



# The Benefits of Swimming on the Lungs Vital Capacity

## Review Article

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### Abstract

Sport is an activity that is useful to nourish the individual body physically and spiritually. Health is an important need and has a major role in survival. Physical health or also called physical fitness has a vital contribution in indicators of a person's overall health status. Through descriptive-qualitative research method by collecting secondary and primary data from several journals. Swimming is a sport that is a form of water sports. Swimming is also a water aerobics sport, where this sport requires a lot of oxygen input. The benefits of this swimming sport are on the respiratory system. The respiratory system is one of the systems found in the individual's body that plays an important role in the process of life. In swimming, which is an aerobic exercise that requires a lot of oxygen, this affects the vital capacity of the lungs. The vital capacity of the lungs is the maximum amount of oxygen that enters the lungs. So that by doing swimming regularly, the vital capacity of the lungs will be better.

**Keywords:** *exercise physiology, swimming, lungs vital capacity*

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## INTRODUCTION

Theoretically, physical fitness has a vital contribution as an indicator of a person's overall health status. Physical fitness in simple terms can be understood as a condition where the body can perform all motion tasks both in daily work and exercise or sports activities optimally and does not experience excessive fatigue and avoids the risk of health problems (1).

Cases of physical health problems that are quite common in the community, one of which is a respiratory system disorder. (2) States that according to the World Health Organization report in the World Health Report, lung disease is the main cause with a percentage of 17.4% of all deaths in the world. Respiratory system disorders are a major cause of morbidity and mortality. Respiratory tract infections are much more common than infections of other organ systems, and these range from the common cold with relatively mild symptoms and disorders to severe pneumonia (3).

This fact puts respiratory health problems need special attention. Judging from the physiological function of the human body, respiratory system disorders or diseases are diseases

that attack the respiratory organs or respiratory tract such as disturbances in the work of the heart, lung function, and constriction of blood vessels which can have an impact on the body's abnormal physiological homeostatic system, because lack of sufficient oxygen availability in the body's organs to carry out their metabolic functions. (1) Explain that the health of the respiratory system has a great influence on physical health in general, because basically humans are aerobic creatures, which means that human life is very dependent on the need for oxygen to carry out all the functions of the body's cells.

In terms of health, exercise is very important for everyone. This physical activity has an effect on physical fitness, including breathing. Exercise can have a physiological effect, including the working system of the heart and lungs. The lungs have an important function in life, where the exchange of oxygen and carbon dioxide occurs, excess carbon dioxide will stimulate the respiratory centre and increase the inspiration and expiration signals to the respiratory muscles.

In carrying out normal functions, the lungs need good capacity and can maintain physical endurance in physical health. The vital capacity of the lungs is a physiological condition status related to the ability to process respiratory air as proposed. Pearce also stated that lung capacity is defined as the volume of air obtained by the body from the atmosphere when breathing in, thus it can be said that lung capacity is closely related to the quality of the lungs. Disturbances in lung function can result in decreased ability of the athlete's respiratory muscles and reduced performance. One way to maintain the quality of the lungs is to exercise and swimming is the right physical activity.

**MATERIAL AND METHODS**

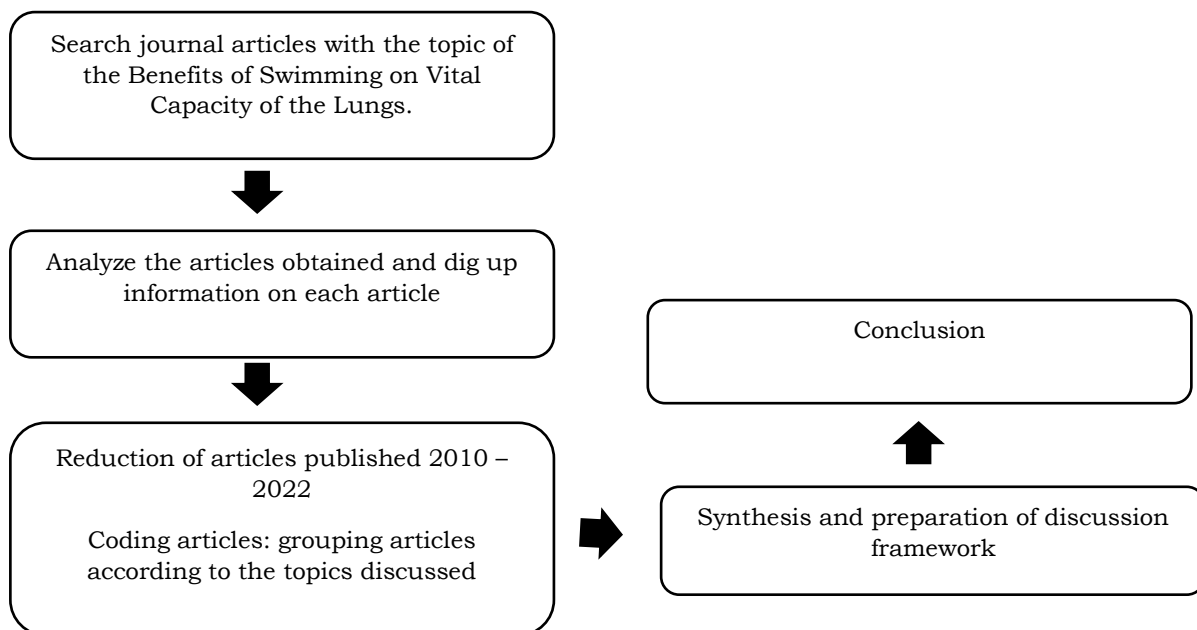


Figure 1. Article Review Process

In this article method, there are as many as 20 journal articles as data and guidelines in the review of compiling this article. The data used in compiling this article is secondary data. Secondary data were obtained from various articles published in the last 12 years with the topic of the Benefits of Swimming on Vital Lung Capacity. The journal articles used in compiling this article were obtained from library sources, namely Google Scholar. The analysis used in this literature review includes four steps that must be carried out sequentially to provide an acceptable answer to the research statement. 1) In the first stage, namely the search and collection of materials regarding the Benefits of Swimming on the Vital Capacity of the Lungs; 2) in this stage, namely reduction and coding, filtering and classifying materials according to the topics discussed; 3) At this stage, namely analysis and synthesis or examining and digging

detailed information about the material obtained; 4) The last stage is the presentation of the conclusions from the journal article review process to state the novelty of the research. The review process can be seen in Figure 1.

The process of reviewing journal articles takes a long time. So that in a long time researchers have produced valid data regarding differences in lung vital capacity in certain sports and lung vital capacity between people who practice and people who do not exercise. In addition, researchers collect data on the benefits of swimming as a sport that must be done regularly by all groups. This is because swimming has benefits, especially for the respiratory apparatus.

## RESULTS

The results of a review of journal articles conducted to select articles according to the criteria resulted in several journal articles that became references on the main topic, namely the Benefits of Swimming on Vital Capacity of the Lungs. Below are the results of a journal review in the form of tabulation of data based on the results of data reduction that has been carried out by researchers.

Table 1. List of Article

Num.	Title	Years	Source
1.	<i>Korelasi Denyut Nadi Istirahat dan Kapasitas Vital PAru Terhadap Kapasitas Aerobik (3)</i>	2012	<i>Journal of Physical Education, Sport, Health and Recreation</i>
2.	<i>Korelasi Kapasitas Vital Paru dengan Prestasi Atlet di Sekolah Olahraga Nasional Sriwijaya Palembang (4)</i>	2019	Syifa' MEDIKA
3.	<i>Pengaruh Olahraga Renang Gaya Dada Sebagai Hydro Therapy Terhadap Penurunan Intensitas Kambuh Pada Penyakit Asma (5)</i>	2016	Universitas Pendidikan Indonesia Kampus Sumedang
4.	<i>Model Pembelajaran Pernafasan Renang Melalui Permainan di Air Untuk Siswa Pra-Sekolah dan Taman Kanank – Kanak (6)</i>	2018	Jurnal Pendidikan Jasmani dan Adiptif (JPJA)
5.	<i>Sekolah Renang di Kota Semarang dengan Penekanan Design Sustainable Architecture (7)</i>	2015	Journal of Architecture
6.	<i>Manfaat Olahraga Renang Bagi Lanjut Usia (8)</i>	2010	Medikora
7.	<i>Perbedaan Kapasitas Vital Paru Sebelum dan Sesudah Berenang Pada Wisatawan di Kolam Renang Taman Rekreasi Kartini Rembang (9)</i>	2013	Jurnal Keperawatan Medikal Bedah
8.	<i>Buku Ajar Fisiologi Kedokteran (10)</i>	2010	EGC
9.	<i>Perbandingan Kapasitas Vital Paru Pada Atlet Pria Cabang Olahraga Renang dan Lari Cepat Persiapan Pekan Olahraga Provinsi Bandar Lampung 2013 (11)</i>	2013	Medical Journal of Lampung University (MAJORITY)
10.	<i>Penerapan Olahraga Dalam Meningkatkan Kesehatan (12)</i>	2015	Jurnal Pengabdian Kepada Masyarakat
11.	<i>Manfaat Latihan Olahraga Aerobik Terhadap Kebugaran Fisik Manusia (13)</i>	2015	Jurnal e-Biomedik (eBM)
12.	<i>Pengaruh Latihan Interval dan Kapasitas Vital Paru terhadap Kecepatan Renang 50 Meter Gaya Crawl (14)</i>	2015	Jurnal Media Ilmu Keolahragaan
13.	<i>Gangguan Sistem Pernafasan (1)</i>	2017	YA Farabi <a href="http://repository.unmuhsember.ac.id">http://repository.unmuhsember.ac.id</a>
14.	<i>Pengembangan Pendekatan Konsektual Terhadap Hasil Belajar Renang Gaya Dada (15)</i>	2012	Jurnal Universitas Jambi
15.	<i>Macam – macam Gaya Renang Beserta Teknik, Gambar, dan Penjelesannya (16)</i>	2019	Zonareferensi.com

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16.	<i>Analisis Keterampilan Renang Gaya Bebas Mahasiswa Putri Mata Kuliah Renang 1 FIK-UNJA (6)</i>	2017	Fakultas Ilmu Keolahragaan, Universitas Jambi
17.	<i>Hubungan Daya Tahan Jantung Paru Terhadap Kemampuan Renang Gaya Dada 200 Meter (17)</i>	2020	Jurnal Olympus Jurusan PKR
18.	<i>Alternatif Mengembangkan Kemampuan Motorik Kasar Anak Usia Dini Dengan Aktivitas Akuatik (18)</i>	2016	Jurnal Pendidikan Anak
19.	<i>Pengaruh Circuit Training Terhadap Peningkatan Kelincahan dan Kapasitas Vital Paru – Paru (19)</i>	2013	Universitas Pendidikan Ganesha
20.	<i>Pengembangan Pendekatan Konsektual Terhadap Hasil Belajar Berenang Gaya dada (15)</i>	2012	Jurnal Penelitian Universitas Jambi

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## DISCUSSION

Swimming is one type of exercise that can improve a person's health which is also a sport without the earth's gravity (non-weight bearing). Swimming is the most recommended exercise for someone who is overweight (obese), pregnant women, and people with joint disorders or arthritis. Swimming has many benefits that can be felt when someone does it regularly, these benefits include:

- 1) Building muscles, when swimming we move almost all of the muscles in the body, starting from the head, stomach, back, waist, lower limbs, and soles of the feet. When moving in water, the body expends more energy because it has to "fight" the mass of water which is able to strengthen and flex the muscles of the body.
- 2) Improve the ability of heart and lung function. The movement of pushing and kicking water with the limbs, especially the hands and feet, can stimulate blood flow to the heart, blood vessels, and lungs. This means that swimming can be categorized as aerobic exercise in water.
- 3) Practice breathing. It is highly recommended for people with asthma to swim because the cardiovascular and respiratory systems can become stronger. Our breathing becomes healthier, smoother, and our breathing becomes longer.
- 4) Burn more calories. When swimming, the body will feel heavier moving in the water. Automatically the energy needed becomes higher, so it can effectively burn about 24% of the body's calories.
- 5) Refresh the mind and relieve stress. Psychologically, swimming can also make the heart and mind more relaxed. Swimming movements that are carried out in a relaxed and slow manner can increase endorphins in the brain. The mood becomes cool, the mind is more comfortable, and the body is free from heat.

Swimming is a water-based sport activity where this swimming exercise performs underwater exercises and holds your breath for a long time so that the respiratory muscles and diaphragm expand with high water pressure which causes muscle functional strengthening and also increases the elasticity of the chest wall. Someone who regularly does swimming or a swimming athlete will have excellent lung and chest wall elasticity. This is because the process of exercise and stretching is different from sports on land.

Sports activities carried out by a person, the organs that play the most role are the heart and lungs. At the time of exercise, the heart will beat rapidly with an increased respiratory rate accompanied by rapid work by the lungs. The ability of the lungs to accommodate as much oxygen as possible and to use it appropriately over a long period of time is very much needed for a swimming athlete, because the lungs function as a breathing apparatus to meet the needs of oxygen in the body and also work as fuel to produce energy.

During swimming the water pressure will increase the load on the chest wall, resulting in an increase in respiratory tract resistance. Ventilation restriction that occurs momentarily in the respiratory cycle causes intermittent hypoxia, which triggers an increase in respiratory rate. Overall, someone who does water sports or a swimming athlete tends to have good functional respiratory muscles as a result of physiological mechanisms against water pressure.

When swimming, the alveoli work excessively, forcing the previously inactive alveoli to become active. In addition, when swimming, the breathing process becomes very vital because it determines the length of time the swimmer is in the water, thus spurring the swimmer to breathe as much as possible. This is obtained if done continuously will increase the elasticity of the lungs and ultimately increase the carrying capacity and delivery of oxygen.

Changes in the respiratory system will occur in the long term as a form of adaptation to the exercise process that is carried out regularly. The respiratory muscles experience changes in their ability to carry out oxygen consumption, so that lung capacity can change continuously.

The increase in the total lung capacity and vital lung capacity will occur through an increase in the ability of the respiratory muscles and the activation of the alveoli in a trained person. With an increase in lung capacity, endurance in doing sports increases. Endurance is one of the factors that affect the athlete's achievement and physical fitness of a person.

Exercise that is done regularly will lead to an increase in optimal physical fitness and endurance, during exercise there is a collaboration of various muscle strength, reaction speed, agility, movement coordination and cardiorespiratory endurance. The vital capacity of the lungs affects the ability to exercise. On the other hand, regular exercise can increase lung capacity. The frequency of exercise will increase when the vital capacity of the lungs is 30-40% (10).

## CONCLUSION

Swimming is a sport related to the respiratory system. Breathing itself is the event of inhaling air containing oxygen (O<sub>2</sub>) from outside the body and exhaling or exhaling carbon dioxide (CO<sub>2</sub>). As a swimmer, you have a way of taking your breath, by way of your hands (turning to the right). Swimming itself has several benefits including building muscle, increasing the ability of heart and lung function, breathing training, burning more calories, refreshing the mind, and relieving stress. The vital capacity of the lungs has a significant relationship and has a contribution to swimming in providing oxygen for the body which is useful for carrying out activities that foster endurance. The vital capacity of the lungs from one person to another is very different, this is due to the ability of the lungs to accommodate air to the maximum. The increase in the total lung capacity and vital lung capacity will occur through an increase in the ability of the respiratory muscles and the activation of the alveoli in a trained person. With an increase in lung capacity, endurance in doing sports increases. Endurance is one of the factors that affect the athlete's achievement and physical fitness of a person. The more activity you do, the greater the vital capacity of the lungs. Body position also affects lung volume and capacity, usually decreasing when lying down and increasing when standing. This change in position is distinguished by two factors: the tendency of the abdominal contents to press up against the diaphragm in the recumbent position and the increase in pulmonary blood volume in the recumbent position, which is associated with a reduction in the space available for air in the lungs.

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**CONFLICTS OF INTEREST**

**Conflict of interest** : Authors state no conflict of interest.

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