Characteristics and Degree of Dyspnea that Happened in COPD Patients Using Modified Medical Research Council (mMRC) Method at Dustira Cimahi Hospital

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Abstract—**Chronic Obstructive Pulmonary Disease is characterized by persistent airflow resistance. The degree of breathlessness in each patient can be measured by Modified Medical Research Council (mMRC) questionnaire. This study was descriptive by interviewing COPD patients. This study has been done on 45 patients at Dustira Hospital pulmonary clinic and ward in December 2018. The data obtained from questionnaires and medical records were presented in the descriptive form and arranged in table form using the SPSS application. The result in the pulmonary clinic, most patients are in mMRC grade 0 there are 13 patients (52%) and, mMRC grade 1 there are 10 patients (40%). While in the pulmonary ward, most patients are in mMRC grade 2 and 3 there are 8 patients (40%). Based on the characteristics, there are 15 patients (33,3%) up to 70 years old, 29 patients (64,4%) are male, 18 patients (72%) are had last educated in high school, and 31 patients (68,9%) didn't work. The result of this study concluded that the characteristics of COPD patients consisted of age, gender, occupation, and degree of smoking which were risk factors for COPD. The degree of breathlessness measured using the mMRC method is different for each patient. This result occurs because the breathlessness is qualitatively different in each COPD patient.**

Keywords—degree of breathlessness, chronic obstructive pulmonary disease, modified medical research council

I. Introduction

Chronic Obstructive Pulmonary Disease is a progressive chronic lung disease characterized by persistent airflow obstruction. This is caused by chronic inflammation due to exposure to toxic substances, oxidant and antioxidant dysregulation, protease imbalance, and antiprotease [1,2].

The typical symptoms of COPD are shortness of breath and chronic cough that is persistent and gets worse with activity [3]. Research conducted by Andayani et al with 49 respondents at the Banda Aceh Regional Hospital, found the degree of shortness of breath of chronic obstructive pulmonary disease, the majority of respondents with a percentage of 28.6% experienced shortness of breath in grade 3, namely the need to rest to take a breath every 30m of walking (100 yards) on a flat road or after walking a few minutes [4].

The chronic obstructive pulmonary disease has risk factors including smoking. The number of smokers who are at risk of suffering from COPD ranges from 20-25%. Host factors such as gender, education, socioeconomic status, employment status. Jobs that are at risk of developing COPD include jobs exposed to dust such as coal workers, factory workers, construction workers, gold miners, bricklayers, welders, and drivers [5].

Symptoms of shortness of breath should be routinely evaluated in every COPD patient. Shortness of breath is usually assessed by calculating lung function using spirometry. Spirometry is important for evaluating the course of the disease but in some places spirometric equipment is not available so that other ways are needed, such as looking at complaints of shortness of breath, to assess the progression and course of COPD disease [6].

The degree of shortness of breath in COPD patients can also be measured using the Modified Medical Research Council (mMRC) questionnaire [7]. The MRC examination is

an applicable examination adapted to clinical work so that it can be used as a support in determining the management of shortness of breath. The MRC examination is carried out based on a particular patient's ability to make a physical effort or daily activities [8].

The World Health Organization (WHO) stated that in 2002 COPD was the fifth leading cause of death in the world. According to WHO, as many as 65 million people suffer from moderate or severe COPD and more than 3 million people die from COPD and it is estimated that the number three cause of death in 2020 is coronary heart disease and stroke. This means that 5% of deaths in the world are caused by COPD. Chronic Obstructive Pulmonary Disease (COPD) is one of the challenges for medical personnel because it is a cause of morbidity and mortality in the world [1,8].

In Asia, 56.6 million people suffer from moderate to severe COPD, with the highest incidence in Vietnam at 6.7%. Indonesians who suffer from COPD, namely 3.7% with the highest incidence rate are in the province of Nusa East Southeast (10.0%), while the lowest incidence was in the province of Lampung (1.4%). West Java is one of the provinces that has a population with COPD (4.0%). 10 In 2014 in the city of Cimahi it was recorded that as many as 1,426 patients suffered from COPD disease [9].

Based on the description above, the researchers are interested in further researching the characteristics and degrees of shortness of breath in chronic obstructive pulmonary disease (COPD) patients using the Modified Medical Research Council (mMRC) method at Dustira Cimahi Hospital, because there has not been any research done at Dustira Cimahi Hospital and it is important to determine the degree of disease for COPD sufferers in various health service places. using the mMRC method and the data taken is the latest data. This research is also expected to be used as an evaluation material regarding the treatment that has been carried out at the Dustira Cimahi Hospital.

II. METHODS

The research design that has been carried out is a descriptive design. The method of this study was collected and measured data through interviews with COPD patients at the Polyclinic and Lung Ward of Dustira Hospital, Cimahi. The subjects in this study were the patients of COPD at Dustira Hospital for the period December 2018.

The sampling method used consecutive sampling at the Polyclinic and Lung Ward of the Dustira Cimahi Hospital for the period of December 2018. The number of samples that met the inclusion criteria during the December 2018 period was 45 people.

The inclusion criteria in this study were patients diagnosed with COPD by pulmonary disease specialists at the Polyclinic and Lung Ward of Dustira Cimahi Hospital and willing to take part in research and fill out informed consent.

The variable studied was the degree of shortness of breath using the mMRC method in COPD patients. Data processing was carried out using Statistical Product and Service Solution and presented in table form which is discussed descriptively.

III. RESULTS AND DISCUSSION

This study was conducted on 45 COPD patients at Dustira Cimahi Hospital for the period December 2018 who met the study inclusion criteria. This study aims to describe the characteristics and degrees of shortness of breath in chronic obstructive pulmonary disease (COPD) patients using the Modified Medical Research Council (mMRC) method at Dustira Cimahi Hospital for the period December 2018.

TABLE I. CHARACTERISTICS OF RESEARCH SUBJECTS BY AGE

Variables	Frequency (n)	Percentage (%)
Age		
41-45 yo	1	2.2
46-50 yo	5	11.1
51-55 yo	2	4.4
56-60 yo	9	20
61-65 yo	9	20
66-70 yo	4	8.8
>70 yo	15	33.3
Total	**45**	**100.00**

The data in Table 1 shows that most of the research subjects were >70 years old, namely as many as 15 people (33.3%), 9 people aged 56-60 years (20%) and 61-65 years (20%), 5 people aged 46-50 years(11.1%), 4 people aged 66-70 years (8.8%), 2 people aged 51-55 years (4.4%), and 1 person aged 41-45 years (2.2%).

The result of this study are following the research conducted by Octaria in 2010 at RSUD Dr. Moewardi Surakarta that the majority of COPD patients aged> 60 years amounted to 62.9% [9]. Following the results of research by the Global Initiative for Chronic Obstructive Lung Disease, which shows that the risk factors for COPD, one of which is the host factor, including age. The age at the incidence of COPD was dominated by the age group ≥ 45 years [1].

This result probably occurs because in elderly patients there has been a change in the form of a decrease in the physiological ability of the lungs. Aging is thought to be a pro-inflammatory condition associated with dysregulation of the immune system. Because excessive tissue and systemic inflammation are important in the pathogenesis of COPD, the immunologic changes in COPD may overlap with age [10,11].

TABLE II. CHARACTERISTICS OF RESEARCH SUBJECTS BY GENDER

Variables	Frequency (n)	Percentage (%)
Gender		
Male	29	64.4
Female	16	35.6
Total	**45**	**100.00**

The data in Table 2 shows that most of the research subjects were male, namely as many as 29 people (64.4%), and the rest were female as many as 16 people (35.6%).

The results of this study are following the results of Permatasari's research. In this study, it was found that the sex distribution of COPD patients who underwent outpatient care at the Arifin Achmad Regional Hospital of 60 COPD patients was 55 (91.7%) male. This shows that risk of COPD patients is more at risk in men [11]. Following this study, the research conducted by Almagro et al. in 2010 stated about comorbidity and relationships gender differences in COPD patients who were admitted to the hospital showed that from 398 patients, 352 (89%) were male and 45 (11%) were female [12].

This may be related to men's lifestyles and cigarette consumption, because of the social influence and views of smoking in a society where there are more male smokers than female smokers. Women who smoke are seen as more of a negative behavior [13].

TABLE III.   CHARACTERISTICS OF RESEARCH SUBJECTS BY EDUCATION

Variables	Frequency (n)	Percentage (%)
Education		
Elementary	1	2.2
Junior High	6	13.3
Senior High	30	66.7
College	8	17.8
Total	**45**	**100.00**

The data in Table 3 shows that most of the research subjects were Senior high graduate as many as 30 people (66.7%), 8 people were college graduate (17.8%), 6 people were junior hih graduate (13.3%), and 1 person was elemantary graduate (2.2%).

The results of this study are different from the research conducted by Suprayitno, where the majority of 30 respondents had education <SLTP as many as 24 people (80.0%) and far from the respondents who had education> SLTP were 6 people (20.0%) [4]. Although the results of the educational level of the research are different, the results of this study still show that the level of education is less. The level of education is less likely to behave at risk of COPD, for example, smoking due to their ignorance of the health hazards caused by smoking [14].

TABLE IV.   CHARACTERISTICS OF RESEARCH SUBJECTS BY PROFESSION

Variables	Frequency (n)	Percentage (%)
Profession		
Government Employees	4	8.9
Private Employees	4	8.9
entrepreneur	4	8.9
Unemployees	31	68.9
Other	2	4.4
Total	**45**	**100.00**

The data in Table 4 shows that most of the research subjects were unemployees as many as 31 people (68.9%), 4

people were college government employees (8.9%), private employees (8.9%), entrepreneur (8.9%), and 2 people were other profession (4.4%).

These results indicate that the majority of COPD patients are unemployed or most are retirees. This is consistent with research conducted by several studies which stated that most patients undergoing COPD treatment in hospitals are retired [10,11,15,16]. The occupational distribution of COPD patients who do not work may also occur because many patients are elderly so many have retired [11,15].

TABLE V.   CHARACTERISTICS OF RESEARCH SUBJECTS BY SMOKER STATUS

Variables	Frequency (n)	Percentage (%)
Smoker Status		
Non Smoker	17	37.8
Smoker	28	62.2
Total	**45**	**100.00**

TABLE VI.   CHARACTERISTICS OF RESEARCH SUBJECTS BY SMOKING DEGRREE

Variables	Frequency (n)	Percentage (%)
Smoking Degree		
Light Smoker	8	28.6
Moderate Smoker	9	32.1
Heavy Smoker	11	39.3
Total	**28**	**100.00**

The data in Tables 5 and 6 shows that most of the research subjects were a smoker as many as 28 people (62.2%). 11 of the smoker were heavy smoker (39.3%), 9 of the smoker were moderate smoker (32.1%), and 8 of the smoker were mild smoker (28.6%).

These results are consistent with research conducted by Prabaningtyas in 2010 regarding the relationship between smoking degrees and COPD degrees, showing that the tendency for COPD patients to have a history of smoking was mild to moderate. History of heavy smoking can affect (73.10%) more than non-COPD (26.90%) [10].

The smoking habit is the most important cause of COPD, far more important than any other cause. Cigarette smoke has a high prevalence as a cause of respiratory symptoms and pulmonary function disorders [6].

The results of this study indicate that even light smoking habits are at risk for COPD. COPD patients are closely associated with smoking. As the results of the research conducted by Nia, it was stated that the distribution of COPD patients who underwent outpatient treatment at the Arifin Achmad Regional Hospital, seen from their smoking status, was obtained from 60 COPD patients, as many as 48 (80%) of whom were former smokers [11].

Active smokers have a higher prevalence of respiratory symptoms, pulmonary function abnormalities, and higher mortality than nonsmokers. Environmental tobacco smoke (ETS) or second-hand smoke can also experience respiratory

and COPD symptoms because the irritating particles are inhaled, causing the lungs to "burn" [10].

TABLE VII.   DISTRIBUTION OF DEGREE OF SHORTNESS OF BREATH IN
LUNG POLYCLINIC

Variables	Frequency (n)	Percentage (%)
Degree of mMRC		
mMRC stage 0	13	52
mMRC stage 1	10	40
mMRC stage 2	2	8
mMRC stage 3	0	0
mMRC stage 4	0	0
Total	**25**	**100.00**

The data in Table 7 shows that most of the research subjects at Lung Polyclinic had stage 0 of mMRC, as many as 13 people (52%), 10 people had stage 1 of mMRC (40%), and 2 people had stage 2 of mMRC (8%) and there was none at stage 3 and 4 of mMRC.

Based on the theory, shortness of breath in stage 0 occurs when shortness of breath occurs when doing strenuous activities involving the sternum [1,17]. The results of Risilwa's research with the title Relationship Degree of Shortness of Breath of COPD Patients according to the mMRC questionnaire on the Degree of Outpatient COPD Disease at Lung Poli Hospital Banda Aceh stated that the stage of shortness of breath 0 and 1 were dominated by the degree of COPD [18].

The results of this study were different from the results of Anwar's research which was conducted at the Dr. Lung Polyclinic. M. Djamil Padang in 2012 stated that the degree of shortness of breath was dominated by stage 2 as much as 44% and stage 3 by 32% and the lowest was in stage 0 and 4 [6].

According to the literature, COPD sufferers begin to feel shortness of breath after entering grade II so they will have their health checked at the hospital. Grade I chronic obstructive pulmonary disease is the mildest and these patients are not aware of decreased lung function 3 so rarely go to the hospital [6].

TABLE VIII.   DISTRIBUTION OF DEGREE OF SHORTNESS OF BREATH IN
LUNG WARD

Variables	Frequency (n)	Percentage (%)
Degree of mMRC		
mMRC degree 0	0	0
mMRC degree 1	2	10
mMRC degree 2	8	40
mMRC degree 3	8	40
mMRC degree 4	2	10
Total	**20**	**100.00**

The data in Table 8 shows that most of the research subjects at Lung Ward had stage 2 and 3 of mMRC, as many as 8 people (40%), 2 people had stage 4 of mMRC (10%), and 2

people had stage 1 of mMRC (10%) and there was none at stage 0 of mMRC.

The theory states that the degree of shortness of breath in grade I patients experience slight shortness of breath when in a state of anxiety or shortness of breath occurs when walking fast on a flat floor, or if walking on a slightly sloping place [1,3,4]. COPD patients in this study generally expressed anxiety. Following Kunik's research, which stated that each COPD patient generally had symptoms of anxiety and depression symptoms at the same time, namely as many as 862 patients (65%) [4].

The results of research conducted by Andayani et al., the degree of shortness of breath through limited physical activity as measured by the MMRC questionnaire has a significant relationship and correlation (P-value 0.003) to patient anxiety. Which is dominated by grade 2 (24.4%) and 3 (2.6%). COPD patients generally complain of symptoms of shortness of breath which tend to get worse, causing anxiety and depression. So that it had a bad impact resulting in respiratory problems [4].

Shortness of breath is qualitatively different for each COPD patient and is highly dependent on the form of physiology that occurs which of course varies with the disease. heterogeneous and complex [18].

IV. CONCLUSION

Based on the results of research conducted by researchers, it can be concluded that based on the description of the characteristics of COPD patients, it was found that most of the COPD patients at Dustira Cimahi Hospital were in the> 70 years, namely 15 people (33.3%) category with the majority being male, namely 29 people (64.4%). Most of the patients was high school graduate, namely 30 people (66.7%) and were unemployed, namely 31 people (68.9%).

Total of 17 COPD patients at Dustira Cimahi Hospital did not smoke and most of the patients who smoked, namely 11 people (39,3%) were heavy smokers. Based on the degree of shortness of breath in COPD patients at the Lung Polyclinic of Dustira Cimahi Hospital, most of them, namely 13 people (52%) were in grade 0 and most of the COPD patients in the Lung Ward of Dustira Cimahi Hospital, namely 8 people (40%) were mostly in grade 2 and 3.

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