

THE EFFECT OF UNDERWATER TRAINING ON THE BREATH HOLDING ABILITY OF KABADDI PLAYERS

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ABSTRACT

Purpose: Mastery of respiratory control is an essential proficiency for raiders in Kabaddi, especially during intense struggle. As a result, during practice sessions, kabaddi players frequently engage in breath holding exercises. In this study the researchers want to investigate the effect of underwater training on the breath holding ability of Kabaddi players. **Methods:** The researchers randomly selected thirty male state-level Kabaddi players from Amravati, Maharashtra, as subjects. The subjects' ages ranged from 12 to 18 years. The researchers equally divided the subjects into two groups: the experimental group (15) and the control group (15). Treatment was given through underwater training to the experimental group only, and the training period was restricted to six- weeks as it was considered adequate. To analyse the data, descriptive statistics such as means, standard deviation, range minimum score, maximum score, standard error, Skewness, and kurtosis were employed. To find the significant difference between each group's pre-test and post-test results, the researchers employed a dependent t-test. An independent t-test was used to test the hypothesis. For all statistical procedures, the level of significance was set at 0.05. **Result:** Findings indicated that there is a significant difference among the pre and post-test means ($t = 6.081$) of the experimental group but no significant difference among the pre and post-test means ($t = 1.930$) of the control group for the variable breath holding ability. The data also revealed no significant difference between the post-test means ($t = 1.851$) of the experimental and control groups for the variable breath holding ability. This indicated a lesser effect of underwater training on breath holding ability.

Keywords: Under Water Training, Breath Holding Ability, Kabaddi.

1. INTRODUCTION

Kabaddi is a team sport where each participant has a distinct role to fulfil in both defensive and offensive strategies (Sardar & Pandey, 2016). The motor qualities differ from player to player, and the specific abilities of players occupying different positions or roles in the team game also differ. The specific fitness of a raider is different from that of the main defensive player. This emphasizes for the design of individual training programs for each player, as far as possible, especially when they reach a certain standard of performance. A raider raids in the opponent court, tries to touch out as many of the defenders as possible, and returns to their own court, all without being tackled by the defenders (R. & G., 2019). During the raid, the raider has to use a cant. Cant is a repetitive uttering of the word kabaddi without breaking the rhythm of the breath (Rao & Kishore, 2014). For that purpose, a raider needs specific fitness in terms of breath control and breath holding ability and cardiovascular endurance. To develop this specific quality of breath-holding, players usually practice during the training session. But to effectively develop the breath holding ability, proper training and training methods are crucial.

Kabaddi is an indigenous game of India (Sardar & Pandey, 2016; Sen, 2015; T.M, 2019). In team sports, success is influenced by a combination of physical attributes (Kenney, W. Larry, Wilmore, Jack, Costill, David, 2015; Keogh, 1999) psychological variables, and external circumstances, like the evolution of

national and international standards (Schellenberger, Hans, 1990). Breath control and breath holding, offensive push, falls, turns, dodging, holding, bending, bouncing and movement of hands and feet are the basic skills that one must acquire to play Kabaddi (Ram & Singh, 2021a, 2021b). The game blends the elements of rugby and wrestling (T.M, 2019), and to succeed in it, a player needs develop strength and both offensive and defensive skills (Sardar & Pandey, 2016). The main purpose of kabaddi in ancient India was to help young men gain physical strength and speed. Kabaddi was originally developed as a means of improving self-defense abilities and fast reaction times to attacks.

Breath holding ability is one of the specific physical fitness components for kabaddi (Ram & Singh, 2021a, 2021a). The fundamental physiological ability to sustain a prolonged breath hold is the prioritization of blood circulation enriched with oxygen to the brain and the effective utilization of the oxygen that is accessible (Bain et al., 2018). A study conducted on Kabaddi players from Govt. Jr. College Sattenapalli, Guntur District, India, investigated the effect of yoga practice on cant ability. The study separated the participants into two distinct groups: control and experimental. The experimental group engaged in daily pranayama exercises for a duration of six weeks. The study's findings revealed a notable disparity in breath retention and the capacity to pronounce the word Kabaddi in a solitary breath or inhalation (cant) (Rao & Kishore, 2014). In another study, the researchers tried to ascertain how university Kabaddi players selected physiological variables were affected by an eight-week circuit training program. Thirty subjects were chosen at random from Kashmir University Hazratbal Srinagar, India, with ages ranging between eighteen and twenty-eight years. They were split equally into the experimental group and the control group. The experimental group received circuit training for eight weeks. According to the findings of the study, the circuit training program had a significant impact on a number of physiological variables, including breath holding time, resting pulse rate, and respiratory frequency (Dr. Hartej Singh, 2016). The resting heart rate and breath-holding duration of Kabaddi players were impacted by intense interval training. Intense interval training affected the resting heart rate and breath-holding duration of Kabaddi players. In 2018, G. Kasi Rajan and Dr. S. Mariappan conducted a prior study on 24 Kabaddi players from Thoothukudi District, ages ranging from 18 to 24. The researchers randomly selected the experimental and control groups, each with twelve participants, from among the subjects. The experimental group participated in an intensive interval training program for three different days each week for a duration of six weeks. Researchers subjected the obtained data from the respondents to an analysis of covariance (ANCOVA) and a dependent t-test. Six weeks of intense interval training significantly improved the resting heart rate and breath holding time, while the control group showed no change in the relevant dependent variables (G Kasi Rajan and Dr. S Mariappan, 2018).

Physical fitness is an integral component of sports performance and accomplishment. The capacity to achieve a better degree of performance of a player is directly proportional to their level of fitness (Sardar & Pandey, 2016). Fitness training prepares athletes to confront the physiological and psychological obstacles they encounter in their competitive sports careers. Kabaddi players require a high level of breath holding ability as a specific fitness requirement. The athlete needs specific fitness to perform the unusual motions required by the sport. Enhancing breath holding ability can optimize a player's performance by helping them to sustain their breath for extended durations, hence facilitating more effective court navigation and reducing the likelihood of being attacked. Therefore, in this study, the researchers examined whether six weeks of underwater training had an effect on increasing the breath holding ability of Kabaddi players.

1.1. Statement of the problem

The rapid advancement in technology and training methods in the sport of kabaddi has prompted the research scholars to investigate the effect of underwater training on the breath holding ability of kabaddi players.

1.2. Purpose of the study

Kabaddi is a sport that requires participants to hold their breath, making a strong cardio-respiratory system essential for achieving peak performance. Various training programs exist to enhance the performance of Kabaddi players. The study aimed to investigate the effect of six weeks of underwater training on the breath holding ability of Kabaddi players.

1.3. Hypothesis

A hypothesis was made that underwater training would have significant effect on the breath holding ability of Kabaddi players.

2. MATERIALS AND METHODS

2.1. Subject

Thirty male state-level Kabaddi players were selected as subjects from Amravati, Maharashtra in a random manner. The subjects' ages ranged from 12 to 18 years. Each subject provided their informed consent, and their parent or legal guardian provided a parental consent form prior to participation.

2.2. Statistical Procedure

The researchers decided to use breath holding time as a variable. To analyse the data, descriptive statistics such as means, standard deviation, range minimum score, maximum score, standard error, Skewness, and kurtosis were employed. A dependent t-test was utilized to ascertain the statistical significance difference between each group's pre-test and post-test scores. An independent t-test was used to test the hypothesis. The level of significance for all statistical procedure was set at $p = 0.05$. Bar diagrams were included to facilitate the comparison of mean differences. Microsoft Excel was employed for data analysis.

2.3. Experimental Procedure

Two groups were evenly divided among the 30 subjects: the experimental group (15 subjects) and the control group (15 subjects). These groups were homogeneous and belonged to the same population. The training period was restricted to six weeks, as it was considered adequate. During the training period, underwater breath holding was practiced for five days per week. The researchers employed a pulmonary function test to obtain the breath holding time (Gold & Koth, 2016). External factors like diet, daily routine, atmospheric conditions, and altitude were not taken into consideration. Different personalities, other training techniques, tournament playing experience, and the economic condition of the subjects were limited to the researchers. All the subjects were medically fit and knew how to swim, and before starting the training program, the researchers explained the purpose and method of the test and demonstrated it properly.

With the whistle (Fox 40 Classic Official Whistle, Fox 40, Canada) and hand signals of the researchers, the subject exhaled to residual volume (RV), then inhaled to total lung capacity (TLC), placed a nose clip to close the nostrils completely, went under the water, and held their breath for at least 30 seconds, or as long as comfortably possible. Breath-holding time equals the average time in seconds from the end of inspiration to TLC until the first expiration. The test is repeated as per the prescribed schedule for six weeks. The data were collected through a stopwatch (Nivia JS 307 stopwatch, Nivia, Shenzhen Junsd Industry Co. Ltd., Junsd Techonology Park, West of Jinan Rd., Watch & Clock Park, Guangming District, Shenzhen, China), once before applying for the training program and once after the completion of the six-week underwater training program. The score was measured in seconds.

2.4. Administration of training

Only the experimental group received a six-week underwater training program. The control group received no training. Finally, the post-test was given to both groups following the completion of the six-week training period. A suitable safety protocol was followed for conducting the experiment in a 50-meter open swimming pool. In the training period, underwater breath holding was practiced for five days per week, and every day, a 10-minute warm-up was made mandatory by the researchers to prepare the subjects physically and mentally for the main task. The training load progressively increases throughout the course of the week and the whole training program. The first two days of a week (Monday and Tuesday), only bubbling and breath holding (5 repetitions) were scheduled for 5 minutes. The next two days (Wednesday and Thursday) of bubbling (8 repetitions), breath holding and floating (3 repetitions), all for 10 minutes were scheduled. Floating (5 repetitions), underwater swimming (25 repetitions), and bubbling and breath-holding (9 repetitions) were all scheduled for 20 minutes on Friday. In order to gradually increase the training load, the Monday training program was rescheduled as Friday from the fourth, fifth, and sixth week of training.

2.5. Statistical treatment

The dependent t test was employed to determine whether there was a significant difference between each group's pre and post-test results. An independent t-test was employed to determine the effect of

underwater training on the ability of kabaddi players to hold their breath between the experimental and control groups' post-test results.

3. RESULTS

The results pertaining to the above variable have been presented separately under the following tables.

Table -1

Descriptive statistics and comparison of post and pre-test performance on breath holding ability of Kabaddi players of control and experimental group

Group	Control		Experimental	
	Pre	Post	Pre	Post
Mean	28.326	28.679	28.537	32.122
Standard Error	1.015	1.024	1.234	1.554
Standard Deviation	3.929	3.966	4.780	6.017
Kurtosis	10.349	10.356	0.939	0.408
Skewness	3.043	3.037	1.644	1.379
Minimum	25.460	25.700	25.285	26.340
Maximum	41.530	42.010	38.430	43.650

Graphical presentation of Descriptive statistics and comparison of post and pre-test performance on breath holding ability of Kabaddi players of control and experimental group has been shown below-

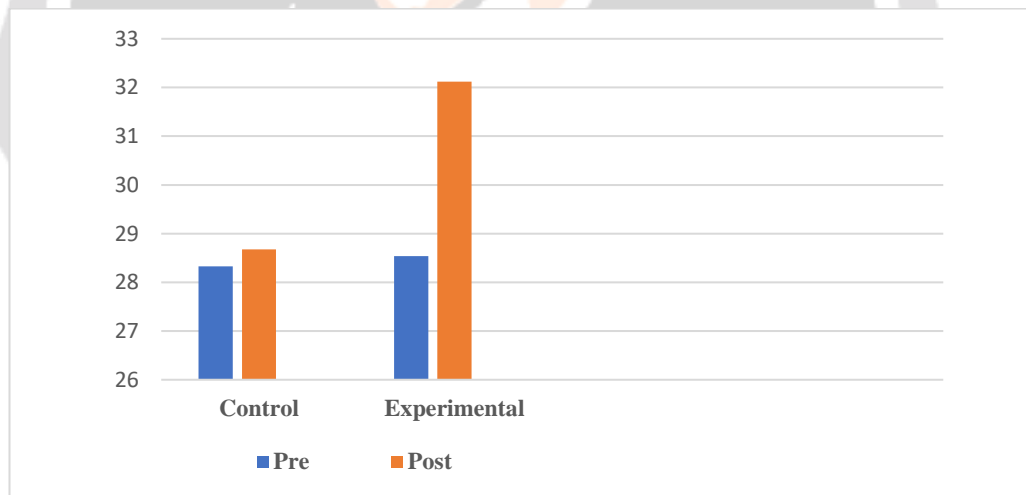


Figure – 1 Representing the mean comparison between pre-test and post-test of control and experimental group

Table - 2

Paired differences between pre and post-test performance on breath holding ability of Kabaddi players of control and experimental group

Tests	Control Group		Experimental Group	
	Pre	Post	Pre	Post
Mean	28.326	28.679	28.537	32.122
Standard Deviation	3.929	3.966	4.780	6.017

Variance	15.440	15.732	22.851	36.202
t ratio	1.930@		6.081*	
P(T>=t) two trail	0.074		0.050	

*Significant at 0.05 level

The results in Table 1 show that there was a significant difference in the experimental group's ability to hold their breath between the pre-test and post-tests. This is because the obtained t value of 6.081 is higher than the tabulated t value of 2.145 at the 0.05 level for the degree of freedom of 14.

The above table's findings also show that there was no significant difference in the control group's breath holding ability between pre-test and post-test performance, with the calculated t value of 1.930 being less than the tabulated t value of 2.145 at the 0.05 level for the 14 degrees of freedom.

Table -3
Comparison of post-test performance on breath holding ability of Kabaddi players of control and experimental group

Group	Mean	SD	Mean Difference	Standard Error	t ratio
Control	28.679	3.966	3.443	0.077	1.851@
Experimental	32.122	6.017			

*Significant at 0.05 level

Tab t 0.05 (28) = 2.064 @Not Significant at 0.05 level

The data presented in Table-3 indicate that there was no statistically significant difference in breath holding ability between the experimental and control groups during the post-test. This is because the observed t-value, 1.851, is smaller than the critical t-value, 2.064, at a significance level of 0.05 for a sample size of 28. Figure 2 visually represents the differences in the mean scores of the control and experimental groups post-test.

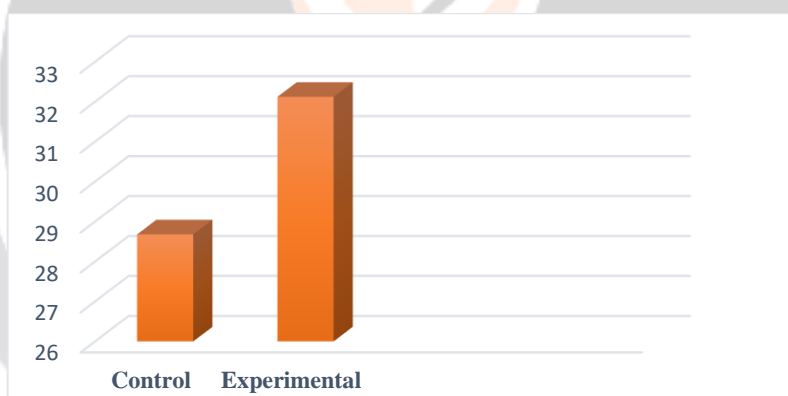


Figure – 2 Representing the mean comparison of post-test performance on breath holding ability of experimental and control group

4. DISCUSSION ON FINDINGS

There are so many training regimens that impact the duration of breath holding for kabaddi players, especially yogic training, circuit training, interval training, skill-based training (Arumugam Subramani, 2019), etc., and underwater training is one of them. Implementing these training regimens may be helpful to enhance the duration of breath holding among Kabaddi players. The purpose of the study was to investigate the effect of underwater training on the breath holding ability of Kabaddi players. Findings of the study showed significant differences among the pre-test and post-test means ($t = 6.081$) of the experimental group for the variable breath holding ability and no significant differences among the pre- and post-test means ($t = 1.930$) of the control group for the variable breath holding ability. The present research also revealed an insignificant difference between the post-test means ($t = 1.851$) of the experimental and control groups for the variable breath holding ability, which indicates a lesser amount of effect of underwater training on breath holding ability.

In previous research, the researchers determined the impact of underwater respiratory workouts on the duration of breath holding among Kabaddi players, utilizing the nose clip technique. The study included a total of 12 participants, whose ages ranged from 19 to 23. Underwater breathing control training was given

to the participants for a period of 6 weeks (3 times per day). The researchers concluded their findings based solely on the pre- and post-test means of the participants. Following the analysis, the initial breath-holding time was determined to be 38 seconds. The last breath-holding time was 53 seconds. Therefore, the breath-holding time of Kabaddi players showed significant improvement as a result of practicing underwater breathing workouts (Gokulakrishnan . J, Haribaskar A.R, 2022).

However, this study found that underwater breath-holding training in Kabaddi did not significantly improve breath-holding time among Kabaddi players when comparing the post-test mean of the experimental group to the control group. This type of training can enhance athletes' tolerance for oxygen deprivation, potentially benefiting their performance, but due to individual variation in physiological adaptation and involvement in other training regimes in the control group, the result may be negative. It is important to emphasize that engaging in breath-holding tasks or hyperventilation, particularly prior to underwater swimming, might pose a serious risk to one's life and should be strongly discouraged (Mark Wilson, Nirmala Perera, Richard Saw, David Hughes, Ana Holt, 2020). Prioritizing safety is crucial when engaging in any type of breath-hold exercise, particularly in sports such as Kabaddi.

5. CONCLUSION AND RECOMMENDATION

Based on the findings of this study, the researchers concluded that there was an improvement in the breath holding ability of Kabaddi players after six weeks of systematic underwater training. However, compared to the control group, the effect on the experimental group of the training was found to be insignificant. This could be attributed to the individual variation in physiological adaptation among people, which necessitates significant effort to cultivate certain abilities.

The findings of this study may be valuable for physical education teachers and coaches in the process of evaluating and choosing Kabaddi players. Additionally, these results may be helpful for the systematic design of training programs that focus on enhancing specific fitness that have a major impact on Kabaddi performance. Researchers suggest conducting analogous studies with female Kabaddi players. Researchers also suggest conducting comparable studies with a substantial sample size and across various age demographics.

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