

Study of selective Yoga practices on pulmonary volume and capacities of female students

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Abstract: Hatha Yoga practices (respiratory-dynamic) have effects on heart- respiration system performance and it plays an important role at public health and hygiene development. The goal of this research is, Yoga selective practices influences on Impact volume amount, respiration storage volume amount, Vital capacity pressure, voluntary ventilation volume, and top of exhale current, top of inhale current. The research is practical and it is semi-empirical. Between 110 nonathletic student girl of a student dormitory with age range of 18 to 23, 28 numbers were selected randomly for research and they were divided randomly to two empirical groups and control groups randomly. Yoga selective practices program was 6 weeks, and 4 sessions per weeks. Empirical and control group participated in before and after practice measurements test of electronic spirometry. Regarding being normal, data were analyzed using T paired test. A meaningful surface at this research had P below 0.05. Yoga selective practices program had a meaningful change on respiration storage volume amount “P-value: 0.000”, Vital capacity pressure “P-value: 0.000”, maximum voluntary ventilation “P-value: 0.001”, top of exhale current “P-value: 0.001”, top of inhale current “P-value: 0.000”, but it had not a meaningful change in current air volume “P-value: 0.531”. Yoga selective practices program has effects on reinforcement of respiratory muscles and it is effective on storage volume amount, maximum voluntary ventilation, pressure capacity, top of exhale current and top of inhale current.

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1. Introduction

Heart-respiratory perseverance is one of important factors of physical preparation, which can progress with aerobic practices. Reaching aerobic preparation, in addition of a strong heart will need lungs with higher capacity and blood cells with higher Hemoglobin to transfer Oxygen to muscles. Yoga is the oldest sport practice, which after thousands years of its finding, millions of people around the world still practice it every day with increasing enthusiasms.

There are different Yoga practices, which all of them have one goal, and it is reaching human eminent goal. But one of Yoga practice which was more considered and we also used it in this study is Hatha Yoga or respiratory-dynamic Yoga, which is a complete science for mind and body health security. This method is containing physical practice (Asana), respiratory practice (Peranayama) and mind control. Physical Yoga practices must accompany with yoga respiration, otherwise they are only gymnastic physical movement without desired efficiency [1]. The most physiological benefit of yoga practices for athlete is performance improvement of different body organs, especially respiratory organ. Most of

previous studies only investigated general effects of Yoga, and a few of them emphasized on Yoga respiratory benefits. In fact, Yoga creates lasting reform at respiration pattern which is including increase current volume and decrease of respiration number. This can reform nerves activation of respiratory or sensory-nervous muscles using mechanical loading of respiratory organ, and it also can increase efficiency because of central modulation of sensory-respiratory lines. In addition most of Yoga athletes believe that respiration education has benefits for them, and increase their respiratory capacities [2].

Based on studies, when a person use more muscles for activities, active tissues and muscles would need more Oxygen, and due to metabolic activities, more carbon dioxide will generate and exhale from respiratory organ. So, increase of ventilate amount during activities, in a long time, would cause to compatibility of respiratory system to this condition. Compatibility means increase of lung operation in comparison to the time before doing activity [3].

In the past because of lack of information about Yoga respiratory practices at lung performance

improvement and inattention, most of people such as elderly and people with special physical injuries at sport activities, have used only medical treatment like heart and respiratory patient, while Yoga is a low cost sport without need to a wide space and it can be used at any time in any place. So, regardless of selective respiratory practice program had any effect on performance of respiratory system or not, result of this study can be considered by education programmers, managers and researchers.

Considering appearance of physical disorders and its negative effect on respiratory system and mental problems, maybe using the research result and Yoga respiratory practices can cause to limitation of adverse factors influences. The medicine cost and its complications can be avoided by doing selective respiratory practices. Finally, the result of these research can aware people about benefits of Yoga and it can play an important role at public health of society.

2. Research method

Research method is semi-empirical, and it was carried out in two control and empirical group. Empirical and control group participated in before and after practice measurements test of electronic spirometry Quark PFT at specified times. Between 110 nonathletic student girl of a student dormitory with age range of 18 to 23, 28 numbers were selected randomly for research which filled out body health questioner which said they do not have any hearth-vascular or lung diseases or any physical abnormality or addiction. Subjects were divided randomly to two empirical groups (14 people) and control groups (14 people). Subjects made a commitment to take part at the research program regularly. After primary tests, empirical group took part at Yoga selective practices and control group did not any sport program.

3. Research executive method

After selection of empirical and control group and before doing practices and tests, some meeting with Mashhad Yoga community chief and Yoga teachers were hold to introduce Yoga to subjects more and more.

Subjects based on program recourse to physical education college laboratory of Ferdowsi University, to take part at the lunges volume and capacities performance test for the before test step, and laboratory liable made them familiar with different steps and correct ways of doing lungs tests. Their high and weight were measured and record at laboratory.

Execution of lungs performance tests were done at two stages:

First stage was done before beginning of practice program, and second stage was done after 24th session of practices. At before and after test stages every session 3 to 4 spirometry test were done and best pulmonary performance was record, when a subject disability was noticed during the tests, a she would have took a rest and then the test was done at another time on her.

Practices were done during 6 weeks, 4 sessions of 90 minutes per week, with the presence of experienced teachers which were recommended by Yoga community. The Yoga selective practices at any 90 minutes sessions were divided into three stages:

5 minutes warm up, 60 minutes dynamic respiratory practices, and 20 minutes relaxation. The Yoga selective practices program was planed based on Nimol and Bierdel protocols [6] and mentioned research history. Beside, the overload principle was considered and before doing program it was carried out by researcher using a pilot.

Table 1: Central orientation and current volume variance data

Standard deviation	mean	session	group	Lungs capacities and volume
0/257	0/577	Before practice	Control	Current volume
0/258	0/526	After practice		
0/280	0/645	Before practice	Empirical	
0/283	0/547	After practice		
P-Value	Freedom degree	T data	Group	
0/531	26	-0/636	Empirical & control	

Table 2: Central orientation and current volume variance data

Maximum	Minimum	Standard deviation	Medium	mean	session	group	Lungs capacities and volume
2/24	1/18	0/337	1/74	1/789	Before practice	Control	Inhale storage volume
2/24	0/83	0/417	1/67	1/657	After practice		
2/71	1/03	0/468	2/00	1/890	Before practice	Empirical	
3/03	1/57	0/438	2/290	2/232	After practice		
P-Value	Freedom degree	T data	Group				
0/000	26	4/9909	Empirical & control				

Table 3: Central orientation and pressure vital capacity variance data at control and empirical groups

Maximum	Minimum	Standard deviation	Medium	mean	session	group	Lungs capacities and volume	
4/02	2/59	0/421	3/29	3/360	Before practice	Control	Pressure vital capacity	
4/02	2/54	0/377	3/09	3/156	After practice			
4/43	2/45	0/557	3/360	3/332	Before practice	Empirical		
5/21	3/24	0/604	3/905	4/035	After practice			
P-Value		Freedom degree			T data	Control		
0/000		26			7/426	Empirical & control		

Table 4: Central orientation and maximum voluntary ventilation variance data at control and empirical groups

Maximum	Minimum	Standard deviation	Medium	mean	session	group	Lungs capacities and volume	
131/60	77/30	18/974	113/05	109/664	Before practice	Control	Maximum voluntary ventilation	
143/50	71/70	20/307	114/05	110/807	After practice			
166	98/80	23/159	121/8	128/378	Before practice	Empirical		
180/10	113	23/295	139/35	146/485	After practice			
P-Value		Freedom degree			T data	Control		
0/000		26			0/662	Empirical & control		

Table 5: Central orientation and exhale current top variance data of control and empirical groups

Maximum	Minimum	Standard deviation	Medium	mean	session	group	Lungs capacities and volume	
10/52	4/33	1/576	7/235	7/215	Before practice	Control	exhale current top	
9/73	5/16	1/411	6/78	7/178	After practice			
9/88	5/74	1/240	7/05	7/319	Before practice	Empirical		
1/10	12/62	7/36	1/388	9/580	After practice			
P-Value		Freedom degree			T data	Control		
0/000		26			6/268	Empirical & control		

Table 6: Central orientation and inhale current top variance at control and empirical groups

Maximum	Minimum	Standard deviation	Medium	mean	session	group	Lungs capacities and volume	
2/04	0/21	0/524	0/76	0/87	Before practice	Control	inhale current top	
2/14	0/21	0/477	0/96	1/012	After practice			
1/68	0/21	0/464	0/710	0/759	Before practice	Empirical		
0/12	0/89	0/635	1/480	1/660	After practice			
P-Value		Freedom degree			T data	Control		
0/000		26			5/107	Empirical & control		

4 Result and discussion

The goal of this research was Study of selective Yoga practices on pulmonary volume and capacities, and these practices were including respiratory, dynamic and relaxation practices. The emphasis of this research was more on respiratory practices and it was carried out on healthy people.

The result show that selective Yoga practice program do not have any effect on current volume which is in disagreement with Ram, Rai (1993) and Marechal and colleagues results (1981) [7 and 8] but it is in agreement with Mac Wana and colleagues results (1998) and Volga Hospian (2000) [5 and 9]. Regarding that any change in respiratory pattern structure and increase of current volume and decrease of respiration number of Yoga respiratory program is because of compatibility and neural mechanism at receivers, lines and respiration centers, and this compatibility needs daily and longer practices, so, it

seems during short time practices such as this research this computability cannot achieved.

-Selective Yoga practice program has effects on inhale storage volume and increase it.

These findings are in agreement with Mohan and colleagues (2003) and Chandrabosa and colleagues (2004) results [9 and 10] and it is in disagreement with Baj Bros Penmol results [11].

As inhale storage volume increase is based on power, respiratory muscles perseverance, chest volume increase, more lungs dilatation and using more alveolus, so, it seems this research with emphasize on Yoga respiratory practices (Peranayama) and dynamic practices (Asana) had an influence on perseverance and power of respiratory muscles especially inhale muscles.

The result of this study show that Yoga selective practice program cause vital capacity increase with pressure: this finding is in agreement

with Yadaw and Doss (2001) Telse and colleagues (2004) Tond.

Nop and colleagues (2002) Hamilton and Nolis (2001) results [12, 6, 10, 13, 7, 14]. It is in disagreement with Vej Bross Penmol (2006) results [11 and 12]. As F.V.C is the total amount of air which can be displaced voluntarily during an inhale and exhale so $FVC=CT+ERV=IRV$ [4]. Based on our result current volume had not a meaningful change and inhale storage volume had increased. So, even exhale storage volume had not had any change, it seems logical that F.V.C vital capacity with pressure increased too.

-Yoga selective practice program caused maximum improvement of voluntary ventilation; this finding is in agreement with Tondonap and colleagues results (2002). At mentioned research such as our research the practices time period was short but it seems that practices had enough intensity and it increased power and respiratory perseverance and maximum voluntary ventilation.

- Selective practice program caused an increase of exhale current top: this finding is in agreement with Yadaw and Doss results (2001) [16, 15and 10]. Hamilton and Nolis (2003) at their research of "influence of Yoga dynamic and respiratory practices on Vital capacity among healthy young men" announced that Yoga respiratory practice (Peranayama) is the factor of primary changes creation at pulmonary capacities and it has faster changes comparing to Asana. At this research the more emphasize was on respiration (Peranayama) which was the goal of research too, and seems it caused the increase of exhale current top at this practice period. Based on the result of this research Yoga selective practice program caused an increase of inhale current top. This finding is in agreement with Depak result (1996) [12]. But it is in disagreement with the Legahospian result [5].

As the Yoga respiration techniques is include using diaphragm, external intercostals muscles, internal intercostals muscles and abdominal muscles, and all of them are active at inhale and exhale, it seems Yoga selective practices of this research was effective at reinforcement of these muscles. Also it seems Legahospian respiratory practices has not enough intensity and regarding research goals it has more emphasize on Asana. Studies about inhale current top are few and insufficient and for decisive result more research are needed. Yoga respiratory techniques by using dynamic practices (Asana) and relaxation and concentration would caused to frequent use of respiratory muscles such as internal intercostals muscles, abdominal muscles, external intercostals muscles, diaphragm, mastoid-Toric-merrythought

muscles and scalar muscles. Reinforcement of these muscles is effective on inhale and exhale mechanism. As, reinforcement of external intercostals muscles, diaphragm, mastoid-Toric-merrythought muscles and scalar muscles would cause to chest volume increase and it will cause to pressure decrease and lunges dilatation, more dilatation of lunges would cause to more use of air alveolus and then more air will inter to chest and inhale amount will increase. Reinforcement of internal intercostals muscles, abdominal muscles, and diaphragm help will cause to chest volume decrease during exhale especially voluntary exhale and it will cause to Janb curtain pressure increase and so more air will come out of lunges and exhale amount will increase.

The mentioned exhale mechanism will cause to flow of more air during inhale and exhale in lunges and outside it, and generally improvement of pulmonary capacities and volume.

Losia Sporza and colleagues (2000) investigated Yoga practices and its chemical response to Oxygen decrease and carbon dioxide increase of blood, and they announced that: Yoga respiratory practices will decrease oxygen decrease and carbon dioxide increase response [17]. James and colleagues announced at their research (2005) "Yoga respiratory selective practices, increase respiratory feelings at healthy men": Yoga professional practices have lasting reform at respiratory pattern, current volume increase and respiration number decrease is its indices. Daily respiratory practice can reform the nerve activation of respiratory muscles or nerves-sensory muscles by mechanical loading of respiration system, and the central modulation of respiratory-sensory lines will increase respiratory efficiency [18].

Regarding mentioned studies it seems that: nerves compatibility is effective at respiratory efficiency increase and these compatibilities will make changes at respiration pattern during a long time.

The occurrence during a Yogi respiration, actually what is effective in respiration pattern are: dynamic and relaxation of Yoga which are effective on tensional receivers of lunges tissue and respiratory muscles, so their response to lunges dilatation decrease and lunges will expand more and more air will inter lunges and finally current volume will decrease.

5 Conclusion

Regarding general goal of the research, Yoga selective practices effect on pulmonary capacities and volume of female students, we can say that Yoga selective practices program include: respiratory practices (Peranayama), dynamic practices (Asana), relaxation practices and meditation for 6 weeks of 4

session of 90 minutes per week have influences on inhale storage volume, maximum voluntary ventilation, pressure capacity, inhale current top, and exhale current Top.

This research also shows that Yoga selective practices program has more effect on reinforcement of respiratory muscles.

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