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The Effect of Progressive Muscle Relaxation with Pursed Lips Breathing Towards Fatigue, Depression and Lung Function of Copd Patients in Provincial Hospital of Jayapura

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Abstract: ***Background: COPD is one of the chronic diseases that can cause fatigue, depression and respiratory system disorders. Efforts to overcome anxiety and depression in similar chronic diseases to reduce fatigue one of them is by using the Progressive Muscle Relaxation (PMR) method. Another effort to increase oxygen supply to the alveoli is through breathing exercises that one of them with Pursed Lips Breathing (PLB). Objective: To analyze the progressive muscle relaxation relationship with purshed lips breathing against Depression Score, Fatigue Score and respiratory function in COPD patient. Research Design: Quantitative research, with experimental design through the pretest-posttest randomized control group design approach. In the experimental study, random assignments were allocated to the groups in which the researchers conducted a comparison between the intervention group and the control group. Sampling technique by way of sampling Consercutive. Data collection using FACIT-T, the BDI II, and will be analyzed using GLM-RM. Results: There is influence of progressive muscle relaxation with pursed lips breathing to decrease fatigue score and depression score with P value 0.000 while for respiratory function there is no influence with p value 0.191. Suggestion: PMR with PLB can be used one of the U.S. intervention in care in preventing fatigue and depression taught in COPD patient in pulmonary poly room u.s. preventive action and become one of intervention in discharge planning in patient going home in inpatient room.***

Keywords: fatigue, depression, pulmonary function, COPD, purshed lips breating, progressive muscle relaxation.

1. Introduction

Chronic obstruction pulmonary disease (COPD) is a lung disease characterized by obstacles chronicles the air flow in the respiratory tract is not fully refersibel. This air flow obstacles are *progressive* and associated with inflammatory lung against particles or gases that are toxic or hazardous (COPD Control Guidelines, 2008).

The prevalence of COPD was incidence in the world average ranging 3-11% (GOLD, 2015). *The World Health Organization* (WHO) estimates that by the year 2020 the prevalence of COPD will continue to rise from the ranks the 6th being ranked 3rd in the world and the 6th rank of being ranked the 3rd leading cause of death in the world (Health RI, 2008). In the year 2013, in the United States, COPD is the third leading cause of death, and more than 11 million people have COPD diagnosis with at (*the American Lung association*, 2015).

In 2007 the number deaths from COPD ranked sixth of the top 10 causes of death in Indonesia and the prevalence of COPD on average by 3.7% (Riskesdas, 2013). COPD patients in Papua Province year 2016 indicate the number of COPD patients as much as 101 cases and is ranked nine out of ten of the diseases are not contagious in the province of Papua. The party Office of the province of Papua said that data from the province of less accurate due to the process of reporting from each hospital to provincial service has not run properly because he was doing the repair process system in the service of the province of Papua. Data service of the district town of Jayapura said that of the 11 clinics which is under the Office of the county town of Jayapura reported COPD patients in the year 2016 amount to 259 cases. COPD patient data obtained from PROVINCIAL HOSPITAL in Jayapura in the year 2016 Lung Poly totaled 549 cases.

Dyspnea or shortness of breath is considered primary symptoms that limit activity in patients with COPD, this is caused by the production of phlegm or mucus in the respiratory tract in large quantities so as to cause airway resistance. Patients will appear to have a frequency above normal breathing (hyperventilation) in an effort to meet the needs of the oxygen network. Other symptoms such as fatigue are also commonly reported. This shows there is a relationship between lung function and exhaustion dimensions, tolerance and quality of life, exercise in COPD (Henny, 2014).

Tiredness or *fatigue* is a common symptom experienced in many disorders, such as cancer, *multiple sclerosis*, neuromuscular disorders, mitochondrial disease, Parkinson's disease, poliomyelitis, post stroke and diseases chronic obstructive pulmonary (COPD) (Davis, Mellar 2014). The prevalence of COPD in patients who experience *fatigue* around 43%-58% (Sahin, 2015). *Fatigue* can be defined as a decrease in the ability of the progressively to generate maximum power during muscle contraction repeated or

continued or loss of ability to perform an activity (Davis, 2014).

Fatigue can be either a physical and mental fatigue. Physical fatigue is tiredness due to physical work; work is marked by a reduction of pathological, sense of tired and has to do with psychosocial factors. *Fatigue* is described with *fatigue* at rest, *fatigue* with activity, lack of energy which hinder the daily tasks, *inertia* or lack of durability, and loss of morale. Mental fatigue is the accumulation of toxin substances (lactic acid) in the blood and psychological factors, namely the conflict that led to prolonged emotional stress. (Davis, Mellar 2014). To rate *fatigue* there are some *assessment* that can be used include *Fatigue just my Assesment Scale* (FAS) (Zuraida, 2014), *Functional Assessment Chronic Illness Therapy Fatigue* (FACIT-F) *Scale* (Al-Shair et al, 2012) and *The Multidimensional Fatigue Inventory* (MFI) (Wong, 2010).

In a primary care population, patients with *fatigue* during his life going undiagnosed depression or anxiety more often than those with no symptoms of *fatigue*, and obtained there a relationship between the longitudinal levels the severity of *fatigue* and impaired lung function and psychological symptoms. Identification of depression and anxiety on COPD can be assessed with a variety of scale, such as BASDEC (*the Brief Assessment Schedule Depression Cards*) and BDI (*Beck Depression Inventory*) (Kandowangko year 2014), *Anxiety and Depression Scale* (HADS) (Wong, 2010). Research conducted by Kentson et al (2016) stated that patients with COPD *fatigue* have lower lung function, shorter, more dyspnoea, anxiety and depression symptoms, as well as having a worse health status compared with patients without fatigue.

One of the body's reactions to the fear and anxiety is muscle tension. The anxiety of sending information to the body system to increase adrenaline so that any body release hormones from the intense response and cause someone exhausted. (http://www.mothera ndbaby.co.id/). *Fatigue* will impact further in time if not getting handling (Sulistini, Yetti, and Hariyati, 2012).

COPD is often compounded by a number of systemic komorbiditas. Depression is one of the komorbiditas who are often not undiagnosed. The prevalence of depression was reported in Indonesia in patients with COPD have ranged from 10-42%, its proportions more and are higher than in the general population. Incidence rate of depression, based on a large retrospective cohort study in general practice Research Database, was 16.2 per 1,000 people per year in patients with COPD and 9.4 per 1,000 people per year in the group without COPD (Hannania et al., 2010). *Fatigue* that occurs in patients of COPD can also be caused by the presence of depression due to conditions/prognosis is not good in COPD patients. Depression is a major komorbiditas on COPD, is associated with a poor functional performance decreased health status, and a high mortality.

Relaxation exercises can prevent *fatigue* in chronic illness caused by anxiety and depression. One of the most commonly used exercise i.e. *Proggresive Muscle Relaxation* (PMR). The existence of this exercise can raise the levels of norepinephrine, dopamine, and serotonin in the brain, thereby reducing depression. It has been proven that the brain's nervous dealers such as norepinephrine (NE) and serotonin (5-HT) is involved in depression and schizophrenia. With practice, not only the trained muscles, circulation of blood and oxygen in the body also became a smoothly so that the metabolism of the body becomes optimal. The body will feel fresh and brain as nerve center will work to become better (www.deherba.com).

Research conducted by the Damanik (2014) stated that there was influence the awarding practice PMR decline level of anxiety in patients with chronic kidney disease who underwent hemodialisa with a value of p value 0.05 and t values < =-5.779. Similar statements with research conducted with the title *Effects of progressive muscular relaxation training on quality of life in patients after coronary artery anxious bypass graft surgery*, the effect of exercises conducted during the 6 weeks results can be decrease anxiety and improve quality of life *(*Setyaningrum, 2015).

In the case of metabolic syndrome such as hypertension, Hyperlipidemia and diabetes as well as heart disease is often reported as a factor companion on COPD. The disorder or disease that can worsen COPD sufferers on exercise tolerance. Crisafulli et al, year (2008) States the prevalence of metabolic syndrome by as much as 61% and 24% of heart disease as a companion on a COPD sufferers 2962 examined. The entire disease companion in this research to worsen tolerance and reduce the effectiveness of rehabilitation (Octariany, 2014).

One strategy management of pulmonary rehabilitation is with COPD, one of them with breathing exercises. One of the breathing exercises are often taught in patients COPD was technical *Pursed lips breathing* (PLB). *Pursed lips breathing* is breathing exercises that emphasize the process of ekspirasi with the aim to process expenses air trapped by airway that *floppy*. Through this technique, then the air that comes out will be inhibited by both lips, and will cause the pressure in the oral cavity is more posistif. The key to the success of this technique that is to do with a State of relaxed (Henny safitri, 2014).

Hilma (2015) explained that the technique of *Pursed lips breathing* conducted were able to reduce oxidative stress, thus increasing the cell's energy, increasing the elasticity of the blood vessels and improve circulation throughout the network so that the body can produce energy, the results of which can reduce even overcome *fatigue* in patients with hemodialysis.

A preliminary study undertaken of the results of observation and interview against nurses in the poly data was obtained by lung that complaints are most often obtained i.e., patients feel a shortness of breath, chest pain and fatigue when doing light activities. Symptoms of tightness and chest pain usually only intervene with therapy-medication which is medical intervention, while for symptoms of *fatigue* has been no intervention given, usually only provided advice in order to limit the the activity so as not to get tired, and yet the

existence of a standard operational procedure of nursing interventions that can be given to COPD patients with complaints of *fatigue*.

2. Method of Research

Research done at this time is kuantitaitf, with a research design the research using the method of *true* e*ksperiment* via the approach of *pretest-posttest control group design randomized* to view the influence of therapy of *Progressive Muscle Relaxation with Pursed Lips Breathing* against *Fatigue*, depression and Respiratory Function.

The population in this research is that all clients diagnosed with COPD in the PROVINCIAL HOSPITAL in Jayapura. In the year 2016 the population of COPD patients in HOSPITALS in Jayapura totaled 549 cases so that an average COPD cases per month i.e. 45 – 46 cases. The sample in this study is clients who experience a COPD yang get treatment at the PROVINCIAL HOSPITAL of pulmonary Poly Jayapura. The technique of sampling by means of *Consecutive sampling* that is how sampling is done by selecting samples that meet the criteria of research until a certain period of time so that the numbers of samples are met and in this research sampling is carried out up to July 4, 2017.

3. Result

A. The Results of The Univariate Analysis

1. Characteristics of Respondents.

The results of the distribution characteristics of respondents in this research include age, *Fatigue*, depression and Respiratory Function (RR, SaO_2, and APE) can be seen in table 5.1.

Table 5.1: Distribution Characteristics of respondents based on age and description of *Fatigue*Score Stats, scores of depression and Respiratory Function (RR, SaO_2, and APE) COPD Patients At HOSPITALS In Jayapura in July the year 2017 (n = 18)

The characteristics of the	Control			Intervention		
	Mean	**SD**	**Min-Max**	**Mean**	**SD**	**Min-Max**
The age of *Fatigue*	59.22	8.229	45 – 78	62.17	13.098	40 – 86
Pre test	22.00	6.334	10-34	21.83	5.294	8 – 34
Post test	20.94	5.450	9-32	9.33	5.488	3 – 20
Depression						
Pre test	23.06	10.235	7-41	22.71	13.736	0-42
Post test	21.89	8.217	7 – 36	7.78	6.103	0 – 18
Respiratory function						
RR						
Pre test	18.89	3.085	16 – 24	19.00	3.106	14 – 26
Post test	18.17	1.543	16 – 20	19.00	2.142	15 – 24
Sao_2						
Pre test	95.06	2.313	91 – 99	96.50	4.048	82 – 99
Post test	95.11	2.763	88 – 99	97.72	1.526	95 – 99
APE						
Pre test	219.72	86.780	80 – 370	238.33	64.283	170 – 370
Post test	215.83	72.137	75 – 350	209.17	61.219	150 – 350

Based on table 5.1 above, the characteristics of the respondents viewed from the age in the control group was obtained by respondents with an average age of 59.22 – with minimum age 45 years and a maximum age of 78 years and for the intervention group obtained the respondent with an median age – minimum age the age obtained 62.17 40 years and a maximum age of 86 years.

Retrieved value *fatigue* low *pre test* on a control group of 10 and the highest amounting to 34, while the intervention group the lowest value by 8 and 34 with the highest average yield – average measurement of *fatigue score* 22.00 in the control group and in the intervention group and the median results – 21.83 average score *fatigue post test* control group in 20.94 and intervention group 9.33.

The value of the lowest depression *pre test* on a control group of 7 and the highest of 41, whereas in the intervention group the lowest value of 7 and 36 with the highest average yield – average measurement score depression at 23.06 and control group at the intervention group 22.72 average results – and the mean *post test* control group at 21.89 and intervention group 7.78.

The lowest value of RR *pre test* on a control group of 16 x/mnt and the highest of 24 x/min, while the intervention group the lowest value of 14 x/mnt and the highest 26 x/mnt with the median results – average value of the measurements of the RR group the control and intervention group at 18.89 19.00 and the results averaged – averaged *post test* control group 18.17 in the intervention group and 19.00.

The value of the SaO_2 lowest *pre test* on a control group of 91% and the highest of 99%, whereas in the intervention group the lowest value of 82% and 99% with the highest results average – average value of the measurements of SO2 in the control group 95.06 and intervention group at 96.50 and results averaged – averaged *post test* control group 95.11 in the intervention group and 97.71.

The value of the lowest APE *pre test* on a control group of 80 L/min and the highest of 370 L/min, while the intervention group the lowest value of 170 L/min and a high of 370 L/min. with an average yield – average value of the measurements of the APE group the control and intervention group 219.72 238.33 and results averaged – averaged *post test* in the control group and group interventions 215.83 209.17.

B. Bivariate Analysis Results

Test of normality is done before performing analysis bivariate. The median distribution results – averages the value of *Fatigue*, depression and Respiratory Function (RR, SaO_2, and APE) can be seen in table 5.2.

Table 5.2: Median the median of values – distribution of RR, SaO_2, APE, *Fatigue* and depression in COPD Patients at HOSPITALS in Jayapura in July the year 2017 (n = 18)

Variable	The control group		SD	p *value*	The intervention group		SD	p *value*
	Min-Max	Mean			Min – Max	Mean		
RR								
Pre test	16 – 24	18.89	3.085		14 – 26	19.00	3.106	1.000
Post test	16 – 20	18.17	1.543	0.567	15 – 24	19.00	2.142	
Sao_2								
Pre test	91 – 99	95.06	2.313		82 – 99	96.50	4.048	0.324
Post test	88 – 99	95.11	2.763	0.905	95 – 99	97.72	1.526	
APE								
Pre test	80 –370	219.72	86.780		170–370	238.33	64.283	0.001
Post test	75– 350	215.83	72.137	0.807	150–350	209.17	61.219	
Fatigue								
Pre test	10-34	22.00	6.334		8 – 34	21.83	5.294	0.000
Post test	9-32	20.94	5.450	0.176	3 – 20	9.33	5.488	
Depression								
Pre test	7-41	23.06	10.235		0-42	22.71	13.736	0.000
Post test	7 – 36	21.89	8.217	0.383	0 – 18	7.78	6.103	

Based on table 5.2 shows the results of the analysis of the difference of the values of RR *pre* and *post test* control group gained on both the value of the p *value* (0.567) and intervention group obtained Indigo p *value* > 0.05 (1.000), This means that there is no significant difference value of RR pre and post test between the two groups.

The results of the analysis of the difference between the SaO_2 pre and *post test* control group gained on both the value of the p *value* (0.905) and intervention group obtained Indigo p *value* (0.324) > 0.05, which means that there is no difference significant value SaO_2 *pre* and *post test* between the two groups.

The results of the analysis of the difference between the APE *pre* and *post test* values obtained in the control group p *value* > 0.05 (0.807) means that there is no significant difference value of APE in the control group and group intervention acquired Indigo p *value* (0.001) < 0.05, which means that there is a significant difference of value APE pre and *post test* in the intervention group.

The results of the analysis of the difference between the *fatigue of pre* and *post test* values obtained in the control group p *value* (0.176) > 0.05 means there is no significant difference value of *fatigue* on the Group the control and intervention group obtained Indigo p *value* (0.000) < 0.05, which means that there is a significant difference value of *fatigue pre* and *post test* in the intervention group.

The results of the analysis of the difference of the value of depression *pre* and *post test* values obtained in the control group p *value* (0.383) > 0.05 means there is no significant difference value of depression in the intervention group and the control group acquired Indigo p *value* (0.000) < 0.05, which means that there is a significant difference value of depression pre and *post test* in the intervention group.

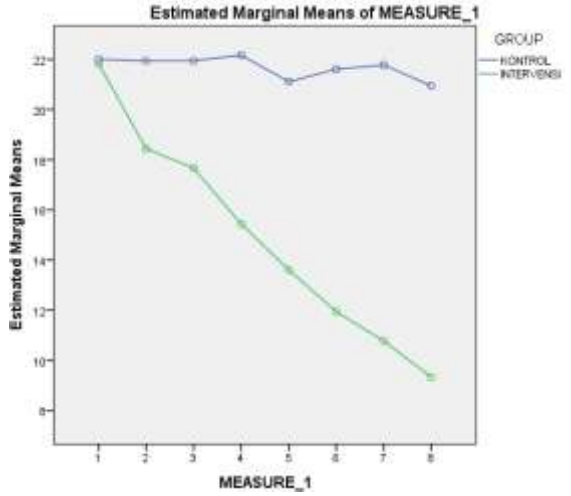
C. The Results of the Multivariate Analysis

Before doing a multivariate analysis done in advance of its homogeneity and normality test. The results of multivariate statistical description of score *fatigue* can be seen in table 5.3.

Table 5.3: Multivariate Statistical description of *Fatigue* in patients COPD at the PROVINCIAL HOSPITAL in Jayapura in July the year 2017 (n = 36)

Variable *fatigue*	The control group		The intervention group		p *value*
	Min – Max	The Mean ± SD	Min-Max	The Mean ± SD	
Pre test	8 – 34	21,92 ± 5,754	8 – 34	21,83 ± 5,294	0.000
Post test I	3 – 32	20,19 ± 6,774	3 – 32	18.44 ± 7,943	
Post test II	3 – 32	19,81 ± 6,840	3 – 30	17,67 ± 7,388	
Post test III	3 – 34	18,81 ± 7,281	3 – 28	15,44 ± 7,278	
Post test IV	3 -30	17,36 ± 7,507	3 – 28	13,62 ± 7,897	
Post test V	3 – 32	16,78 ± 7,713	3 – 24	11.94 ± 6,620	
Post test VI	3 – 34	for 16.28 ± 8,109	3 – 20	10,78 ± 6,015	
Post test VII	3 – 34	15,14 ± 7,983	3 – 20	9,33 ± 5,488	

Based on table 5.3 multivariate measurement results, obtained using the test of general linear model repeated measure (GLM-RM) obtained the value of the p value 0.000 < 0.05 for the measurement of pre test first day up to post test day, it means there is a significant difference between the score fatigue either pre or post intervention PMR with PLB from pre test first day to post test day the seven. So it can be inferred that a given intervention significantly to influential results score fatigue.



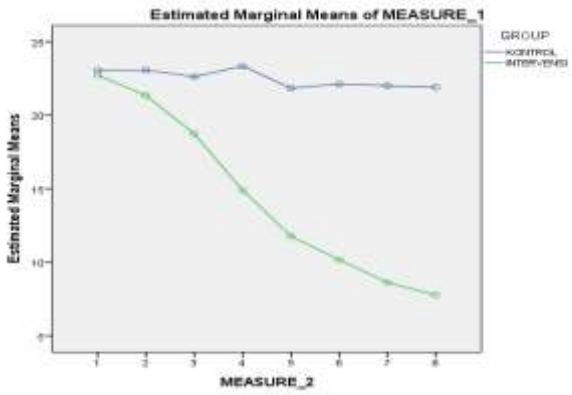
Pigure 5.1: Picture Profile Plot Multivariate scoore *Fatigue*

Figure 5.1 profile plots shows that in general the two charts on the intervention group or a control group is very different. The graph shows a decrease in *fatigue* scores significant each time the measurement is performed, different from the control group are less likely to experience a meaningful change. This is in line with the results of the multivariate test with a value of p *value* 0.000 < 0.05 which means there is the influence of the treatment of PMR with PLB against decrease in *fatigue* scores in the intervention group. The results of multivariate statistical description of score of depression can be seen in table 5.4.

Table 5.4: Multivariate Statistical description of depression in COPD Patients at HOSPITALS in Jayapura in July, 2017 (n = 36)

Variable Depression	Group control		The intervention group		p value
	Min-Max	The Mean ± SD	Min-Max	The Mean ± SD	
Pre test	0-42	22,89 ± 11,940	0-42	22,72± 13,736	0.00
Post test I	0 – 46	22,19 ± 11,531	0 – 46	21,33± 13,569	
Post test II	0 – 44	20,67 ± 11,100	0 – 44	18.72± 13,101	
Post test III	0 – 40	19,11 ± 10,457	0 – 32	14,89 ± 10,895	
Post test IV	0-37	16,81 ± 10,290	0 – 31	11,78 ± 9,397	
Post test V	0 – 36	16,14 ± 10,592	0 – 28	10.17 ± 8,926	
Post test VI	0 – 35	15,31 ± 10,265	0 – 25	8,61 ± 7,056	
Post test VII	0 – 36	14,83 ± 10,104	0 – 18	7,78 ± 6,103	

Based on table 5.4, multivariate measurement results obtained by using the test of *general linear model repeated measure* (GLM-RM) obtained the value of the p *value* 0.000 < 0.05 for the measurement of *pre test* first day up to post test day, it means there is a significant difference between the score of depression either pre or post intervention PMR with PLB from pre test first day to post test day the seven. So it can be inferred that a given intervention effect significantly to depression score results obtained.



Pigure 5.2: Picture *Profile Plot* Multivariate Scoore of Depression

Figure 5.2 profile plots shows that in general the two charts on the intervention group or a control group is very different. The graph shows the decline in significant depression scores each time different measurements, performed with a control group who are less likely to experience a meaningful change. This is in line with the results of the multivariate test with a value of p value 0.000 < 0.05 which means there is the influence of the treatment of PMR with PLB against a decrease in depression scores in the intervention group.

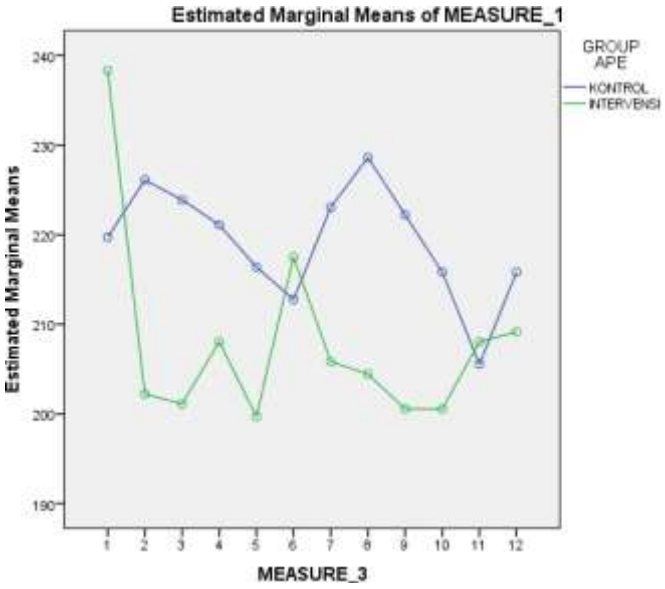
The results of multivariate statistical descriptions of APE, values can be seen in table 5.5.

Table 5.5: Multivariate Statistical description of the APE At the PROVINCIAL HOSPITAL In Jayapura COPD Patients in July 2017 (n = 36)

Variable APE	The control group		The intervention group		p *value*
	Min-Max	The Mean ± SD	Min-Max	The Mean ± SD	
Pre test	65–375	219,72 ± 75,185	170–370	238,33 ± 64,283	0.191
Post test I	60–375	214,17 ± 78,153	60–370	201,22 ± 86,249	
Post test II	75–360	212,50 ± 66,789	75–310	201,11 ± 66,699	
Post test III	75–360	214,58 ± 66,744	75–335	208,06 ± 70,213	
Post test IV	85–375	208,06 ± 67,744	85–375	199,72 ± 72,608	
Post test V	85–350	215,14 ± 68,894	85–330	217.50 ± 72,177	
Post test VI	75–370	214,44 ± 72,069	75–370	2015,83 ± 85,220	
Post test VII	70–350	216,53 ± 71,272	70–350	2014,44 ± 80,529	
Post test VIII	75–340	211,39 ± 67,439	75–325	200,56 ± 75,066	
Post test IX	75–350	208,19 ± 66,581	75–325	200,56 ± 75,066	
Post test X	80–350	206,81 ± 66,913	80–330	208,06 ± 75,618	
Post test XI	75–350	212,50 ± 66,025	150-350	209,17 ± 61,219	

Based on table 5.5, multivariate measurement results obtained by using the test of *general linear model repeated measure* (GLM-RM) obtained the value of the p *value* > 0.05

to 0.191 measurements *pre test* first day up to *post a test* day to eleven, meaning that there is no significant difference between the value of the APE either *pre* or *post* intervention PMR with PLB from *pre test* first day to *post test* day to the eleven. So it can be inferred that a given intervention has no effect significantly to the value of the APE.



Pigure 5.3: Picture *Profile Plot* Multivariat Nilai APE

Figure 5.3 profile plot shows that in general the two charts on the intervention group or a control group is not too much different. The graph shows the occurrence of a value that fluctuates each time the measurements are performed, different from the control group are less likely to experience a meaningful change. This is in line with the results of the multivariate test with a value of p value > 0.05 0.191 which means no influence treatment PMR with PLB to increased value of the APE in the intervention group.

4. Discussion

A. The Results Of The Univariate Analysis

The results of the analysis of the characteristics of respondents consisting of age, *fatigue*, depression and respiratory function (RR, SaO_2 and APE).

1. Age.

Results of the study showed the average distribution of the median age of COPD sufferers – in control of or intervention groups minimum age 40 years maximum age 86 years.

This is similar to research conducted by Setiyanto, et al (2008) shows that of the 120 patients, the youngest age is 40 years old and the oldest is 81 years old, *Latin American Project for the Investigation of Obstructive Lung Disease* (PLATINO) examines the prevalence of airflow limitation after the giving of the bronchodilator among individuals over the age of 40 in five important city of Latin America, each in different countries (Brazil, Chile, Mexico, Uruguay, and Venezuela). In each country, the prevalence of COPD in sharp increases with increasing age, with the highest prevalence among those over the age of 60, from a total population of 7.8% low in Mexico City, Mexico to the high of 19.7% in Montevideo, Uruguay. And on the research conducted by Shinta (2007) in RSU Dr. Sutomo Surabaya in 2006 showed that of the 46 most COPD sufferers are sufferers in the age group over 60 years of 39 sufferers (84.8%). Age group is very important because of the prevalence of COPD in individuals under the age of 45-year low, while the highest prevalence in individuals over the age of 65 years.

Mahler research year, dkk (2009) in Lebanon against COPD sufferers 101 with average age 66 10 ± 9 years. Hajiro research et al explained in 1998 in Japan against COPD sufferers 161 with average age 69 11 ± 7 years. Research Camargo et al in 2010 in Brazil against COPD sufferers 50 with a median age of 12 flat 69 ± 8 years. Research Wegner et al. the year 1994 in Germany against 62 sufferers of COPD with a median age of 8 averaged 69 ± 7 years. Research Wells et al in 1988 in the US against COPD sufferers 91 with the average age of 13 57 ± 15 years. While the research Setiyanto et all in 2008 in RS Friendship against COPD sufferers get 120 average age ± 9.3 65.87 years. This is in accordance with the libraries stating that sufferers of COPD generally over the age of 40 years. (Anwar, et all 2012).

According to the theory of the distribution of the age of sufferers of COPD can be influenced by the existence of a deficiency of α_1 *-antitrypsin* that weight can cause early emphysema at the age of 53 years on average for not smokers and 40 years for smokers. Sufferers with a deficiency of α_1 *-antitrypsin* experiencing shortness of breath 20 to 30 years earlier (at the age of 30 to 45 years) than smokers with emphysema and level α_1 *-antitrypsin* normal. Studies conducted in 28 countries between 1990 and 2004, and an additional study of Japan, gave evidence that the prevalence of COPD at age of individuals over 40 years old than those under 40 years of age.

According to the analysis of researchers, the irritant ingredients causing inflammation of the alveoli. If an inflammation lasts a long time, the damage could happen to settle. In the alveoli that are inflamed, be collected white blood cells that will produce the enzymes (especially neutrophil elastase), which will damage the connective tissues inside the walls of the alveoli. Smoking will result in further damage in the lung's defense, by disrupting cells like hair (Cilia) that normally carry the mucus into your mouth and help excrete toxic materials. The body produces the protein Alpha-1-antitrypsin, which play an important role in preventing damage to the alveoli by neutrophils in estalase, so that when the body of the enzyme deficiency will result in damage to the lung – pulmonary. Because the body is not making enough proteins to protect the lung – pulmonary, then with a condition like COPD sufferers age it will be found at the age under 40 years of age.

The prevalence of COPD increased with increasing age. Characteristic of the age in this study are quite varied because it is not controlled the eastern limit, it can be profitable because the results obtained may be causing age lower limit and upper limit on the respondent. Because at the moment the elderly throughout the system that exists in the

body also experienced a decrease or degeneration is compounded by the existence of a history of smoking, because at the time examined almost all of the respondents is an active smoker history with the number of cigarettes that consumed above 6 bar/day except 1-sex female respondents who do not have a history of active smokers but rather passive smokers.

2. *Fatigue*

The results showed a median distribution – average *fatigue* in the control group were not too significant compared to the intervention group by Yixin. Related research stated that the prevalence of COPD in patients who experience *fatigue* around 43%-58% (Sahin, 2015). Studies conducted by Marcel, et all (2011), show that a high level of fatigue is common in COPD patients. They have a lower exercise capacity and a lower health status. However, they benefit from pulmonary rehabilitation. Response to pulmonary rehabilitation is evaluated by using the change in size at 3 months and 1 year after entry. High exhaustion occurs on 97/251 (39%) patients. Patients with high fatigue experienced greater improvements in fatigue CRQ (0.74 points again) and the SGRQ score (with 6.0 points; $p < 0.01$), with a significant increase in clinically maintained at 1 year.

Ravary et all (2008), in his work gets results that fatigue in patients COPD increased significantly compared with the control group (average 35.3 units (SD 11.0) compared to 43.2 (10.5), $p = 0.001$). Improvement of fatigue on COPD is associated with reduced time spent outdoors ($r = -0.43$, $p < 0.001$), fatigue increased on exacerbation in 31/32 patients. Overall, fatigue increased by 8.3 units (5.9), $p < 0.001$. The perception of fatigue is increased in patients with COPD compared with control subjects tailored to the age, and is associated with morbidity when patients are stable and are experiencing exacerbation.

Based on theory, COPD patients breathing average be faster, so fatigue diaphragm muscles, this is caused due to a decrease in blood flow to the muscles, muscle weakness will cause increased anaerobic metabolism that will memperberat work and supporting the occurrence limitation of activity. These conditions will cause a decrease in pulmonary ventilation function.

Fatigue often occurs because your body does not get enough oxygen supply to the blood and inner muscles, when experiencing difficulty breathing. Your bodies will slowly slowing down and experiencing fatigue in the absence of oxygen supply. In addition, the perceived fatigue condition can also be caused because your lungs are working so hard to get oxygen and exhale carbon dioxide which this condition will greatly deplete energy in your body. Hypoxia tissue one muscle will increase the anaerobic metabolism which will generate a lot of lactic acid. Excess lactic acid buildup will lead to muscle fatigue (Guyton & Hall, 2007).

Respiratory muscle fatigue resulting in breath will be short and difficult, which in turn causes the client anxiety, panic, and frustrating so that clients reduce activity to reduce sesaknya (Turnip, 2013). Low activity in COPD clients will cause physical dekondisi i.e. the adverse circumstances due to low activity and can affect the musculoskeletal system, circulatory, respiratory, and other systems (Turnip, 2013).

According to the researchers, analysis of muscular fatigue and decreased exercise tolerance in COPD led to increased client visits to health facilities and the decline in quality of life (Decramer et al., in Sugiono, 2010). The Epinefrin nerve stimulated by sympathetic dystrophy or adrenal medulla are carried by the systemic circulation, heart on the organ will bind to the β1 which increases the kardioakselerasi and the bulk of the heart so the blood distribution by repair the heart that will increase the number of capillaries in the body including the muscles and lungs. Epinefrin on pulmonary organs especially in bronchial will bound to β2 which will give the effect of a bronkodilatasi can improve the lung ventilation (Guyton & Hall, 2007).

The perfect oxygen extraction by cells due to increased myoglobin and enzymes will be menururunkan the formation of lactic acid (Ganong, 2008). Decrease the amount of lactic acid in the muscle will reduce fatigue so an increase in muscle function is mainly the respiratory muscles (Guyton & Hall, 2007). In addition, the increased blood flow to the lungs resulting in pulmonary capillaries it gets the maximum so that perfusion diffusion of oxygen into the pulmonary capillaries will increase (Guyton & Hall, 2007). The improvement of the diffusion of oxygen reduces the hypoxic cells will lower symptoms of shortness of breath (Potter & Perry, 2005). The increase in pulmonary ventilation or work capacity with maximum efficiency at low oxygen consumption can give the effect of COPD client's activity on tolerance (PDPI, 2003). So in patients COPD will always feel exhausted when beraktifits but this can be avoided by routinely doing exercises that is lightweight but often to train respiratory muscles to work optimally.

3. Depression.

The research results obtained average results – average value of *pre test* and *post test* in the control group and group interventions there is a significant difference. Drop quite a lot going on in the intervention group compared with the control group.

Research conducted by Marcel, et all (2011), obtained results that patients with high fatigue younger, have more symptoms of depression, dispnea bigger and worse SGRQ score ($p < 0.01$). They also have 6MWD, durability, and low volume of oxygen consumption (VO2; $< p\ 0.05$). Other research conducted by Al-shair, et all (2011) this study shows relationship possible between TNF-α and two major morbidity in COPD, namely depression and fatigue. Multivariate linear model of all biomarkers indicating that TNF-α only has positive correlation with a score of BASDEC depression ($p = 0.007$). TNF-α remain correlated positively with depression ($p = 0.024$) after adjusting more TNF-α-R1, TNF-α-R2, 6MWD, FEV1%, and the package of the year. Even after adding the score MCFS, body mass and body composition against the model of TNF-α is still associated with a score of BASDEC ($p = 0.044$). Furthermore, patients with levels of TNF-α which is higher (> 3 pg/ml, $n = 7$) has a value of depression CES-D which is higher than the total sample ($p = 0.03$).

Based on theory, in fact has shown that inflammatory cytokines have direct effects on the central nervous system including the improvement of negative mood. On the other hand, depression is associated with increased plasma, cytokines and cytokine production of pro-inflammatory commonly seen in depression. These can be clinically important given the pattern of chronic inflammatory chronic COPD, and opens the possibility of an effective anti-depressant that has effects on the inflammatory response system or bitter taste effective therapy has an effect on depression is the main komorbiditas in COPD.

According to the analysis of the researcher, the prevalence of panic attacks in patients COPD ten times greater than the normal person. It also results in reduced participation in the activities of sufferers – social activities including in regard to sexual intercourse. Psychological guidance should be done against COPD patients especially those who have a tendency of experiencing panic attacks. Psychotherapy in the form of counseling or education or relaxation therapy and desentisasi shortness of breath which is integrated in the components of pulmonary rehabilitation more expected to reduce anxiety, depression, and shortness of breath, as well as improve the flavor confident. The success of rehabilitation is not only determined by the physical problem of handling the patient but also the problems of psychology, emotion and social. Sufferers with psychosocial problems often can't determine the problem on its own. Neuropsychology abnormalities often found in COPD, patients become depressed, afraid, and anxious and extremely depend on others to meet their needs.

A symptom of progressive shortness is a symptom of the highly feared due to a slight increase in activity at the seams so that it generates fear and anxiety. In the end the activities of sufferers will be limited. Psychosocial status and attention to the problem can be determined the time of the interview such as the level of support the family and their environment, daily activities, hobbies and the level of its limitations. Important key when the interview is paying attention to the nonverbal communication such as facial expressions, posture, posture of the hands and body movement. Cognitive abnormalities are limited to patients can be well identified. Psychosocial support is useful to give a sense of confidence and prevent a COPD patient of depression that will result in lowering the effectiveness of pulmonary rehabilitation.

4. RR

The research results obtained that both the intervention group and the control group experienced no significant effects against COPD patients with the mean value – nearly the same averages.

Research according to Basuki Duwi, et al (2009) Test shows the calculation of *SPSS Wilcoxon Sign Rank Tests* indicate the significance of < 0.05 0.002 or exercise influence there breathe against a decrease in COPD patient shortness of breath). In COPD, the frequency of Breathing or *Respiratory Rate* (RR) *Post test* rise as efforts to compensate for the volume of a small breath square (Agustin & Yunus, 2008).

Based on the theory in a State of rest, breathing speeds about 15 times per minute (Price et al., 2006). On COPD respiratory muscles disorders occurred that affected konstraksi muscles and respiratory muscle strength. Loss of lung elastic on COPD causes hyperinflation and chronic airway obstructive that interferes with the process of ekspirasi so that the volume of air in and out of balance and there is air trapped *(trapping water). Air Trapping* in a State long horizontal diaphragm, causing muscle contractions are less effective and its function as the main muscle of breathing reduced pulmonary ventilation against.

According to the researchers, the difference analysis of research results with previous studies may be due to shortness of breath can be associated with clinical signs such as excessive breath effort, the use of auxiliary respiratory muscles to breath, the tip of the nose, and an increase in the frequency and depth of breathing, (Potter & Perry, 2005). A variety of compensation muscles interkostal and muscles commonly used extra inspiration on additional activities will continue to be – a constant so that the role of the diaphragm decreases up to 65%. The volume decreased breath and breath became shorter so that it becomes alveolar hipoventilasi which will increase the consumption of O_2 and lowering the spare power of sufferers.

5. SaO_2

Research shows any change value SaO_2 but not so much or significant, both in the intervention group or a control group. Based on outstanding research into by Hafiizh (2013) are obtained by test *Wilxocon T-Test*, retrieved the value significance of 0.004, because the value of < 0.05 significance (0.004 < 0.05) means that there is a there is a significant influence on the granting of *pursed-lip breathing* to increased *pulse oxygen saturation* (SpO_2). Contrary to research Priyanto, et al (2011), meaningful differences were not found between SaO_2 on day 2, 3, 4 and 5 in both groups (p = 0.068 0.915;; 0.670; 0.100, α = 0.05) means that there is no difference for the saturation of oxygen in days 2, 3, 4 and 5. In research Ramos et al (2009) in a Cache (2014), which showed that that the PLB can significantly decrease shortness of breath and *heart rate* as well as improve oxygen saturation in patients with COPD?

According to the theory, a decrease in *pulsed oxygen saturation* (SpO_2) is hipoksemia and hiperkapnia symptoms, caused by impaired ventilation and perfusion plus hipoventilasi alveolar (Agustin & Yunus, 2008). Saturation of oxygen/*pulse oxygen saturation* (SpO_2) on the most important Factor that determines the COPD% saturation of Hb is PO_2 blood, related to the concentration of O_2 physically dissolved in the blood (Sherwood, 2012). Hipoksemia arterial oxygen saturation or decline during exercise usually occurs in patients with severe COPD as a result of venous oxygen pressure drop effects, due to the disruption of perfusion and ventilation. (O'Donnell, 2001). The value of SpO_2 normal is 95% to 97% (Price et al., 2006).

With the existence of several different opinions of researcher's beranalisis that decrease or increase saturation of oxygen is affected by shortness of breath or dyspnoea which is a symptom that is common in people with COPD (Ambrosino & Serradori, 2006). Causes of shortness of breath is not only due to obstruction in bronchial or

bronkhospasme alone but more due to the presence of hyperinflation. The impact to the State of decreased oxygen saturation (SaO_2). Sao_2 is the ratio of the rate of hemoglobin oxygen/hemoglobin teroksigenasi (HbO_2) with hemoglobin in the blood (total levels of HbO_2 and terdeoksigenasi hemoglobin (Hb), $thus_2$ SaO will increased . As delivered by Sherwood (2001) that the increase in PaO_2 will increase the affinity of Hb to oxygen and a decrease in the amount of CO_2 will also increase the affinity of Hb to oxygen and vice versa.

6. APE

The research results obtained in the control group and group interventions that there was no significant change towards patients COPD. Research results yatun, dkk (2016), shows there is a significant relationship between the value of peak flow ekspirasi (APE) with the quality of sleep patients COPD ($p = 0.000$; $\alpha < p$). Based on the value of korelasinya ($r = -0.876$), can be taken to mean that the value of peak flow ekspirasi (APE) and the quality of sleep has a strong correlation with the strength of the direction of the relationship is negative. The research of the Goddess (2015) with intrvensi *pursed lips breathing* performed a repeat 6 times with a pause of 2 seconds per repetition, this exercise was conducted for 3 days in the get results there is influence of *pursed lips breathing* (PLB) against the values of *forced expiratory volume in one second* (FEV1) in people with chronic obstruction pulmonary disease (COPD. Research Alfanji et al, (2011) in Suprayitno, dkk (2017) that which is done four times a day before meals and before going to sleep for 30 minutes and is done on a regular basis then the results obtained after 3 weeks SaO_2 in significant increases, $PaCO_2$ decreases and frequency of breathing is significantly decreased. The research of Kim (2013) in Suprayitno, dkk (2017) obtained as a result of which effective to improve the patient's asthma bronchiale in PEF value < p 0.05.

According to the theory of the COPD patient will have elevated prisoners' airflow, *air trapping*, and hyperinflation of the lungs. Lung hyperinflation caused the loss in muscle inspiratori in mechanical, so an increase in the imbalance between the ventilation task on breathing, strength and ability to meet volume breathing effort tidal. COPD patients will experience a decrease in respiratory muscle strength so that the *recoil* and *compliance* of the lungs decreases. This decrease will cause interference with the air flow progressively, so that can cause disorders of perfusion that can develop into arterial hipoksemia. COPD patients spirometri inspection results showed a decrease in pulmonary functional capacity derived from the ratio of the decrease in *force ekspiration volume* (FEV1) and the FEV1/FVC ratio is abnormal, and decline (ekspirasi current APE) as well as the existence of limitations in activities a day – day due to shortness of breath. A peak flow value of ekspirasi (APE) on a person reflects the occurrence of changes in airway, can be used to see the degree of obstruction COPD. Airway obstruction in COPD causes a reduction of the air flow. The first sign of the onset of limitations of airflow is a decrease in the ratio of VEP1/KVP. Obstruction of the airway and lungs deflate easier than normal channels causes the value of the APE decreased. The habit of smoking greatly affects the function of the lung that cause large changes in airway structure in the form of mucus gland hyperplasia and hypertrophy. An environmental factor such as air pollution greatly affects lung faal obtained due to workplace environment Yatun, et al (2016). APE is a measure how much powers a person issuing the air with ekspirasi maximum (Santoso, 2010). The pressure and the volume of air in the lungs on work of breathing is affected by respiratory muscle strength, number of surfactants, and the level of kompliansi (Potter & Perry, 2005).

According to researcher analysis i.e. fatigue on muscles will decrease the ability of the expansion and the recoil of the chest on COPD clients (Potter & Perry, 2005). The condition will affect pulmonary function values that occur as kapasital vital force (KVP), the first volume of ekspirasi seconds (VEP1), and peak flow ekspirasi (APE) (Celli, in Turnip, 2013). Measurement of lung function describes the ability of the lungs to Exchange oxygen and carbon dioxide efficiently (Potter & Perry, 2005). Measurement of lung function that is easily done for clients with COPD is the measurement of the APE'S *peak flow meter*. Respiratory muscle repair and bronkodilatasi will improve ventilation and increase lung function i.e. one fixes the value of the APE (Guyton & Hall, 2007; and Potter & Perry, 2005).

B. Bivariate Analysis Results

1. *The difference in the values of RR in patients COPD before and after*.

The treatment in the control group and group interventions on day to day – 1 – 12. Analysis of difference in RR based on table 5.3 shows the results of the analysis of the difference of the values of RR pre and *post test* control group gained on both the value of the p *value* (0.567) and intervention group obtained the value of the p *value* (1.000) > 0.05, which means that there is no significant influence on the value of RR pre and *post test* between the two groups. The research results reveal the breath in or *pursed lips breathing* (PLB) can affect the respiratory rate and tidal volume due to p-*value* < 0.001 (Kim, 2013) in Suprayitno, (2017).

Ekspirasi forcibly will certainly increase the strength of muscular contraction intra intra abdominal pressure of the abdomen thus increased exceeded at the time of passive ekspirasi. Intra abdominal pressure increased more strongly again certainly will increase also the movement of the diaphragm upwards making the shaft cavities are increasingly shrinking. The thoracic cavity is getting smaller as it leads to increasing pressure intra alveoli so exceeded air pressure atmosphere. These conditions will cause the air to flow out from the lungs into the atmosphere. Ekspirasi who are forced to breathe on the PLB will also cause airway breath removed so that the respiratory resistance decreases. Decreased respiratory resistance will streamline the air or inhaled and exhaled.

Efforts to extend ekspirasi will prevent the air exhaled spontaneously which can result in pulmonary kolap or collapse, thus with breathing air that helped issue the PLB was trapped on COPD patients so that the CO_2 in the lung can issued. $Spending_2$ CO. of the lung provide opportunities to O_2 to fill the alveoli even more space. Moreover, there are also breathing on the PLB is a strong and inspiring mechanism in, then this mechanism will help boost the intake

of O_2 into the alveoli. The high pressure of the O_2 in alveoli compared with$_2$ O pressure in the lung capillaries and low pressure CO_2 in the alveoli as compared to the high pressures of CO_2 in the pulmonary capillaries causing an increasing gradient gas pressure in the gas – among both sides. Difference gradient of pressure O_2 high increase gas exchange, i.e. the diffusion of O_2 of the pulmonary alveoli into the capillaries. The differences in pressure of CO2 are high also improving gas exchange, i.e. the diffusion of CO_2 from the pulmonary capillaries into alveoli to next report issued into the atmosphere. *Pursed lips breathing exercise* is exercise that aims to regulate the frequency and pattern of breathing thereby reducing *water trapping*, improving the ventilation of the alveoli to improve gas exchange without increasing employment breathing, organize and coordinate speed of breathing so that breathing is more effective and reduces shortness of breath (Smeltzer, 2008).

In COPD, Respiratory Frequency or *Post test* (RR) increased in an effort to compensate for the volume of a small breath square. Shortness of breath can be associated with clinical signs such as excessive breath effort, the use of auxiliary respiratory muscles to breath, the tip of the nose, and an increase in the frequency and depth of breathing, (Potter & Perry, 2005). The frequency of Breathing or *Post test* (RR) increased in an effort to compensate for the volume of a small breath square (Agustin & Yunus, 2008). Research conducted is not in line with the results of the research of Kim et al. (2012) showed that the significant increase in breathing pattern which is tidal volume (TV) and lower than the natural breathing and RR research Jones, Dean and Chow (2003) which also shows that the PLB increase Tidal Volume and lowered RR in patients with COPD.

But there is another opinion which suggests that p.engukuran *post test* (RR) obtained results of nila p *value* 0.007 to *post test* (RR) and values of 0.004, where p < 0.05 which means there is the influence of the granting *pursed-lip breathing* (PLB) towards a decrease in the *post test* (RR) Edwin Hafiizh, dkk (2013). This can be caused by a *Pursed Lip Breathing* (PLB) increases the partial pressure of oxygen in the arterial (PaO_2), which led to a decrease in pressure on the need of oxygen in the body's metabolic processes, thus causing the decrease of shortness of breath and *post test* (RR) or the frequency of breathing.

Note that a decrease in bodily functions especially respiration occurs above the age of 40 years. And on the patient's COPD usually occurs tachypnea or rapid breath. Tachyipnea common in people suffering from emphysema, because they don't get enough oxygen or they were trying to "undermine" the excess carbon dioxide (a waste product of metabolism), which has awakened in their blood, because disposal of the inhalation air is not adequate. In other words, tachypnea in people with COPD is usually caused by oxygen levels are too low (or oxygen partial pressure pO2) that stimulate breathing fast, shallow, or too high levels of carbon dioxide (which stimulates rapid shallow breathing). In addition to COPD is responsible for low oxygen or carbon dioxide levels rise, there are other mechanisms by which people with COPD may experience tachypnea. For example, fever associated with lung infection may cause tachypnea. Heart damage such as congestive heart failure, and also anemia can also cause rapid breathing, because of the anxiety associated with dispnea-very much like mendapatakan's a good breath and let go. A very important difference to note with takipnea on COPD

Whether physiological or pathological tachypnea may be seen when fsiologis tachypnea means that have a purpose. by taking rapid shallow breathing, body fixing other abnormalities. In this case, it is important to treat the underlying cause, because treating tachypnea alone may actually be harmful. On the contrary, pathological tachypnea occurs when a person develops breathing fast and shallow that may be harmful to the body e.g. hyperventilation due to anxiety. Instead of fixing the levels of oxygen/carbon dioxide and acid-base balance of blood, hyperventilation can exacerbate this situation. (Leader, 2017)

According to the researchers, the results of analysis are not significant in this study could be caused due to the quite short so as not to affect the decline *the post test* (RR) in people with COPD. Because to reach the required amount of constant respiration activity that can be controlled, reducing anxiety and healthy life patterns with away from the exposure of the originator as well as control factors to a doctor who routinely. Less effective actions combined with PMR PLB on this study may be due to a very short measurement gap against RR in the two groups. While as already communicated earlier that breathe PLB consists of two main mechanisms i.e. the inspiration deep and strong as well as the forced ekspirasi and length, which certainly requires energy to perform that action and can make patient fatigue. Fatigue also will have an impact to the increasing frequency of RR.

5. *Difference between SaO_2 on COPD patients before and after treatment in the control group and group interventions on day to day – 1 – 12*.

The research results obtained in the control group p *value* 0.905 and intervention group p *value* > 0.05 0.324, which means the absence of significant effects between SaO_2 in the control group as well as the intervention group.

The results of this study are inconsistent with research Alfanji and Harry (2011) that which is done four times a day before meals and before going to sleep for 30 minutes and is done on a regular basis then the results obtained after 3 weeks SaO_2 significantly increased, $PaCO_2$ breathing frequency and decreased significantly decreased shortness of breath or dyspnoea is a symptom that is common in people with COPD (Ambrosino & Serradori, 2006). Causes of shortness of breath is not only due to obstruction in bronchial or bronchospasm alone but more due to the presence of hiperinflansi. The impact to the State of decreased oxygen saturation (SaO_2).

A series of studies on PLB has been done, as was done by Bianchi (2004), Ambrosino & Serradori (2006), Ramos et al (2009), and Kim, et al (2012) indicates that the PLB may increase respiratory condition COPD patients, i.e. boost SaO_2. Other nursing actions that can be done to help improve the patient's respiratory condition COPD are positioning the patient (Bhatt, et al, 2009).

Sihotang research results, (2015) obtained from test *kai-kwadrat* shows that the oxygen saturation in the statistics do not relate to the existence of the complaint respiratorik (p = 0.775) or it could be said that a decrease in oxygen saturation is not related to the age factor, it is the same with research conducted by Bendrick dkk, (1995) in sihotang, (2015) found a decrease in oxygen saturation of oksimetri not related to age.

According to researcher analysis equation that occurs in this research due to physiological Disorders of the lungs will cause a decrease in the oxygen supply is indicated by decreased oxygen saturation (SpO_2) in COPD patients. The oxygen saturation of a patient's COPD could decline by up to 85% of the patients experienced menyebahkan hipoksemia, cyanosis, decreased concentration and mood changes.

6. *The difference in the value of the APE in patients before and after treatment of COPD in the intervention group and the control group on day to day – 1 – 12*.

The results of this research obtained value APE *pre test* values in the control group p *value* > 0.05 0.807, whereas in the intervention group value p *value* 0.05 < 0.001. Then it can be inferred that there is a significant change towards the intervention group compared with the control group.

The research is in line with research conducted Muawanah (2015), which gets the value of the P *value* 0.000 < 0.05 that get results there is influence of PLB of APE. PLB is effective for improving asthma bronchiale APE in patients with p-*value* 0.048 (Natalia, 2007), ranking dispnea was no different between devices at rest or during exercise, but lower in the period following post-workout the use of *Positive End-Expiratory Pressure* (PEEP) or a PLB (Suprayitno,2017).

The magnitude of the value of the APE depends on several factors, including age, height, and inhalant exposure at work (Alsegaff et al., 1993). In this study a comparison is the percentage of the APE which has been divided by the value of the value prediction based on APE'S age and height. So the height and age factors which can influence the decline of APE are already controlled. From the results of the data analysis the percentage of stable COPD and sample APE healthy people with the t test obtained p = 0.000 (p < 0.05) which means there is a statistically meaningful difference between the two groups, where the percentage of the APE group of stable COPD lower compared with healthy people. This is due to changes in the lung that initially still reversible gradually become such. Airflow limitation is usually progressive nature so that the value of his faal dropping drastically. In addition, it is also influenced by the age and height of the sample. The older a person means also experienced a longer exposure against the various causes of COPD. (Firdahana, 2010).

Achieve maximum lung Faal at age 19 – 21 years, after which its value continued to fall according to the growing age which increases susceptibility to disease especially COPD. Sex greatly affects the value of the APE, where the normal value of the APE man is larger than the female. Khotimah (2013), namely the increasing age it will be going decline in FEV1 and FVC average. The more muscle a person aged respiratory muscles getting weak. The development of lung tissue and musculoskeletal systems of the strength in the chest cavity play a role against the magnitude of value of FEV1 and FVC.

Pulmonary function especially APE can be influenced by the age factor (Guyton & Hall, 2007). Based on the average age of respondents included in the adult age range 40-65 years of age i.e. mid (Potter & Perry, 2007). According to Jonah (Novarin, 2014) pulmonary function since childhood increase or increase in volume and reached a maximum at the age of 19-21 years which can be proven in value prediction table where the value of the APE APE will be reduced with increasing the age of a person, pulmonary function values after that continue to decline according to the growing age because with increasing age someone thus susceptibility to disease will increase. That is because the human biological system will decrease in berlahan due to a decrease in elasticity of the chest wall. The change of respiratory structures began in mid adulthood, and as you get chest wall elasticity, elasticity of the alveoli, and lung capacity is decreased as well as thickening of the bronchial glands will occur (Guyton & Hall, 2007) . These changes have an impact on the vulnerability to disease increases and easy going on respiratory tract infection that triggers the appearance of mucous that can mengobstruksi the respiratory tract. The presence of bstruksi that occur in the respiratory tract menurnkan can be the value of the APE (somebody (Potter & Perry, 2007) (Widiyani, 2015)).

Based on the theory of COPD Patients, have a fundamental inability to reach the normal air flow during breathing especially during the phase of ekspirasi. The inability of the patient in achieving normal air is caused due to an obstruction can result in respiratory lung easy to deflate so decreasing the flow or PEF ekspirasi peak. On a normal person in a State of rest, the influence of diaphragm movement of 65% and tidal volume. When ventilation is increased then used auxiliary respiratory muscles (such as the skalenus, the sternokleidomastoideus, the muscles supporting the spine) this happens when the vent beyond 50 l/min. In people with COPD there are airflow obstacles especially during the time of ekspirasi. In General lower diaphragm position and layout of the thoracic cage is very high so mechanically respiratory muscles work less effectively. COPD sufferers' diaphragm function is less than 35%, as a result of tidal volume sufferer always use auxiliary respiratory muscles. (Suprayitno, 2017)

Lung disease on the air flow at the time of the expenditure will decline due to the narrowing or obstruction of the road the breath. A person is said to be still within the bounds of a normal scale, if the value of his APE prediction between 80%-120%. APE is highly correlated with the vital capacity of the lungs or VEP (*Volume Ekspiratory Pulmonal*).

Based on the analysis of the researcher, that changes a person's respiratory structure began in mid adulthood. Increasing age will cause chest wall elasticity, elasticity of the alveoli and lung capacity is decreased as well as

thickening of bronchial glands occur. These changes have an impact on the increased vulnerability to disease and infection occurs readily in the respiratory tract so that it triggers the appearances of mucous that can mengobstruksi the respiratory tract. Obstruction that occurs in the respiratory tract may decrease the value of the PEF. A history of smoking had also become the founders of a decrease in PEF on the respondent. The more the number of cigarettes that are smoked and the longer be smokers will be even greater risk of experiencing a COPD. The content of the substances nicotine in cigarettes can decrease the function of the respiratory tract epithelial cells so that triggered inflammation and excess mucous expenditure resulting in airway breathe.

4. *Difference score of depression in COPD patients before and after treatment in the control group and group interventions on day to day – 1 – 12.*

The research results obtained a score of depression *pre test* values in the control group p *value* > 0.05 0.383, whereas in the intervention group value p *value* 0.000 < 0.05.

Similar statements with research conducted by the Damanik (2014) stated that there was influence the awarding practice PMR decline level of anxiety in patients with chronic kidney disease who underwent hemodialisa with a value of p *value*< 0.05 and the value t =-5.779. Similar results were also obtained from research conducted under the title *Effects of progressive muscular relaxation training on quality of life in patients after coronary artery anxious bypass graft surgery*, the effect of exercises conducted over the past 6 Sunday result can decrease anxiety and improve quality of life *(*Setyaningrum, 2015). Research by local sermsak dkk (2008) in Thailand with the title of the study "*Effects of Progressive Muscle Relaxation Training on Anxiety and Depression in Patients Enrolled in an Outpatient Pulmonary Rehabilitation Program*" obtained results that the PMR effective of lowering anxiety and depression in patients with chronic pulmonary disease significantly with p *value* < 0.0001. *Pursed lips breathing* to improve ventilation and abdominal muscles working and synchronize thoracic. As well as useful also to train ekspektorasi and strengthen the muscles of the secondary.

Research by Kim Young-Jae, et al (2010) titled "*Effects of Progressive Muscle Relaxation on Nausea, Vomiting, Fatigue, Anxiety, and Depression in Cancer Patients Undergoing Chemotherapy"* obtained the result that there is a decrease in statistically significant on anxiety and depression in the experimental group compared to the control group with the highest p *value* 0.008 < 0.05 for depression. Research by li Yunpin, et all (2015) entitled *"Progressive Muscle Relaxation Improves Anxiety and Depression of Pulmonary Arterial Hypertension Patients"*obtained the results that the PMR shows significant improvement in anxiety, depression, overall QOL, and mental component summary score QOL with Indigo p *value* 0.05 < domain but not the physical health. From some existing research results it can be concluded that the practice of PMR with PLB effectively used to decrease depression in patients with COPD.

Numerous studies show a higher prevalence of depression in patients COPD COPD is not compared. At the age of 40 years, there has been a process of degeneration and destruction of lung tissue and supporters due to exposure to chemicals such as smoking and other risk factors. To that end, anxiety at the age of 40 years will be different from 40 years and under. This can be due to the age of 40 in the top year was viewed as a period of biological degeneration disease and misery accompanied the realization that everyone will die. Therefore, the anxiety will death be psychological problems in patients with progressive and chronic disease such as COPD. In fact, age 40 years more aging process is accompanied by decreased metabolism and body durability so as to become vulnerable to the disease. However, nowadays many diseases that accompany the aging process can be controlled and treated. Examples of such diseases are asthma. Physical and psychological problems often found in patients above 40 years of age, especially the patient's airway disease. Psychological factors in them feelings of boredom, fatigue or feelings of depression (Nugroho, 2005).

According to Varcoralis (2000), a person who has a younger age was more prone to interference due to anxiety than someone older, but there are also argued to the contrary. It is related to one's personal maturity. Individuals who have personal maturity harder due to anxiety disorders experience because a individuals have power matur adaptation over anxiety. However, some authors also concluded that increasing the age of a person, then the higher the chances of such a person to experience anxiety. This can be caused by factors of vulnerability to disease, awareness of death, and loneliness. In General, loneliness is the most psychological problems experienced by seniors. Some of the causes of loneliness can be reduced a friend or relation, the death of the spouse, children who leave home because of some things, and others – other. It is this facet of seniors experiencing psychological problems which many psychics affect health, thus causing the elderly more likely experiencing anxiety and depression. Anxiety gives change psychologically and physiologically in patients. The physiological responses that accompany the anxiety include increased blood pressure, increased heart rate, palpitations, increased frequency of breathing, dry mouth, muscle tension and diarrhea. (' Uthman, 2016).

Analysis of researchers believe that some research has proven that exercise can reduce depression in PMR patients with Chronicle diseases as COPD patients so that the results of this research are increasingly strengthened that the PMR exercises plus with PLB is indeed effective at lowering depression.

5. *The difference in fatigue scores on COPD patients before and after treatment in the control group and group interventions on day to day – 1 – 12.*

Score *fatigue pre test* values in the control group p *value* > 0.05 0.176, whereas in the intervention group value p *value* 0.000 < 0.05. It brings the existence of significant influence towards score *fatigue* in respondents who was diagnosed with COPD.

It is similar with research by Yoon Kyung Choi of the year 2010 "*The Effect of Music and Progressive Muscle Relaxation on Anxiety, Fatigue, and Quality of Life in Family Caregivers of Hospice Patients"*, the group shows a difference of PMR significant in the period of pre and quality score *post test*. There is a significant correlation between anxiety and quality of life (r (32) =-. 75, p <. 01), anxiety and fatigue (r (32) =. 55, p <. 01), and fatigue and quality of life (r (32) =-, 53, p <. 01) and research conducted by Nuray Dayapog ˇ lu (2012) " *Evaluation of the Effect of Progressive Relaxation Exercises on Fatigue and Sleep Quality in Patients with Multiple Sclerosis "*, suggesting it has been determined that the PMR decreases the level of fatigue patients and improve the quality of their sleep, and These differences observed are statistically significant p *value* 0.05 < 0.001. But in contrast to research conducted by Kim Young-Jae, et al (2010) titled "*Effects of Progressive Muscle Relaxation on Nausea, Vomiting, Fatigue, Anxiety, and Depression in Cancer Patients Undergoing Chemotherapy"* obtained results that there is a statistically significant decrease in anxiety and depression in experimental group compared to the control group with the highest p *value* 0.008 < 0.05 for depression. However, there was no meaningful difference in nausea, vomiting, and fatigue between groups with a value of *fatigue* p *value* > 0.05 0.257.

According to research conducted by Kentson, et all (2016), experience fatigue among patients with COPD is primarily associated with the physiological and psychological factors. No clear relationship with the circumstantial factors such as age or gender, and despite slight differences in education levels between patients with and without fatigue, regression analysis was negative. These findings. Unlike the Kapella and his colleagues, who reported that fatigue was significantly correlated with age (Kapella et al. 2006). This study shows that fatigue is a common and important symptom in COPD patients. Experience functional limitations due to exhaustion and fatigue appear to be associated primarily with a combination of physiological and psychological factors that affect IE with dyspnoea, depressive. Symptoms of insomnia and problems as the most important factors related to the perception as well as the impact of fatigue. Overall, it seems that there is a stronger connection between the fatigue and psychological variables than on fatigue and physiological parameters in patients with stable COPD.

Based on theory, n uasana relaxes the body will make start relaxing, breath becomes slow and provide a positive influence to the overall circulatory system and the heart to rest and undergo a process of rejuvenation. The sympathetic nervous system which is always ready to receive secure messages to do relaxation while the parasympathetic nervous system will give response to relaxation. In addition to sympathetic nervous, messages for relaxation are also accepted by the endocrine glands that are responsible for most of the physical and emotional state. With such a PMR with the PLB may be applied in patients COPD as it can help in a downturn score *fatigue.*

Analysis the researchers notice any difference of opinion regarding the results of the research associated with *fatigue*, this can be caused because of different types of respondents, because cancer patients with fatigue is caused by process the disease itself with different patients COPD although the same – the same chronic diseases. Due to a diagnosis of cancer patients more feel that age will not be long, unlike the koping against chronic diseases such as COPD.

C. The Results of the Multivariate Analysis

1. *The effective implementation of the intervention Time PMR with PLB scores against depression.*

In the previous discussion has proven that the PMR with PLB can reduce depression in COPD patients with the results of the value of the p *value* 0.000 < 0.05. Next on the multivariate analysis will be analyzed time effectively implementing the intervention of PMR with the PLB over how many days of treatment. This is in line with the results of the study "*Effects of Progressive Muscle Relaxation Training on Anxiety and Depression in Patients Enrolled in an Outpatient Pulmonary Rehabilitation Program*" obtained the results that the PMR effectively lowers anxiety and depression in patients with chronic pulmonary disease significantly with p *value* < 0.0001. Multivariate analysis in this study uses the MANOVA test method with GLM – RM. That goal eventually is to find the optimum time for which a treatment. Through the image *plot* 5.1 shows a positive trend in which the graph shows the decline significantly but has not yet reached the optimum point.

According to researcher analysis it can happen because of the brevity of the given time i.e. during 12 days. But it seem that the measurements of each of the three days showed significant changes, i.e. the measurement of 3 to 4 and 5 to 6. Until the time of the study need to be added to the optimum results can be achieved from this intervention. This research is very helpful and can be used as reference in further research because of the existence of research that has yet to provide information on the day keberapa these interventions can decrease depression score results and reasons underlying the decline in this score. The underlying reason for the score decline in the literature is uncertain for sure, but the decline of this score could be influenced by a lot of stuff that is in compliance with the commitments of the respondents while doing exercise because of a strong desire to recover, routine control and taking medication provided, avoiding the main originator of factors namely smoking during the process of research, as well as a strong family support when the process of research. The awarding of the technique repeatedly and routinely done at home can make it easier for participants to become calm and decrease anxiety. Physiologically if a behavior is repeated continuously so nervous on the brain more quickly receive a response to relax and build up a *trace* in the brain due to repeated behavior that the longer will be the easier done (Azhar, 2008).

2. *The effective implementation of the intervention Time PMR with PLB scores against fatigue.*

In the previous discussion has proven that the PMR with PLB can reduce depression in COPD patients with the results of the value of the p *value* 0.000 < 0.05. These results are consistent with research conducted by Nuray Dayapog ˇ lu

(2012) "*Evaluation of the Effect of Progressive Relaxation Exercises on Fatigue and Sleep Quality in Patients with Multiple* Sclerosis", suggesting it has been determined that the PMR lower levels of fatigue patients and improve the quality of their sleep, and this difference statistically significant observed with a p value 0.05 < 0.001 On the previous discussion has proven that the PMR with PLB can lower fatigue in patients COPD.

Next on the multivariate analysis will be analyzed time effectively implementing the intervention of PMR with the PLB over how many days of treatment. Multivariate analysis in this study uses the MANOVA test method with GLM – RM. Through image shows positive trends 5.2 plot where the graph shows the decline significantly but has not yet reached the optimum point. Analysis of researchers, it can happen due to the short time i.e. during 12 days. But there are changes of ditiap 4 days measuring 4 to 5 and 7 to 8. Until the time of the study need to be added to the optimum results can be achieved from this intervention.

This research is very helpful and can be used as reference in further research because of the existence of research that has yet to provide information on the day keberapa these interventions can decrease depression score results and reasons underlying the decline in this score. The underlying reason for the score decline in the literature is uncertain for sure, but it can be caused by the body's reaction to stress result in respiratory nerve of someone who is experiencing stress may be interrupted for example breath It felt heavy and congested due to the narrowing occurs at the respiratory tract starting from the nose, throat and chest cavity muscles. And severe shortness of breath due to thoracic muscles (the muscles between ribs) experienced spasme and not or less elastic as usual. So rising gas diffusion, neuromuscular function of the O_2 and CO_2 for the better. Similarly to volume (fill) a minute for the same heart, O_2 taken and CO_2 emitted (diffusion gas) increases. With regular practice continuously, the efficiency of respiratory muscles increase lung ventilation, as evidenced by a decreasing frequency but amplitudonya (it) increases, until it reaches the respiratory frequency 8 times permenit time off on a trained person must pull out extra power to draw breath that cause fatigue. Although the sport is not able to return the deficit Physiology and structure on COPD, but it can reduce the patient's inability to repair durability through the body, breathing that is efficient, and tolerance of shortness of breath, especially on patients that his heavy damage.

3. *The effective implementation of the intervention Time PMR with PLB of APE*.

In the previous discussion of the obtained values of p *value* > 0.05 to 0.191 measurements *pre test* first day to *post a test* day to eleven, meaning that there is no significant difference between the value of a good APE *pre* or *post* intervention PMR with PLB from *pre test* first day to *post a test* day to eleven. So according to analysis the researchers inferred that the intervention can be given no effect value significantly to APE so not obtained also the effective time to measure it, due to changes in the value of the APE cannot happen within a short period but mebutuhkan quite a long time with the intense intervention.

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