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Comparative study of selected respiratory variables between female swimmers and non-swimmers

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■ **ABSTRACT**

The purpose of the study was to compare the selected respiratory variables of subjects between female swimmers and non-swimmers. Twenty female subjects from Lakshmibai National University Physical Education, Gwalior was selected and tested. The age of the subjects ranged from 18 to 24yrs.The selected respiratory variables were breath holding, vital capacity and forced ventilator capacity. Mean and standard deviation of female swimmers and non-swimmers in breath holding were 52.8953, 10.59587 and 51.6606, 10.61326, respectively. For vital capacity, the mean and standard deviation of swimmers and non-swimmers were 3.3038, 0.56662 and 3.0300, 0.45109, respectively. For forced ventilator capacity, the mean and standard deviation of swimmers and non-swimmers were 2.9650, 0.56763 and 2.5375, 0.39111, respectively. The selected respiratory variables *i.e.* breath holding, vital capacity, forced ventilator capacity were administrated after a complete rest of ten minutes. Mean results of both the groups were tested for significance of difference at 0.05 level of confidence of by appling't' test. Breath holding, vital capacity and forced ventilator capacity were not found statistically significant between female swimmers and non-swimmers.

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Physical activity is a complicated process in which a trainer should closely watch all the minute changes in the subject during activity. If any one wants to be an athlete, his or her physical activity level should be high when compared with the normal sedentary population. Noticeable physiological changes take place in the body, when it is subjected to continuous physical or sports training programme. Exercise may be looked upon as a series of movement designed specifically for inducing stress that may cause immediate as well as long-term benefit accordingly, responses to exercise have two aspects analogous to the responses of the body to environmental stress. One is short term response to a single bout of occasional exercise or sports activity called as acute exercise, other is the long term response following regular exercise, which makes exercise easier and improves performance. This adaptation to chronic exercise is often referred to as training (Willmore *et al.*, 1984).

Review of literature reveals contradictory results pertaining to physiological variables between swimmers as non swimmers; some studies conclude that swimmers are more superior in lung volumes than others whereas some says there is no difference.

By studying the review of related literature it is found that some studies says that swimmers are more superior in lung volumes than others and some says their is no difference in lung volumes in swimmers and others, whether swimmers have higher lung capacity or not.

■ METHODOLOGY

Thirty four male and female swimmers and non-swimmers of Lakshmibai National University Physical Education, Gwalior were selected as subject for the study the age of the subject

ranged between 18 – 24 years. The selected respiratory variables were breathe holding, vital capacity and forced ventilator capacity. Subjects were made aware of the study, equipments and procedure to be performed. After the installation and calibration of the equipment in the computer, personal data was collected by signing in the concerned letter.

Once the identification had been confirmed, preliminary explanations was made, informing the subjects of the hygienic and no risk factor of the test; and subject was asked to firm, gestural orders, synchronized with the inspiration and expiration with most efficient. Position the nose clip and verify that the mouth piece was half way inside the mouth in order to stop the tongue passing into or in the mouth piece. The subject was informed to close his mouth firmly around the mouth piece and start to breath into the sensor to get used to it. Push on the start key, then 'empty' to exhale and 'blow' to inhale; the empty order should be accompanied by two hands down ward movement, right until end of expiration. And stop key was pushed at the end of the procedure. For the second test, simply push on 'start key' to proceed to test and subject was asked to exhale again. For this study two parameters were collected VC and FVC and procedure includes, for VC – subject was asked to breathe slowly and completely for a few seconds into a spirometer. For FVC – subject was asked to expire into a spirometer completely and forcefully, following a force full inspiration. At the end of procedures click 'SAVE' key to save the data (User manual, Spirovin).For positive breath holding the subjects were asked to take maximum inhalation (breath in) and hold the breathing. As and when the inhalation stopped, the stop watch was started. It was positive inhalation. Care was taken to avoid leaking of air either through the mouth or the nose. Nose clipper was used. As the subject opened his mouth to expire, the stop watch was stopped. Thus, the time for holding the breath was recorded in seconds.

The analysis of data was realized using the statistical programme spss v 17. For descriptive statistics the student't' test was used at 0.05 level of significance.

■ OBSERVATIONS AND DISCUSSION

The data was collected and analyzed in order to draw a conclusion on the comparison of breathe holding, vital capacity, forced ventilator capacity(FVC) between swimmers and non swimmers and the scores are given below:

Table 1 reveals that mean and standard deviation of positive breath holding for swimmers is 52.8953, ±10.59587, vital capacity is 3.3038,±0.56662, forced ventilatory capacity 2.9650, ± 0.56763 and positive breath holding for non–swimmers is 51.6606, ±10.61324, vital capacity is 3.0300, ±0. 45109, forced ventilatory capacity 2.5375,±0.39111, respectively.

Table 1 : Mean and Standard deviation of comparison on breathe holding, vital capacity, forced ventilator capacity between female swimmers and non swimmers

Variables		Mean	Std. deviation	Number
Positive breath	Swimmers	52.8953	10.59587	8
holding	Non-swimmer	51.6606	10.61324	8
Vital capacity	Swimmers	3.3038	0.56662	8
	Non-swimmer	3.0300	0.45109	8
FVC	Swimmers	2.9650	0.56763	8
	Non-swimmer	2.5375	0.39111	8

Comparison of mean results in breath holding, vital capacity, forced ventilator capacity between female swimmers and non-swimmers is presented in Fig.1.

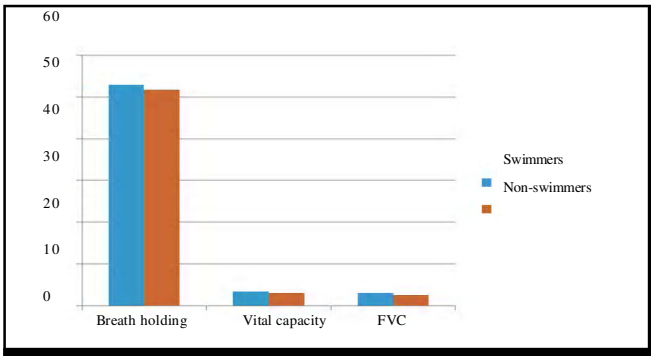

Fig. 1 : Comparison of mean results in breath holding, vital capacity, forced ventilator capacity between female

The comparison of mean difference of breath holding, vital capacity and forced ventilator capacity between female swimmers and non-swimmers is presented in Table 2.

Table 2 : Independent samples t-test for comparison of mean difference of selected respiratory variables between female swimmers and non-swimmers

	t-test for equality of means			
	t	Sig. (2-tailed)	Mean difference	Std. error difference
Breath holding	1.908	0.067	11.23371	5.87783
Vital capacity	1.069	0.303	0.27375	0.25606
Forced ventilator capacity	1.754	0.101	0.42750	0.24371

It is evident from Table 2 that obtained p- value (0.067)is greater than 0.05 thus indicating that there is no. significance difference among female swimmers and non- swimmers in term of breath holding capacity. Obtained p- value (0.303) is greater than 0.05 thus, indicating that there is no. significance difference among female swimmers and non - swimmers in term of vital capacity. Obtained p- value (0.101) is greater than 0.05 thus, indicating that there is no. significance difference

among female swimmers and non- swimmers in term of forced ventilatory capacity.

It was evident from the given results that there was no significant difference of mean breath holding capacity between female swimmers and non –swimmers. Similarly, it is also evident from the results that there was no significant difference between the mean vital capacity among female swimmer and non-swimmers. Similarly insignificant difference of mean forced ventilator capacity was also obtained between swimmers and non-swimmers.

The selected physiological variables of female swimmers and non-swimmers did not show significant difference. This might be because of the reason that, in order to maintain the traditional status of superiority of the university in field of the sports and games in inter-university competition, subjects of different games and sports went through hard training schedule in their respective fields in match practice period, where special care was taken in prescribing a training load pertaining to his and her specialization. The intensity and the duration of training load of various disciplines were more or less the same. More over in our university the swimming session was of four months duration due to absence of proper heating facilities in winter, thus, the swimmer got most of their training on land and less in swimming pool. Probably because of same intensity and duration of the training load of the swimmers and non-swimmers, in which physiological load also had become approximately the same, the groups did not show significant difference in selected physiological variables.

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