure of pre-test group had secured mean 77.5, standard deviation 3.3. However post group had secured mean 78.1, standard deviation 3.6. The t-value for pre-test and post-test of diastolic blood pressure was found to be statistically non-significant as the value obtained was 1.203 with p-value 0.260 (>0.05).

In case of pre-test resting respiratory rate the mean score, standard deviation of control group were 19.4. 1.2 and in case of post-test resting respiratory rate the mean score, standard deviation of Control group were 19.7, 1.8. The t-value for pre-test and post test on the basketball players resting respiratory rate was found to be statistically non-significant as the value was 0.580 with p-value 0.576 (>0.05).

A paired sample 't' test showed that the control group difference with regard to peak expiratory flow rate between the pre-test mean 445.0, standard deviation 49.7 and the post group mean 448.0, standard deviation 50.1 which were statistically non-significant with t-value 0.818 and p-value 0.434 (>0.05).

Figure-3 Illustrations of Blood Pressure, Peak Expiratory Flow Rate,Resting pulse Rate Measurement

Figure-4The Graphical Representation of Mean Score of Pre-Test and Post-Test Measurements for Experimental Group

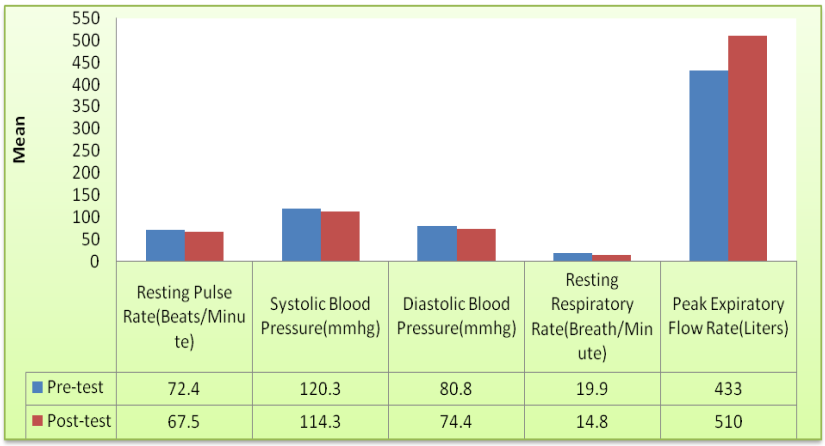
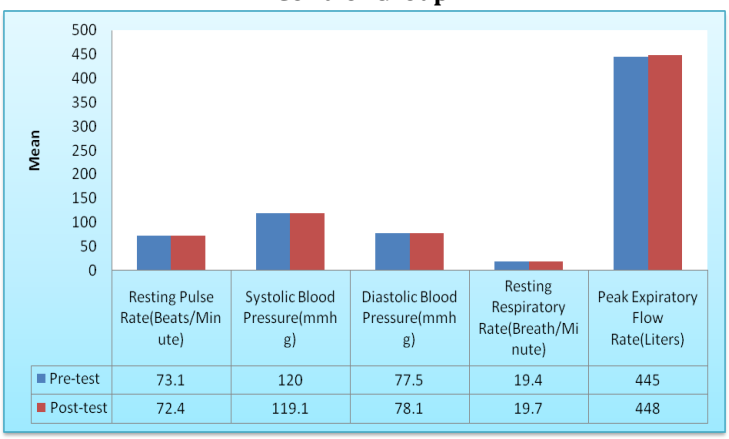


Figure-5: The Graphical Representation of Mean Score of Pre-Test and Post-Test Measurements for Control Group



4. Discussion

The results of the study regarding the physiological variables like resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate and peak expiratory flow rate among basketball players reveal that the experimental group namely SAQ training group had significantly improved after the 12 weeks of training and there was no significant difference was existed between pre-test and post-test of control group. The results are in line with that of study earlier conducted by **Singh &Singh(2015)** revealed that SAQ equipment training group had significantly improved physiological variables- resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate, peak expiratory flow rate and maximum breath holding capacity after the 12 weeks of training and there was no significant difference was existed between pre-test and post-test of control group . It was also observed by **P.SenthilKumar(2015**) in hisstudy that SAQ training produce significant changes on selected physical, physiological variables, and skill performance variables of college men football players.

5. Conclusion

SAQ training program is an important part of training for athletes which also affects the performance and physiological variables of these athletes. Further, many studies have also highlighted its usefulness for athletes and players. The objective of the present study was to analyze the impact of SAQ training program for athletes and to find out its impact on the physiological variables such as respiratory rate, systolic blood pressure, etc. basketball players were chosen as the subjects for the study. It was found that there was a noticeable and significant impact of SAQ training on the physiological variables chosen for the study. Most of the variables showed a significant difference with respect to pre and post-test results. Therefore, it can be inferred that SAQ training has an observable impact as far as the various physiological measurements of players are concerned. It is an effective training to improve the levels of physiological variables of players.

6. References

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