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Lung Vital Capacity Levels on disability in Swimming Learning

Pojemność płuc a niepełnosprawność podczas nauki pływania

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Abstract

This study discusses how the vital lung capacity of disabled students can be achieved in swimming learning at the Yakkum rehabilitation center. The purpose of this study is to find a real picture of the vital lung capacity level of students with disabilities in learning to swim at the Yakkum rehabilitation center. The research method uses descriptive quantitative research methods. The population used in this study were students with disabilities in learning to swim for 2 years. This study used the entire population as a sample of 50 students, consisting of 25 men and 25 women. This type of research is a descriptive study, with one research variable, namely vital lung capacity. The research instrument for collecting data is a spirometer. To analyze the data collected the researchers used quantitative descriptive analysis techniques with percentages and SPSS 12 statistical assistance. The results showed that the vital lung capacity of students with disabilities in swimming learning was 42% very good, 22% good, 20% enough and less categories 16%. Thus, students with disabilities in swimming lessons have the same vital lung capacity as the average vital lung capacity in normal people in general.

Key words:

vital lung capacity, students with physical disabilities, swimming learning

Streszczenie

Niniejsze badanie omawia, w jaki sposób można poprawić pojemność płuc u osób niepełnosprawnych uczących się pływać w centrum rehabilitacji Yakkum. Celem badania jest określenie pojemności płuc osób niepełnosprawnych podczas nauki pływania w ośrodku rehabilitacyjnym Yakkum. Metoda badawcza obejmuje opisowe ilościowe metody badawcze. W badaniu wzięły udział osoby niepełnosprawne uczące się pływać od 2 lat. Grupa badana obejmowała 50 osób: 25 mężczyzn i 25 kobiet. Ten rodzaj badań jest badaniem opisowym, z jedną zmienną badawczą - pojemnością płuc. Narzędziem badawczym do zbierania danych jest spirometr. Aby przeanalizować zebrane dane, naukowcy wykorzystali ilościowe techniki analizy opisowej z wartościami procentowymi i pomoc statystyczną SPSS 12. Wyniki pokazały, że pojemność płuc osób niepełnosprawnych podczas nauki pływania była bardzo dobra w 42%, dobra w 22%, wystarczająca w 20%, i gorsza w 16%. Zatem osoby niepełnosprawne na lekcjach pływania mają taką samą pojemność płuc jak przeciętna pojemność płuc u ludzi zdrowych ogólnie.

Słowa kluczowe:

Pojemność płuc, osoby niepełnosprawne ruchowo, nauka pływania

Introduction

People with disabilities are often referred to as those who have disabilities (physical impairments) or do not have any body parts. People with disabilities have various characteristics in which the cause is caused by, (1) cerebral palsy (2) disease caused by polio (3) muscle and bone disorders and (4) amputation or no limbs. Disorders of the chest wall can cause deformities of the body and respiratory processes, which affect the chest muscles of the breathing, and the stomach, so this disease requires treatment for lung rehabilitation [1]. At the Yakkum rehabilitation center, people with physical disabilities receive therapeutic care, in addition to receiving therapeutic services at the institute, they provide a variety of skills including sewing, computers, handicrafts, screen printing, electronics and gardening skills. With the aim that when they complete their education they can be independent and not depend on others. In addition to this program, the institute organizes recreational and sports programs such as gymnastics and swimming, which aim to ensure that people with physical disabilities can maintain their physical fitness and can carry out daily activities without feeling significant fatigue. Physical activity in adults with ID involving aerobic exercise, sports specialization and a combination of muscle and aerobic exercise done two or three times a week for more than 40 minutes seems to be the most recommended for adults with ID [2].

Swimming is not only enjoyed and liked by normal people in general, but is also popular with people with disabilities. With their limitations in doing swimming exercises to modify or adapt the exercise by utilizing the limbs that are still there. Other body parts where parts of the body that experience wilting due to polio, researchers provide special rehabilitation training for rehabilitation efforts so that later parts of the body that experience withering gradually improve. By looking at the physical limitations experienced by persons with disabilities, to measure the level of physical fitness researchers find it difficult to determine what methods are appropriate for persons with disabilities. This is different from normal people in general to measure physical fitness and easy training and many methods used. A system of training and continuity processes, based on loading intervals, with interchangeable capabilities and various doses of volume and intensity of surgery, as well as the character and remaining periods, five presuppose the development and existence of certain functional abilities [3].

Measurement of lung vital capacity value, as one way to find out someone's fitness, this is deemed sufficient and appropriate by researchers to determine the physical fitness level of people with disabilities by looking at the limitations they have. To the best of our knowledge, researchers have not examined the vital pulmonary capacitance of persons with physical disabilities who have participated in swimming training. Therefore researchers are interested in examining how much the vital lung capacity level of persons with disabilities in learning to swim in the Yakkum rehabilitation center.

To the best of the researchers' knowledge, and previous data related to predictions of the depiction of vital lung capacity of persons with disabilities in learning to swim, no one has done this research, therefore researchers are interested in examining the prediction of vital lung capacity of people with disabilities who practice swimming. This study aims to find out how much the level of vital lung capacity in people with disabilities in learning swimming, as an illustration of the level of fitness of students or people with disabilities, as an effort in determining the next learning program for people with disabilities.

The vital capacity of the lung is the maximum amount of air that a person can expel from the lungs, after first inspiring to the max then releasing to the maximum. The air is about 4,600 cc. Some aspects can change the ventilation mechanism, such as reduction of inspiratory muscles and expiratory strength and even resistance, which can modify the flow of breathing [4]. Pulmonary vital capacity is the sum of tidal volume, expiratory volume and the volume of inspiration reserve [5]. The amount of lung vital capacity is not the same for each person, the average adult is 4,500 cc and for athletes or trained people (4,000 cc-6,500 cc), while for untrained people there are not more than 3,000 cc, [6]. According to in general, long-lasting exercises such as rowing, swimming, running and bicycle racing have an impact on the vital capacity of the lungs increases. The data obtained is evaluated directly by pulmonary function evaluation carried out using a spirometry test, which provides measurements that facilitate accurate interpretation of results [7].

Swimming is one of the physical activities that requires cardiorespiratory endurance which can provide O_2 intake, when doing the swimming activity. Cardiorespiratory endurance is endurance which includes the heart, blood circulation and lungs. Cardiorespiratory endurance is a measure of the heart's ability to pump oxygen-rich blood throughout the body and the ability to adjust and recover from physical activity. In doing swimming, the physically challenged are required to always actively move in the water and breathing exercises in the water either by taking a breath or exhaling [8].

The term is often used to refer to children with severe physical disabilities, such as physical disability, physical disability, bodily tuna and recently the term orthopedic disability has emerged. The term tunadaksa of the word tuna which means loss, lack and daksa means body [9]. Tunadaksa is intended for those who have imperfect limbs, for example stump or disability. What is meant by tunadaksa is a physical child who is seen in the deformity of the bones or muscles, weak bone function and joint muscles and nerves [10]. Based on the explanation above, it can be concluded that what is meant by physical impairment is a non-sensory disability but physical disability in the muscularskelet and nervous system, so that the person concerned has physical limitations and requires specific services, specific equipment, specific facilities and specific training programs as well. effects of physical activity on aerobic capacity, lung function and Strengthening respiratory muscles It is also from the results of the study that physical activity impacts breathing patterns of these people [11].

Based on existing literature studies, research related to vital lung capacity is research conducted. He examined the effect of swimming training on increasing the lung vital capacity of beginner swimmers in the IV and III age groups of the Tirta Youth Club. The study was conducted in 2006 on 15 subjects. The conclusion obtained is that the Tirta Taruna club swimming training has a significant positive effect on the vital lung capacity, in the form of an increase of 534.00 or 7.26% of the mean lung vital capacity [12].

Methods

This research is a descriptive study, with one variable without making comparisons or connecting with other variables. One characteristic of this study is that there are no hypotheses and the data collected was pre-tested. The method used is the survey method and data collection techniques using a spirometer and then analyzed to predict lung vital capacity. The sample used in this study were 20 people consisting of male and female payers.

The instrument or tool used in this study was a spirometer. The norm for assessing vital lung capacity for persons with physical disabilities does not yet exist, so researchers make their own assessment norms. Analysis of the data collected from spirometer measurement tests was confirmed into a prediction of vital lung capacity and then analyzed by descriptive percentages, to determine the level of vital lung capacity of the physically disabled. To analyze existing data, researchers used quantitative descriptive data analysis techniques as a percentage [13].

Analysis of the data, the data collected from spirometer measurements were confirmed into the prediction of vital lung capacity, then analyzed by means of descriptive percentages, to determine the vital lung capacity of the physically disabled who did swimming exercises. To analyze existing data, researchers used quantitative descriptive data analysis with percentages [13]. To be easily understood, researchers present data in the form of relative distribution tables expressed in percent (%). The researcher first determines the number of classes with the Sturges formula, as shown in the formula as follows.

$$K = 1 + 3.3 \log n$$

K = Number of interval classes
n = Number of observational data
log = logarithm

To calculate the range of data that is the way the largest data minus the smallest data available in that group the formula is as follows:

$$R = X_t - X_r$$

R = Range
X_t = The largest data in the group
X_r = Smallest data in a group

To determine the length of the interval class the following formula is used:

Length of class = Biggest data − Smallest data

Number of interval classes

And to find the median, mode, maximum score, minimum score and average, researchers used the help of SSS 12.

Results

The study was conducted at the Yakkum Rehabilitation Swimming Pool Jl. Kaliurang km. 12 Iron. From the spirometer test results obtained vital lung capacity score, then the score is analyzed for a minimum male score of 2,067 cc, a maximum score of 4,200 cc. Furthermore, the score is included in the frequency distribution, but before first looking for the interval class calculated using the Struges formula, the results obtained are 4.3 then rounded 4, thus the interval class is rounded to 4. To calculate the data gap ie the largest data minus the smallest data results obtained 2,113 cc. To determine the length of the interval class, the largest data minus the smallest data is then divided by the number of interval classes the results obtained are 533.23 cc rounded to 533 cc.

Table 1. Relative frequency distribution of men's vital lung capacity

No	Interval	F	%	Category
1	3669-4202	14	56	Very good
2	3135-3668	4	16	Good
3	2601-3134	4	16	Enough
4	2067-2600	3	12	Less
	Total	**25**	**100**	

For a women's minimum score of 1,333 cc, a maximum score of 2,600 cc. Then the score is included in the frequency distribution, but before first looking for the interval class calculated using the Struges formula, the results obtained are 4.3 then rounded 4, thus the interval class is rounded to 4. To calculate the data gap ie the largest data minus the smallest data results which was obtained 1267 cc. To determine the length of the interval class, the largest data minus the smallest data is then divided by the number of interval classes the results obtained are 316.75 cc rounded to 317 cc.

Table 2. Relative frequency distribution of women's vital lung capacity

No	Interval	F	%	Category
1	2287-2604	12	48	Very good
2	1969-2286	8	32	Good
3	1651-1968	4	16	Enough
4	1333-1650	1	4	Less
	Total	**25**	**100**	

After that, the researchers added up the overall vital lung capacity scores of the male and female groups with a total of 50 people. The researcher combines the vital lung capacity scores that have been obtained into the relative frequency distribution and presents the number of frequencies into the relative distribution table as follows.

Table 3. Relative frequency distribution of male and female vital lung capacity

No	Interval	F	%	Category
1	3487-4204	21	42	Very good
2	2769-3486	11	22	Good
3	2051-2768	10	20	Enough
4	1.333-2050	8	16	Less
	Total	**50**	**100**	

When viewed from the table above the category is very good 42%, good category 22%, enough category 20% and category less 16%.

Discussion

Based on the results of data analysis obtained from the spirometer test, it can be seen the vital lung capacity level of men with disabilities there are 3 people who are categorized very well at around 3487-4204cc. Thus, people with disabilities experience abnormalities in body parts or bodily functions, which take part in swimming lessons, there is a level similar to normal people in general at 4600cc [5]. Whereas for untrained people no more than 3,000 cc, [6]. Thus from the opinions of Guyton and Muchtamaji et al, in accordance with the results of spirometer measurements in persons with physical disabilities who take swimming lessons. Lehnhard, Emphasizing the importance of people with physical disabilities joining the Physical Education class [14]. Of these, they experience disability amputated one leg. This kelayan actively participates in swimming training and is serious about swimming. There are 5 good categories, all of them from the group of men with disabilities amputated by one lower leg and 1 person experiencing a deformity withering one lower leg. There are only 7 categories of people, consisting of 2 sons and 5 daughters, disability status consists of 5 people after being amputated one lower leg and 2 people withering disability one leg down. There are less than 5 categories, all of them are princesses. Disability status 1 person with disability, leave one lower leg, and 4 withered. When doing various exercises, the respiratory system can be obtained by monitoring the rate of breathing at rest, during and after exercise. Defects in each domain are defined as the need for total or partial assistance to do at least one activity [15]. By monitoring the movement of vital capacity, we can draw conclusions about the effects of physical activity during physical education classes, training and recreational physical activities on increasing vital lung capacity [16].

Conclusions and Suggestions

Based on the results of research and discussion presented in the previous chapter, it can be concluded that in terms of the total frequency of the overall group of men and women, in general the vital lung capacity of students with disabilities who take part in swimming lessons at the Yakkum Rehabilitation Center is included in the very good category. The results of this study have a useful impact on finding out how much the vital lung capacity of students with disabilities who practice swimming, and in fact swimming training can affect the working system of lung, heart and physiological functions. With swimming exercises, the breathing muscles

develop and become stronger, the lungs work more efficiently and become better.

Based on the results of the study and conclusions can be drawn and advice can be given as follows:

1. For sports trainers, it is recommended that in providing training material, attention must be given to the lung freshness level of people with disabilities.
2. For people with physical disabilities, for those who have a very good level of vital lung capacity to be able to maintain it, and for those who have a level of vital lung capacity is not good to always increase the freshness of the lungs.
3. To strengthen the results of this study, it is necessary to conduct research of a similar nature and with a wider population and the addition of other variables that can affect the level of lung freshness.

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