Characteristic of Demography and Pulmonary Fuction Value Maximal Voluntary Ventilation (MVV) of Cronic Obstructif Pulmonary Disease (COPD) patients in Medan

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Abstract: *COPD (Chronic Obstructive Pulmonary Disease) causes of death worldwide. Patients experiencing a decrease in the work function of the respiratory muscles can be measured by spirometry, interpretasi spirometry results can be obtained by value Maximal Voluntary Ventilation (MVV), which provide databasic abnormalities in lung function. Descriptive method that describes the demographic data and lung function MVV value. The study was conducted in July s / d August 2018, the sample size of 56 respondents using purposive sampling technique. The results of the study describes the demographics and valuesMaximal Voluntary Ventilation (MVV) ranging from age, education, occupation, body mass index, smoking a long history, the sheer number of cigarettes smoked, and duration of pain COPD. There are demographic data linkage with MVV value in COPD patients.*
Keywords : Characteristics of Demography, Fulmonary function, Maksimal Voluntary Ventilation, COPD

I. Introduction

The COPD patients often experience decreased alveolar ventilation which results in the occurrence of hypoxemia, hypoxia and hypercapnia resulting in respiratory acidosis which increases the use of respiratory aids muscles and decreases the respiratory process[1]. The decrease in the respiratory process causes shortness of breath which occurs due to impaired respiratory tract ventilation and decreased ability to work the respiratory muscles. COPD causes various levels of disorders including chronic cough, chest pain, shortness of breath, odema, sputum production, changes in breathing patterns, changes in body posture disruption of gas exchange, and occurrence of pulmonary exacerbations and cause a decrease in lung function[2].

Lung Function Examination was carried out to find out whether respiratory work of COPD patients was able to overcome both resistances that affect breathing work, namely elastic resistance and nonelastic resistance, so as to produce optimal ventilation function. Parameters used to assess the workability of breathing in overcoming both resistance are lung volume, both static and dynamic volumes[3]. Dynamic volume examination in COPD patients can be done with a spirometer to record breathing charts based on the and speed of the air coming out or into the spirometer[4]. Interpretation of spirometry results can be obtained from Maximum Voluntary Ventilation (MVV) values that can measure and provide data on basic pulmonary function abnormalities, namely obstruction abnormalities, restriction, mixture and also the condition of respiratory muscles[3].

MVV testing is recommended as a more specific test to measure respiratory muscle weakness, mechanical properties of the lungs and chest that can help evaluate tolerance to exercise, breathing, and ultimately show a physical fitness reserve in COPD patients. Many factors cause the occurrence of COPD such as age, smoking status, length of smoking, number of cigarettes spent, and BMI. This is what underlies the researchers to look at demographic characteristics and MVV values in COPD patients.

II. Method

This research is a descriptive cross-sectional design, which is to describe the demographic data and the value of lung function Maximal Voluntary Ventilation in COPD patients. This research has been conducted in July-August 2018. The subjects were 56 respondents COPD patients who met the criteria inclusion taken by purposive sampling technique, Researchers conducted the recording weight, height respondents and the value of

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maximum voluntary ventilation. Data were analyzed to look at the frequency distribution of study subjects according to age, sex, education, occupation, body mass index, duration of smoking, number of cigarettes a day, Length of COPD Pain and MVV value measurements by spirometry.

Inspection instruments used to measure Maximal voluntary ventilation (MVV) is Spirometry has been tested and feasible to use the calibrated value accuracy Elitech Digital spirometer Ds-Pro SP10 (Ministry of Health RI AKD 20,401,610,237) 42,271,602-AKS-000 411 155 by the Central Security Health Facilities/ Balai Pengamanan Fasilitas Kesehatan (BPFK): Volume measuring maximum of 10 liters, Accuracy Measure Volume ± 3% or 0:05 liter (select values, Reach flow air 1 - 16 liters per second, Accuracy Measure Air flow ± 10% or 0.3 liters per second Top Resistance value to the flow udara6Pa / liter / second, 3V DC Power Sources, DC Power Used 3V. this study has escaped the review of conduct by the Ethics Unit of the Faculty of Nursing, Sumatera Utara University No. 1502 / VI / SP / 2018.

III.   Result And Discussion

The Characteristics of Chronic Obstructive Pulmonary disease (COPD) Patients in Haji Adam Malik Hospital Medan can be seen in the table below:

Table 3.1 Distribution of characteristics of patients with Chronic Obstructive Pulmonary disease (COPD) in Haji Adam Malik Hospital (n = 56)

No	Characteristic of Resondens	f	%
1	**Age (Year)**		
	<55 (Early Elderly)	12	21,4
	56-65 (Late Elderly)	17	30,4
	>65 (Elderly)	27	48,2
2	**Gender**		
	Male	100	100
3	**Education**		
	Elementary School	26	46,4
	Middle School	18	32,1
	High School	8	14,3
	D1-D3	3	5,4
	S-1	1	1,8
4	**Work**		
	PNS	3	5,4
	Farmer	30	53,6
	Entrepreneur	19	33,9
	Trader	4	7,1
5	**Body Massa Index**		
	Normal	50	89,3
	BB Excess	3	5,4
	Obesity	3	5,4
6	**Long Smoking**		
	There is no History	7	12,5
	>11-<20 Years	5	8,9
	>21-<30 Years	19	33,9
	>31 Years	25	44,6
7	**Value Cigarettes/Day**		
	There is No	7	12,5
	< 2 Packs	35	62,5
	>2 Packs	14	25
8	**Length of COPD Pain**		
	< 2 Years	14	25,5
	3-4 Years	31	55,4
	>5 Years	11	19,6

The results of the study were the most elderly aged 27 people (48.2%) and all respondents 56 people (100%) were male. In this study 26 people (46.4%) had elementary education, worked as farmers 30 people (53.6%), had a Normal BMI of 50 people (89.3%), smoking duration> 31 years 25 people (44.6%), as many as 35 people (62.5%) smoked less 2 packs per day and experienced COPD pain for 3-4 years as many as 31 people (55.4%)

Table 3.2 Distribution of Characteristics and MVV Values of COPD Patients in Haji Adam Malik Hospital Medan (n = 56)

Characteristics	Item	MVV Lung Value		Total
		Medium	Less	
Age	Early Elderly	11	1	12
	Late Elderly	15	2	17
	Elderly	21	6	27
	Total	47	9	56
Education	Elementry schol	20	6	26
	Middle school	16	2	18
	High School	8	0	8
	D1-D3	2	1	3
	S-1	1	0	1
	Total	47	9	56
Work	Parmer	28	2	30
	PNS	3	0	3
	Entrepreneur	13	6	19
	Trader	3	1	4
	Total	47	9	56
Body Mass Index	Normal	41	9	50
	BB Excess	3	0	3
	Obesity	3	0	3
	Total	47	9	56
Long Smoking	No Smoking	5	2	7
	>11-<20 Years	4	1	5
	>21-<30 Years	16	3	19
	>31 Years	22	3	25
	Total	47	9	56
Value Cigaretes	There is no	5	2	7
	<2 Packs	29	6	35
	> 2 Packs	13	1	14
	Total	47	9	56
Length of COPD Pain	< 2 Years	14	0	14
	3-4 Years	25	6	31
	> 5 Years	8	3	11
	Total	47	9	56

Based on the table above, COPD is more common in the elderly, 27 people with MVV values in the moderate category of 21 people and MVV values in the category of less than 6 people. COPD occurs mostly in respondents with education, namely 26 people with a moderate MVV category of 20 people and a MVV value of less than 6 people.COPD is more prevalent in respondents who work as farmers, namely 30 people with MVV values in the medium category 28 people and MVV values in the category of 2 people. COPD is more common in Normal BMI, namely 50 people with MVV values in the moderate category 41 people and MVV values in less than 9 people. COPD is more prevalent in respondents who smoke> 31 years, namely 25 people with moderate MVV values of 22 people and MVV values of less than 3 people. COPD is more common among respondents who spend <2 packs of cigarettes per day, which is 35 people with moderate MVV values of 29 people and less than 6 people in MVV category. COPD is more common among respondents who have experienced 3-4 years of COPD, namely 31 people with moderate MVV values of 25 people and MVV values of less than 6 people.

At the age demographic data studies found no MVV value Lung Function in the category of good / very good, it is because the samples in this study are patients with COPD and basically has experienced restriction / obstruction of the airways so that the value of MVV majority of medium category. In this study are also found respondents with lung MVV value category is very less, this is because the respondent no exacerbations. Pulmonary value MVV categorized as very less commonly experienced in patients with exacerbations of COPD. The results are consistent with research by [5] that the age of the respondents with COPD disease are in the age range> 64 years. Along with the increase in life expectancy and the growing number of elderly will have an effect on the increase in the number of cases of chronic diseases, especially COPD, if not handled properly.

On the demographic gender was not found MVV pulmonary function values in the category of good / excellent. Our research found MVV lung function values are unhealthy, it can be affected because the degrees of disease severity experienced, respondents' lack of effort and fatigue when performing maneuvers. This study is in line with the results by [6] that the incidence of COPD occurs more in men than in women. This statement is the same as the results of research by [7] that the influence of gender on the risk of COPD is caused by a combination of behavioral and environmental factors or genetic factors or biofisiologis.

Demographic data based on education, namely the higher one's education, the more capable he is to absorb the maneuvers taught to conduct MVV examinations. This is seen where the MVV value is the most in the less category is in the elementary education group, but many influence the value of MVV other than education, for example the severity of COPD diagnosis, the severity of tightness felt during examination and fatigue. Supported research by [8] that COPD respondents were mostly elementary school graduates with 76.70%. The level of education affects the ability to understand and follow the directions for health, if someone is illiterate written information about healthy behavior and healthy sources becomes worthless[9].

In this study, the research sample was made as a farmer. Working as a farmer can be directly exposed to irritant factors such as dust, pesticides, and immediately the results of burning the rest of the harvest. This affects the anatomy of the lungs, and causes damage for a long time. In this study, the results of the assessment in the medium category were 47 people and lung function values were less than 9 people. MVV lung function category is more commonly found in groups who work as entrepreneurs, this can be caused by work as an entrepreneur dealing with air conditioning, doing work because of increasing work, air protection that requires work days and sick days, physical and mental stress. and others so as to increase the MVV value at the time of the examination. The incidence of disease associated with occupational exposure itself, workers who work exposed to chemicals, radiation and other hazardous materials tend to be more vulnerable to acute and chronic diseases [10].

In this study, the majority of normal body mass index of 50 people, an MVV value can be influenced by the level of degrees of severity of COPD experienced by respondents, the lack of work done during the maneuver examination. In the case of COPD basically been decreased lung function, decrease the development of the lungs, it can cause the value of lung function MVV is not in the category of excellent / good, and also found the value of lung function MVV in the category of Less all, this is because not No respondents sampled study with severe exacerbations of COPD. Research by [11] concluded that patients with COPD on the degree of tightness weight can cause hormonal disorders and systemic inflammation that can reduce appetite and the incidence of weight loss unwanted and occur hiperinfalasi chest cavity and flattening diaphragm that suppresses stomach so can cause the sensation of satiety.

Based on the results of research by [8] shows that knowledge of self-care among patients with COPD is still low, patients with COPD in addition to decreased lung function was also impaired extrapulmonary and often experience symptoms that disrupt such as shortness of breath, loss of appetite eating, activity limitations that hinder the patient to perform daily activities, causing dependence on people around and of course greatly affect quality of life.

The results showed that the majority of respondents had a history of smoking> 31 years as many as 25 people, it is certainly going to affect the value of MVV. The longer a person is exposed to smoke then the sooner cause organ damage, pulmonary, MVV value influenced by the degree to degrees of severity of COPD experienced by respondents, the work done during the inspection, and precision to do when performing maneuvers. The results of this research together with research conducted by [12] that the old smoke COPD patients who obtained a majority of more than 20 years of 152 (93.30%) of respondents.

The results showed that the majority of respondents spent <2 packs per day at 35 people and led to the highest category of less value MVV many as 6 people. This is because the more the number of cigarettes consumed in a day, and coupled with long-term use, it will cause damage to the lung organ that will have an impact on lung function values, especially the value of lung MVV. The number of cigarettes smoked can be a benchmark for the individual if the individual is categorized as light smokers, moderate and severe. The research by [13] showed that who have shown that of the 20 samples studied, there were 15 respondents with Brikman index weight categories and concluded that there is a significant relationship between degree of smoking to the severity of COPD.

Results showed mayorias COPD respondents had already 3-4 years as many as 31 people. The longer experiencing COPD affects on respiratory status and quality of life of patients with COPD, so the value of MVV also be affected by the length of a person experiencing COPD. Result research consistent with research conducted by [8] that long suffered from COPD disease discovered less than 10 years of 90.00%. Research conducted by [14] show that the length of time a person suffers from COPD disease-related quality of life that will affect the value of maximum voluntary ventilation (MVV).

IV. Conclusion

The conclusion of this study is the need to consider the characteristics of demographic data such as age, sex, education, occupation, body mass index, duration of smoking, and duration of suffering from COPD by measuring the maximum value of Voluntary Ventilation in patients suffering from COPD. Based on research conducted by researchers advise: For further researchers examined the association of demographic data with the value of MVV lung function in COPD patients and make interventions to increase the value of MVV lung function in COPD patients.

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