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Relationship Of Sleep Quality With Fatigue In Chronic Obstructive Pulmonary Disease (COPD) Patients At Rantauprapat Regional General Hospital

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ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable disease characterized by persistent respiratory symptoms and airflow limitation. Disturbed sleep will not be able to restore and restore the condition of his body and cannot rest his body properly. This situation results in irritability, fatigue, dizziness, anxiety, and stress so that it will affect the quality of life of the patient. The purpose of this study was to identify the relationship between quality of life and fatigue in patients with Chronic Obstructive Pulmonary Disease (COPD) at the Rantau Prapat Regional General Hospital. The design of this study was quantitative with a cross sectional approach. The number of samples was 30 people with accidental sampling technique. The results of the study obtained the result of p value = 0.004. These figures show a very strong correlation between sleep quality and fatigue in patients COPD received. It is suggested that the results of this study can be used as policy-making material in improving health services for patients with Chronic Obstructive Pulmonary Disease (COPD).

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INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable disease, characterized by persistent respiratory symptoms and airflow limitation caused by airway or alveolar abnormalities usually caused by significant exposure to harmful particles or gases (Global Initiative for Chronic Obstructive Lung Disease, 2019). COPD is the most common lung disease and is often associated with a history of smoking and increasing age (Safka et al., 2017).

In 2018 the Global Burden of Disease (GBD) estimated 328 million people worldwide had COPD, 168 million men and 160 million women (*Lõpez Campos et al.*, 2018). In the United States, data for 2017 shows that the prevalence of COPD is 10.1% (SE 4.8), men are 11.8% (SE 7.9), and for women 8.5% (SE 5.8). While mortality ranked fourth most cause at 18.6 per 100,000 population in 2017, this mortality rate increased by 32.9% from 2000 to 2017. While the prevalence of COPD in Southeast Asian countries is estimated at 6.3% with the highest prevalence found in Vietnam (6.7%) and China (6.5%) (Oemiati, 2018). In Indonesia, the prevalence of COPD is estimated at 3.7% with the highest prevalence in East Nusa Tenggara (10.0%) and the lowest in Lampung (1.4%), while in North Sumatra (3.6%) (Ministry of Health of the Republic of Indonesia, 2018).

In patients with COPD there are mechanical disorders and gas exchange in the respiratory system and result in decreased physical activity in daily life. The condition of continuous obstruction of the respiratory tract will cause the diaphragm to flatten, disruption of respiratory tract contraction, so that its function as the main muscle of breathing is reduced. As compensation, there is continuous use of intercostal muscles and additional inspiratory muscles, causing symptoms of shortness of breath in COPD patients (Setiawan, 2018).

Peripheral airway obstruction reduces the lung's capacity for gas exchange, leading to hypoxemia and hypercapnia. The body's compensation mechanism in these conditions results in hyperventilation and hyperinflation, thereby reducing the capacity of inspiration and causing

shortness of breath (Yatun, et al 2016). Many COPD patients report that they experience sleep disturbances and fatigue more often than healthy people in general (Cormiers, 2010).

The condition of shortness of breath during sleep results in the reticular activation system (SAR) increasing and releasing catecholamines such as norepinephrine which causes the individual to wake up and results in sleep disturbances. Asthma, bronchitis and allergies alter breathing rhythms and disrupt sleep (Yatun, et al 2016). In the state of illness and hospitalization often occur two opposites, on the one hand sick individuals experience an increased need for sleep, on the other hand a person's sleep pattern disturbances can experience sleep pattern disturbances as a result of anxiety (Potter & Perry, 2010).

Sleep disorders can be life-threatening either directly such as hereditary and fatal insomnia, obstructive sleep apnea or indirectly such as accidents due to sleep disorders (Sutrisna, 2018). Patients with Chronic Obstructive Pulmonary Disease (COPD), although incurable and often irreversible, can be sought so that the progression of worsening respiratory function is slowed and exercise tolerance is improved. COPD management includes smoking cessation, immunization against influenza, pneumococcal vaccine, antibiotics, bronchodilators, corticosteroids, oxygen therapy, secretion control, as well as exercise and rehabilitation in the form of physical exercise, special breathing exercises and psychological assistance (M Ridho, 2017).

The existence of sleep disorders experienced by sufferers will certainly not be able to restore and restore the condition of his body properly and cannot rest his body properly. This situation results in irritability, fatigue, dizziness, anxiety, and stress so that it will affect the quality of life of the patient. Sleep disorders and insomnia can affect the quality of life because this is considered the mildest form of mental disorder, besides that in patients sleeping comfortably every day is one indicator of happiness that determines the degree of quality of life, if sufferers experience sleep disorders every day then it can be said that the quality of life is not good (IN Amalia, 2017).

Another important aspect of a person's sleep needs is circandian rhythm. The circandian rhythm is the body's response to the rhythm of the alternation of day and night. A common problem that occurs in sufferers is that they often wake up early, as a result become easily tired during the day and need more naps. An individual who feels exhausted due to not getting enough sleep will become irritable, and will cause confusion.

Lack of quality sleep in patients that cause fatigue almost every day which will make sufferers feel sleepy and interfere with activities. Many sufferers change their sleep time during the day, but this method actually eliminates the pleasure of sleep does not eliminate fatigue. Patients who experience fatigue due to poor sleep quality will not feel fresh, organs also cannot work optimally and experience a decrease in concentration due to fatigue. The term fatigue always refers to the condition of weakening a person's energy to perform an activity, although it is not the only symptom. Fatigue is a condition that starts from fatigue which then leads to mental or physical fatigue that can prevent a person from being able to carry out his functions within normal limits. This feeling of fatigue is more than just a feeling of fatigue and sleepiness, this feeling of fatigue occurs when a person has reached the limit of his physical or mental condition. Fatigue can reduce almost all physical abilities including strength, speed, reaction speed, and decision making. Symptoms of fatigue that can be seen are such as feeling heavy in the head, legs feel heavy, stiff and awkward in movement, tend to forget, feel pain in the back, tremors in the limbs, and feel unwell.

Based on an initial survey conducted at the Rantauprapat Regional General Hospital, the number of data on COPD patients in 2019 was 395 patients and in 2020 it increased to 475 patients. (Medical Record of Rantauprapat Hospital, 2020)

According to research by Riska Umi Yatun (2016), namely the Relationship between Expiratory Peak Flow Value (APE) and Sleep Quality in COPD Patients at Lung Specialist Poly B Jember Lung Hospital showed that the average APE value was 41.09% with details of more than half of the respondents (71.7%) having APE values in the red zone category. The average sleep quality

was 18.62 and fell into the poor category. The results of the data analysis showed a value of P = 0.000 which showed there was a significant relationship between the APE value and the sleep quality of COPD patients.

Likewise, with Elisa Anggeria's research, 2018, the effect of therapeutic exercise walking on the sleep quality of clients with chronic obstructive pulmonary disease (COPD) at Putri Hijau Medan Tk II Hospital that there is an average difference between pretest and posttest in sleep quality of 0.56, meaning that the average sleep quality on the posttest is better in the category than the average sleep quality on the pretest, Which means therapeutic exercise walking affects sleep quality in patients with chronic obstructive pulmonary disease with a p-value of 0.013. There is a significant effect of therapeutic exercise walking on sleep quality.

From the description above, that fatigue is caused by disturbed sleep quality and from the results of observation for one week it is estimated that fatigue can be reduced in intensity by improving sleep quality.

METHOD

This type of research is quantitative, descriptive, correlative or called *cross sectional*. This study aims to determine the relationship between sleep quality and fatigue in COPD patients. The study was conducted at Rantauprapat Regional General Hospital. The technique of taking the method of *Accidental Sampling technique* with a total sample of 30 people. The inclusion criteria in this study were patients who agreed to be respondents, COPD patients without comorbidities, and the age of COPD patients >20 to <65 years. The exclusion criteria in this study were patients who did not have other diseases and did not agree to be respondents. The measuring instruments used are the PSIQ (*Pittsburgh Sleep Quality Index*) questionnaire and the fatigue questionnaire. This study used a *chi square test* with a p value of <0.05 to determine whether or not there was a relationship between Sleep Quality and Fatigue in COPD Patients at Rantauprapat Regional General Hospital.

RESULTS AND DISCUSSION

Result

The results of this study showed that in the age category the majority of > 60 years old were 16 people (53.3%), the majority of education in the high school category was 16 people (53.3%), the majority of jobs were employed as many as 24 people (80.0%) and the majority of men were 22 people (73.3%).

Table 1 Frequency Distribution of Respondent Characteristics

No	Age	Frequency (n)	Percentage (%)
1	40-49 Years	5	16,7
2	50-59 Years	9	30,0
3	>60 Years	16	53,3
	Total	30	100
No	**Education**	**Frequency (n)**	**Percentage (%)**
1	SD	2	6,7
2	SLTP	8	26,7
3	SLTA	16	53,3
4	College	4	13,3
	Total	30	100
No	**Work**	**Frequency (n)**	**Percentage (%)**
1	Work	24	80,0
2	Not Working	6	20,0

	Total	30	100
No	**Gender**	**Frequency (n)**	**Percentage (%)**
1	Man	22	73,3
2	Woman	8	26,7
	Total	30	100

Based on table 2, the majority of respondents sleep quality in the poor category as many as 14 people (46.7%).

Table 2. Frequency Distribution of Respondents' Sleep Quality

No	Sleep Quality	Frequency (F)	%
1	Good	2	6,7
2	Light	4	13,3
3	Keep	10	33,3
4	Bad	14	46,7
	Total	30	100

Based on table 3, the majority of fatigue respondents in the fatigue category were 24 people (80.0%).

Table 3. Frequency Distribution of Respondents' Fatigue

No	Fatigue	Frequency (F)	%
1	Fatigue	24	80,0
2	No Fatigue	6	20,0
	Total	30	100

Based on table 4, the sleep quality of COPD patients was obtained in the good category without fatigue as many as 2 people (6.7%), sleep quality in the sufficient category without fatigue as many as 4 people (13.3%), sleep quality was lacking with fatigue as many as 10 people (33.3%) and poor sleep quality with fatigue as many as 14 people (46.7%)

By using computer assistance (SPSS program) version 20 in processing data on the relationship between Sleep Quality and Fatigue in COPD patients obtained the result of p value = 0.004. The figure shows a very strong correlation as it <0.05. Thus, it can be concluded that the hypothesis of the relationship between sleep quality and fatigue in COPD patients is accepted provided that p ≠ 0.

Table 4. Cross-Tabulation of the Relationship between Sleep Quality and Fatigue in COPD Patients at Rantauprapat Regional Hospital

Sleep Quality	**Fatigue**				**Total**		***p*Value**
	Fatigue		No Fatigue				
	f	**%**	**f**	**%**	**f**	**%**	
Good	-	-	2	6,7	2	6,7	0,004
Light	-	-	4	13,3	4	13,3	
Keep	10	33,3	-	-	10	33,3	
Bad	14	46,7	-		14	46,7	
Total	24	80,0	6	20,0	30	100	

Characteristics of Respondents

Age

Based on the results of the study, it can be seen that in the age category, the majority of > 60 years old are 16 people (53.3%). COPD often arises in middle age due to smoking for a long time. From several research results stated that COPD sufferers are on average over 60 years old, where there are physiological changes in aging lungs such as decreased pulmonary elastic recoil, stiffer chest walls and weakened respiratory muscle strength, and there is also a decrease in the sensitivity of aging respiratory centers to hypoxia or hypercapnia so that the ventilation response is reduced when there is airway obstruction (Kurniawan F D, 2019).

According to research by Oemiati (2013), COPD will have a negative impact on the quality of life of sufferers, including patients aged > 60 years will cause disability sufferers. But it cannot work optimally because of chronic shortness of breath. COPD morbidity will produce cardiovascular disease, bronchial cancer, lung infection, thromboembolic disorder, presence of asthma, hypertension, osteoporosis, joint pain, depression and axiety. This is in line with the research of Dini Dian Flowerenty (2015), Chronic Obstructive Pulmonary Disease (COPD) is a disease caused by respiratory airflow resistance that is partially reversible and progesive. In more advanced stages, COPD results in impaired activity tolerance, fatigue, loss of appetite, weight loss, and sleep disturbances. The occurrence of sleep disorders in COPD clients can affect sleep quality. Sleep quality consists of several components, including length of sleep, sleep disturbances, latent periods of sleep, sleep dysfunction during the day, sleep efficiency, subjective sleep quality, and use of sleeping pills.

Education

Based on Table 1 above, it can be seen that in the education category, the majority in the high school category were 16 people (53.3%). Education can influence a person, including behavior towards lifestyle, in motivating to be ready to participate in health changes. The lower the education of a person, the less desire to take advantage of existing health services. Education is a predisposing factor, namely factors that exist in individuals such as knowledge, attitudes towards health and the level of education where to behave healthily such as health checks for COPD patients. The results of the study also showed that with higher education also awareness to prevent risk factors for COPD is still lacking, namely the higher a person's education level, the easier a person receives information. Education status as one of the possibilities that affect a person's knowledge related to risk behavior to health such as smoking (F Setiawan, 2018).

Work

Based on the results of the study that in the job category the majority worked as many as 24 people (80.0%). This type of work can indirectly describe the daily physical activity of the patient. Activities carried out while working can cause the body to feel tired and make it difficult for a person to reach the REM phase during sleep at night so it is difficult to have good sleep quality. The category of work on respondents can increase the risk of developing COPD due to the presence of toxic organic dust syndrome and exposure to various pollutants that are outdoors.

Gender

Based on the results of the study, it can be seen that in the gender category, the majority of men were 22 people (73.3%). This is related to men with COPD is with smoking habits that are high enough so that it will affect the results of this study. Smoking habits were more male-dominated and this was common in the environment surrounding the study.

Relationship between Sleep Quality and Fatigue in COPD Patients

Based on the results of statistical analysis research obtained the quality of sleep of COPD patients in the good category without fatigue as many as 2 people (6.7%), sleep quality in the sufficient category without fatigue as many as 4 people (13.3%), poor sleep quality with fatigue as many as 10 people (33.3%) and poor sleep quality with fatigue as many as 14 people (46.7%). By using computer assistance (SPSS program) version 20 in processing data on the relationship between Sleep Quality and Fatigue in COPD Patients, the result of p value = 0.004 was obtained. The figure shows a very strong correlation as it <0.05. Thus, it can be concluded that the hypothesis of the relationship between sleep quality and fatigue in COPD patients is accepted provided that $p \neq 0$.

Lack of quality sleep in patients that cause fatigue almost every day which will make sufferers feel sleepy and interfere with activities. Many sufferers change their sleep time during the day, but this method actually eliminates the pleasure of sleep does not eliminate fatigue. Patients who experience fatigue due to poor sleep quality will not feel fresh, organs also cannot work optimally and experience a decrease in concentration due to fatigue.

This is in line with the research of Riska Umi Yatun, 2016, namely the Relationship of Expiratory Peak Flow Value (APE) with Sleep Quality in COPD Patients at Lung Specialist Poly B Jember Lung Hospital showing the results of the study the average APE value was 41.09% with details of more than half of the respondents (71.7%) having APE values in the red zone category. The average sleep quality was 18.62 and fell into the poor category. The results of the data analysis showed a value of P = 0.000 which showed there was a significant relationship between the APE value and sleep quality of COPD patients. Likewise, with Elisa Anggeria's research, 2018, the effect of therapeutic exercise walking on the sleep quality of clients with chronic obstructive pulmonary disease (COPD) at Tk Ii Putri Hijau Medan Hospital that there is an average difference between pretest and posttest in sleep quality of 0.56, meaning that the average sleep quality in the posttest is better in the category than the average sleep quality in the pretest, Which means therapeutic exercise walking affects sleep quality in patients with chronic obstructive pulmonary disease with a p-value of 0.013. There is a significant effect of therapeutic exercise walking on sleep quality.

CONCLUSION

The characteristics of respondents in the majority age category are > 60 years old, the majority of education is in the high school category, the majority of occupations are working, and the majority of gender is male. The frequency of sleep quality of the majority of respondents in the poor category. The frequency of fatigue of respondents is mostly in the fatigue category. There is a very strong correlation between sleep quality and fatigue in COPD patients.

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