Depression in patients with stable chronic obstructive pulmonary disease: a cross-sectional study in the national center for respiratory diseases in Indonesia

Depresia la pacienții cu bronhopneumopatie cronică obstructivă stabilă: studiu transversal în centrul național pentru boli respiratorii din Indonezia

Abstract

Background: Chronic obstructive pulmonary disease (COPD) is a major cause of morbidity and mortality in the world, including Indonesia. It can cause comorbidities such as osteoporosis, heart failure, diabetes, and depression. Depression is a common comorbidity affecting COPD patients, unfortunately, this comorbidity is often mis- or under-diagnosed.
Objective: The purpose of this study is to reveal the prevalence of depression in stable COPD patients in Persahabatan Hospital Jakarta and its associated factors.
Methods: This is a cross-sectional study in which stable COPD patients who visited COPD Outpatient Clinic in Persahabatan Hospital Jakarta and met the inclusion and exclusion criteria were asked for a history of disease, physical examination, lung function test and underwent Mini International Neuropsychiatric Interview Version (MINI) ICD 10.
Results: One hundred and forty-one patients were enrolled in this study. Prevalence of depression was 19.1%. Subjects with moderate-high COPD assessment test (CAT) score ≥ 10 have 14 times higher risk of having depression (p<0.001) compared to subjects with mild CAT score (< 10). There was a statistically significant association between symptoms-based COPD group (p<0.001), smoking status (p<0.007) and Brinkmann index (p<0.026) with depression. We found no statistically significant association between risk-based COPD group (p=0.799) and airflow limitation (p>1.000) with depression.
Conclusion: The prevalence of depression in stable COPD patients in Persahabatan Hospital Jakarta was 19.1%. There was a statistically significant association between symptoms-based COPD group, smoking status, and Brinkmann index with depression in stable COPD patients.
Keywords: COPD, depression, prevalence, stable

Rezumat

Introducere: Bronhopneumopatia obstructivă cronică (BPOC) este o cauză majoră de morbiditate și mortalitate în lume, inclusiv în Indonezia. Ea poate cauza comorbidități ca osteoporoza, insuficiența cardiacă, diabet și depresie. Depresia este o comorbiditate comună ce afectează pacienții cu BPOC, fiind din păcate adesea subdiagnosticată.
Obiectiv: Obiectivul acestui studiu a fost de a identifica prevalența depresiei și factorii asociați la pacienții cu BPOC stabil din Persahabatan Hospital Jakarta.
Metodă: Acesta este un studiu transversal, în care pacienții cu BPOC stabil care s-au prezentat la ambulatoriul spitalului și au întrunit criteriile de includere și de excludere au fost interogați cu privire la istoricul bolii, făcându-li-se examen clinic și teste funcționale și aplicându-li-se chestionarul Mini International Neuropsychiatric Interview versiunea (MINI) ICD 10.
Rezultate: Au fost înrolați 141 de pacienți. Prevalența depresiei a fost de 19,1%. Pacienții cu test CAT de evaluare a BPOC cu scor ≥10 au un risc de 14 ori mai mare pentru depresie (p<0,001) față de subiecții cu scor CAT ușor (<10). Există o asociere statistic semnificativă a depresiei cu grupul BPOC bazat de simptome (p<0,001), statutul de fumător (p<0,007) și indicele Brinkmann (p<0,026). Nu am găsit nici o asociere semnificativă a depresiei cu grupul BPOC bazat pe risc (p=0,799) și limitarea funcțională (p>1.000).
Concluzie: Prevalența depresiei la pacienții cu BPOC stabil în Persahabatan Hospital Jakarta a fost de 19,1%. Există o asociere semnificativă a depresiei cu grupul BPOC bazat pe simptome, statutul de fumător și indicele Brinkmann.
Cuvinte-cheie: BPOC, depresie, prevalență, stabil

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Abbreviations: *CAT, COPD Assessment Test; CES-D, Center for Epidemiologic Studies of Depression; COPD, chronic obstructive pulmonary disease; FEV1, first second of forced expiratory volume; FVC, forced vital capacity; GOLD, Global Initiative for Chronic Obstructive Lung Disease; HADS, Hospital Anxiety and Depression Scale.*

Author's contribution: *N.N. Rosrita collected the subjects, conducted the study, performed statistical analysis, and approved the manuscript. F. Yunus designed the study, drafted the manuscript and approved the manuscript. T.T. Ginting conducted the study, critically reviewed the manuscript and approved the manuscript. F. Nurwidya performed statistical analysis, wrote the manuscript and approved the manuscript.*

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a major cause of morbidity and mortality in the world with an increasing incidence[1]. Global Initiative for Chronic Obstructive Lung Disease (GOLD) defines COPD as a disease that can be prevented and marked by a progressive and partial irreversible obstruction of the air passage and also has a correlation to pulmonary inflammation as a response to a particle or noxious agents[2].

COPD has several comorbidities including depression[3]. Depression is an emotional disturbing experience that commonly occurs in COPD patients[4]. This could happen because COPD patients have physical damage and prolonged unpleasant symptoms like shortness of breath and productive cough during their illness[5-7]. Unfortunately, depression in COPD patients commonly has been misdiagnosed or undiagnosed in healthcare.

The mechanism of depression in COPD has not been fully understood, but it is suspected to be correlated with multiple factors. The evidence showed that systemic inflammation that results in an increased level of interleukin-6 (IL-6) seems to be the main factor to cause depression in humans and animals[3]. Reactive depression is associated with decreasing degree of patient health, age, smoking, and hypoxemia of brain function[8]. The chronic disease itself is a cause of depression and source of patient anxiety[9]. Some situations that can cause depression in COPD patients such as shortness of breath, incapability to do something, social activity, fear, feeling useless in life and decreasing sexual ability[10].

The objective of our study here is to reveal the depression prevalence in stable COPD patients who visited the COPD Outpatient Clinic in Persahabatan Hospital, a national reference hospital for respiratory medicine in Indonesia. In particular, we aimed at the understanding the degree of COPD that usually comes with depression and the association between smoking status, Brinkmann Index, and airway obstruction degree with the depression in COPD patients.

Methods

Study design

This is a cross-sectional study in which 141 stable mild to very severe degree of COPD subjects were enrolled by consecutive sampling. This study was performed during March – October 2015 at the COPD Outpatient Clinic of Persahabatan Hospital, Jakarta. All patients participating in this study provided written informed consent for the use of their medical data. This study protocol was approved by the University of Indonesia Ethical Committee.

Sampling method

A sample of this study was stable COPD patients that had met the research criteria and recruited by a consecutive sampling. Patients were assessed for their history of illness, and subjected to physical examination, lung function test and COPD Assessment Test (CAT). Data regarding the patients' baseline characteristics were collected, including age, gender, and smoking history.

Based on GOLD criteria, the patients were categorized into group A, B, C or D. We excluded patients who have been diagnosed as having depression before COPD was established and patients who have received antidepressant agent for more than 6 months.

Questionnaire

Interview using Mini International Neuropsychiatric Interview Version (MINI) ICD 10 questionnaire was performed to screen depression in COPD patients. This questionnaire has been validated by the Ministry of Health of the Republic of Indonesia. The interviewer had already received the instructional course from psychiatric consultant and after a period of under supervision, its competency to do interview independently has been verified. A subject that met criteria for depression was offered some options for depression management.

Statistical method

We used the Fisher's exact test to compare patient characteristics. All p-values <0.05 were considered statistically significant. All statistical analyses were performed using SPSS ver. 15.0 for Windows (Chicago, IL, USA). Odds ratio (OR) for depression and the confidence intervals (CI) were calculated.

Results

Patient characteristics

In the current study, 141 with stable COPD were enrolled of which 130 subjects were males (92.9%) and 10 subjects were female (7.1%). The largest group was of the age of 65 and above (69 subjects; 48.9%), followed by subject group between age of 50 up to 65 (66 subjects; 46.8%) and less than age of 50 (6 subjects; 4.25%). The largest category of CAT category was moderate to severe (101 subjects; 71.6%). The result of lung function test showed that the most common was a moderate obstruction (74 subjects, 52.5%) and the patients fall in COPD group B (50 subjects; 35.4%). The majority of patients were former smokers (122 subjects; 86.5%) and the common result for Brinkman index was moderate grade (66 subjects; 15.6%) (Table 1).

Prevalence of depression and associated factors in stable COPD patients

The depression prevalence rate in this study was 19.1% (Table 2). This study found a relationship between CAT and depression (p=0.001). Subjects with the category of moderately severe CAT had a 14 times higher risk for getting depression compared with mild CAT. Based on the GOLD classification, this study found that most subjects with depression were COPD group B and COPD group D, for each group was about 13 subjects (26.5%). The number of depression subjects in COPD group A was only 1 subject (5.0%) and there was no subject with depression in COPD group C. Subjects with COPD with more symptoms were getting 15 times more depression than the COPD group with the less symptom (p<0.001). There was no association between risk-based COPD groups with depression (p>0.799).

Smoking status in this study was divided into ex-smoker, non-smoker, passive smoker and active smoker. Subjects active smoker and passive smoker were classified into "Yes" cigarette exposed in this study (n=11) the number of depression subjects

Table 1 Clinical characteristics of subjects

Variable	n	%
Gender		
Male	131	92.9
Female	10	7.1
Age group		
< 50 years old	6	4.2
50-65 years old	66	46.8
> 65 years old	69	48.9
CAT score		
Mild (< 10)	40	23.6
Moderate-severe (≥ 10)	101	71.6
Obstruction degree		
Moderate	74	52.5
Severe	66	46.8
Very severe	1	0.7
COPD group		
A	20	14.1
B	50	35.4
C	22	15.6
D	49	34.7
Smoking status		
Never smoker	5	3.5
Former smoker	122	86.5
Active smoker	7	4.9
Passive smoker	7	4.9
Brinkman index		
Mild	22	15.6
Moderate	66	46.8
Severe	53	37.5
Depression		
Yes	27	19.2
No	114	80.8

was 6 persons. Ex-smoker and non-smoker were classified into "No" cigarette exposed (n=130) the number of depression subjects was 21 persons. This study has found that COPD patients with "yes" cigarette exposed category had a 6 times higher risks to get depression compared with no cigarette exposed (p<0.007). This study has also found an association between the duration of smoking and the number of cigarettes (Brinkman Index), and the incidence of depression. COPD patients that had severe Brinkman Index had a 3.6 times higher risks to have depression (p<0.026).

The classification of spirometry results among subjects with depression based on GOLD criteria was moderate obstruction in 14 persons (9.9%) and severe obstruction in 13 persons (9.2%). There were no mild and very severe obstruction results found in this study. This study found there was no relationship between spirometry value and depression in stable COPD subjects (p>1.000).

Discussion

The rate of depression prevalence in COPD stable patients using MINI ICD-10 in this study was 19.1%. De, et al. in India found the rate of depression prevalence was 72% and Bhowmik found 86%[11]. The first study was done by Chung, et al. in Hong Kong[12]. They found the

prevalence of COPD in outpatients and stable hospital-ized patients was 61.6%. Iguchi, et al. found the depression prevalence in COPD stable patient was 48.6%[13]. A study conducted in Netherlands, van Ede, et al. found the depression prevalence during 1966 – 1997 was in the range of 6% - 42%[14]. Moreover, van Manen et al found the prevalence of depression was 21.6%[10]. A longitudi-nal cohort study performed in the United States by Katz, et al. found the prevalence of depression in COPD stable patients using phone interviewing in the first, second and third year of the study was 42%, 36.8%, and 36.4%, respectively[15].

The variation between these results may be a result of different screening tools employed. Hayashi, et al. found the rate of depression prevalence in COPD stable patients with Center for Epidemiologic Studies of Depression (CES-D) and Hospital Anxiety and Depression Scale (HADS) as the screening tool was 29.8% (n=30) and 40.5% (n=53) respectively[16]. This implied that using different screening tools would lead to different results. Our study here involved stable COPD patients in outpatient clinic and direct interviewing method, meanwhile another study used secondary data from published reports and phone inter-viewing method as the method of sampling.

The varied results could be caused by demographic char-acteristics, such as age, economic status, and the differen-tial subject social environment. Another study found that a person with a low degree of education, a specific gender, a person who lives alone has a risk factor for depression in case of COPD patients[17-18]. Laurin, et al. found the preva-lence of depression was 18% in stable COPD female patients in two different hospitals[19]. The prevalence of depression in females was higher than in male patients.

According to GOLD classification, the B and D group are patients who have reduced airflow (FEV1/FVC) with increased frequency of exacerbations. This study found that subjects in group B and D had 14 times risk to have depres-sion. Lee et al. stated that CAT score had a significant rela-tion with depression and could be a good predictor to have a depression in COPD patients[20]. Junior, et al. noticed that CAT > 20 was a predictor to have a depression in COPD patients with mild hypoxemia[21]. The difference of CAT score between the current study and Junior's study may be because Junior's study had done the measurement of the oxygen level in the subjects that was not done in this study.

This study also found that cigarette exposed subjects had a higher risk of having depression. A prospective study by Lou, et al. evaluated the death risk among sub-ject with depression and COPD based on smoking status and duration of smoking (years)[22]. The result was that smoker subjects had an increased risk of death 3.8 times higher than the non-smoker subjects. Our study found that COPD patients with severe Brinkman Index had a 3.6 times higher risk of having depression compared to mild Brinkman Index (p<0.026).

This study found no association between airway obstruc-tion with depression (p>1.000). This result was consistent with other studies by Marco, et al.[23], Wust, et al.[24], Lee, et al.[20], that also found no association between FEV1 and

Table 2 Association of COPD-related variables with depression

Variables		Depression YES	Depression NO	OR (CI)	P (Fisher)
CAT score	Moderate-severe CAT (≥ 10) Mild CAT (≥ 10)	26 1	75 39	13.5 (1.7-18.4)	0.001
Symptoms-based COPD group	B-D (more symptom) A-C (less symptom)	26 1	73 41	14.6 (1.9-21.3)	0.001
Risk-based COPD group	C-D (high risk) A-B (low risk)	13 14	58 56	0.9 (0.3-2.0)	0.799
Smoking status	Yes (active and passive) No (former-smoker and non-smoker)	6 21	5 109	6.2 (1.7-22.3)	0.007
Brinkman Index	Mild Moderate Severe	4 7 16	18 59 37	1.9 (0.5-8.0) Reference 3.6 (1.2-10.9)	0.026
Airway obstruction	Moderate Severe Very severe	14 13 0	60 53 1		1.000

depression. However, a study by Manen, *et al.* found a significant association between depression and obstruction of airway passage (predicted FEV1 percentage <50%)[10]. They found that subjects with obstructive airway have a 2.5 times higher risk of having depression. Horita, *et al.* also found a significant association between depression and a lower percentage of predicted FEV1[25]. Variation of these results may be because of different depression screening tool, spirometry classification and spirometry examining method.

Conclusion

As a conclusion, some portion of COPD patients will suffer from depression which implies the necessity of depression screening among stable COPD patients who routinely visit outpatient COPD clinics. Variables that are associated with depression among COPD patients in this study are moderate to severe CAT score (≥10), uncontrolled COPD symptoms, smoking exposure, and severe Brinkman Index. ∎

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