Associations of depressive symptoms with gender, body mass index and dyspnea in primary care COPD patients

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Background. It has been suggested that severe COPD is associated with depressive symptoms, possibly linked to exacerbations, dyspnea and hospitalisation. However, scarce data are available in primary care where most patients suffer from mild or moderate disease.

Objective. We aimed to reveal associations of depressive symptoms with demographic and clinical characteristics in mild to moderate COPD.

Methods. Cross-sectional data on lung function measurements, exacerbation frequency, dyspnea, comorbidity, smoking behaviour, body mass index (BMI), age, gender and depressive symptoms (Beck Depression Inventory) of 147 primary care patients were assessed in multiple logistic regression analyses.

Results. Patients suffered from mild to moderate obstruction (FEV1 63.6% pred, range 45.1% to 82.1%). Female gender (OR 4.8, 95% CI 2.1 to 10.8), BMI > 25 (OR 0.4, 95% CI 0.2 to 0.8) and current smoking (OR 2.3, 95% CI 1.01 to 5.3) were univariately associated with depressive symptoms, while in a multivariate logistic model only female gender (OR 4.0, 95% CI 1.6 to 9.9), BMI > 25 (OR 0.3, 95% CI 0.1 to 0.7) and dyspnea (OR 1.8, 95% CI 1.1 to 2.9) were independently associated with depressive symptoms.

Conclusion. These data suggest that in primary care depressive symptoms in COPD seem to be related with female gender, BMI and dyspnea. In this study, lung function, exacerbation rate, smoking behaviour, age and comorbidity are not independently associated with depressive symptoms in COPD of mild to moderate severity.

Introduction

Several studies have assessed the occurrence of depressive symptoms in COPD patients, reporting prevalences of up to 42% in moderate to severe COPD.[1–3] Depression was found to be the strongest independent predictor of mortality of COPD patients admitted to hospital for an acute exacerbation.[4] Depression and anxiety predict health related quality of life in COPD better than traditional lung function parameters,[1] while the domain mental health of HRQL is scored worse than

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in patients with hypertension, diabetes, heart failure, arthritis and chronic low back pain. However, few studies assessing prevalence of depression have been of sufficient methodological quality,[5] and even less have investigated the primary care patient population, where most COPD is of mild to moderate severity. Underdiagnosis is a common finding, which is caused by both doctor- and patient-related factors.[6] Recent studies found a relationship between depression and emergency visits and postulated that exacerbations may play an important role in the prevalence of depression,[7] while severely impaired lung function was reported to be another key factor[8] as well as living alone, reversibility of FEV1% predicted, respiratory symptoms and physical impairment.[9] However, despite reported findings the role of depression in COPD is still poorly understood.

Recently, mortality from COPD is reported to rise strongly, mainly because of increasing numbers of female patients, now surpassing death rates of male COPD in the United States.[10] But also in Europe this epidemiological

shift starts to occur.[11,12] Research in COPD has focused on males, since these were the most common subjects available, but contains very little data on female patients. Moreover, in primary care most patients suffer from mild to intermediate disease, do not attend pulmonary clinics and as a result have not been studied thoroughly. The aim of this study was to reveal associations of depression with demographic and clinical characteristics of COPD patients who are seen in primary care.

Methods

We conducted a cross-sectional study to investigate possible relations between depressive symptoms and lung function indices, exacerbation rate, smoking behaviour, dyspnea, age, body mass index (BMI), gender and comorbidity. Subjects were primary care patients with physician-diagnosed mild to moderate COPD, who participated in the COOPT Study, a three year randomized clinical trial conducted between 1998 and 2003 in 46 Dutch general practices.[13] In this study, reversibility was not an exclusion criterion, but a history of asthma, allergic rhinitis or atopy was. 147 patients who were measured at the Academic Hospital Maastricht were current or past smokers between 30 and 75 years of age and fulfilled the European Respiratory Society criteria for a clinical diagnosis of COPD.[14] Patients with an FEV1 below 40% of predicted were excluded.

Depressive symptoms were measured with the Beck Depression Inventory (BDI).[15] A score > 10 on the BDI indicates an elevated risk for mood disturbances. Several independent variables were investigated for their association with depressive symptoms. Exacerbation rate was defined as number of registered physician contacts per year for increased respiratory symptoms, necessitating a medical intervention. Dyspnea was measured by the Medical Research Council (MRC) Dyspnea Index.[16] BMI was considered aberrant below 21 or above 25. Comorbidity was defined as the number of co-morbid chronic conditions as registered by the primary care physician. All participants were current or former smokers with at least five pack-years smoking history. Lung function measurements included flow-volume before and after bronchodilatation, using Micromedical Microloop II spirometers and Spirare software. Associations between variables were first investigated univariately, after which all significant variables were tested in an adjusted backward regression model. All analyses were performed using SPSS 10.0 software.

Results

Table 1 summarizes the characteristics of the subgroups with and without depressive symptoms and the total study population. Patients expressed mild to moderate obstruction (FEV1 63.6% pred., range 45.1% to 82.1%),

TABLE 1 *Associations between demographic and clinical characteristics and the risk for depression (BDI > 10)*

	Total (n = 147)	Depressive symptoms (n = 40)	No depressive symptoms (n = 107)	OR	95% CI	OR adjusted	95% CI	P-value
BDI	7.1 (7.0)	16.1 (6.8)	3.7 (2.8)	–	–	–	–	–
Gender (f/m)	36/111	19/21	17/90	4.8	2.1 to 10.8	4.0	1.6 to 9.9	0.003
Age (yrs)	58.6 (10.2)	57.2 (9.5)	59.2 (10.4)	1.0	0.95 to 1.02	–	–	–
BMI	26.2 (4.1)	25.1 (4.3)	26.6 (3.9)	0.9	0.8 to 1.00	–	–	–
BMI < 21 (n)	14	5	9	1.6	0.5 to 5.0	–	–	–
BMI > 25 (n)	88	17	71	0.4	0.2 to 0.8	0.3	0.1 to 0.7	0.007
FEV1 (%pred.)	63.6 (18.5)	63.9 (15.2)	63.4 (19.7)	1.0	0.98 to 1.02	–	–	–
FEV1/FVC	61.5 (14.3)	62.0 (16.0)	61.4 (13.6)	1.0	0.98 to 1.02	–	–	–
Reversibility (%)	6.7 (6.2)	7.1 (5.3)	6.6 (6.5)	1.0	0.96 to 1.08	–	–	–
Pack–years (yrs)	26.5 (4.1)	29.4 (16.6)	25.4 (14.9)	1.0	0.99 to 1.04	–	–	–
Smoking (current/former)	95/52	31/9	64/43	2.3	1.01 to 5.3	2.2	0.8 to 5.9	0.106
Exacerbation frequency (n/yr)	0.8 (0.7)	0.9 (0.7)	0.8 (0.8)	1.2	0.73 to 1.9	–	–	–
Comorbidity (n/pt)	0.6 (1.1)	0.7 (1.3)	0.6 (1.0)	1.1	0.78 to 1.5	–	–	–
MRC Dyspnea Index	2.0 (0.9)	2.3 (0.7)	1.9 (0.9)	1.5	0.99 to 2.3	1.8	1.1 to 2.9	0.016

Figures are means (SD) unless stated otherwise.

with an average of 26.5 pack-years smoked. Female gender (OR 4.8, 95% CI 2.1 to 10.8), BMI > 25 (OR 0.4, 95% CI 0.2 to 0.8) and current smoking (OR 2.3, 95% CI 1.01 to 5.3) were univariately associated with depressive symptoms (Table 2). In a multivariate logistic model only female gender (OR 4.0, 95% CI 1.6 to 9.6), BMI > 25 (OR 0.3, 95% CI 0.1 to 0.7) and dyspnea (OR 1.8, 95% CI 1.1 to 2.9) were independently associated with depressive symptoms.

Discussion

This study was aimed at exposing possible associations between clinical characteristics of COPD and depressive symptoms. In mild to moderate COPD we cannot confirm an association with exacerbations or comorbidity, probably because of a low exacerbation frequency and less impaired lung function. We did, however, find a quite strong association with female gender, and to a lesser extent with elevated BMI and dyspnea. Current smoking behaviour did not remain associated with depressive symptoms in the multivariate model. Interestingly, we found fewer depressive symptoms in patients with an elevated BMI, while the inverse relation with BMI < 21 did not reach significance, probably due to low patient numbers. The importance of BMI and dyspnea has been recognized in recent guidelines,[17] but not the role of female gender. From previous epidemiological studies we learn that females are almost twice as likely to suffer from major depressive episodes as men.[18] However, considering the magnitude of the association we found, could it be that females in our study expressed a different pattern of emotional coping than our male COPD patients? A small Finnish community based study[19] reported earlier that female COPD patients experienced more feelings of dissatisfaction with life than controls, and had more mental health problems than male patients. In an Italian study female gender was associated with a greater impact of COPD on health status.[20] Norwegian females reported more symptoms and lower self-rated health compared with males with similar smoking burden.[21] However, we realize that measuring depressive symptoms can be influenced by gender in itself. From a comparative study on depression measurement instruments, it follows that mean BDI scores were indeed borderline higher in females than in males, as a result of possibly gender-biased items.[22] Major depression in the elderly presents with partially different symptoms in men and women. This suggests that gender influences perception and expression of depressive syndromes.[23] Higher levels of catastrophic withdrawal coping strategy and lower levels of self-efficacy of symptom management are associated with higher levels of depression, anxiety and quality of life.[24] It is therefore important to investigate this possible association between gender and depressive symptoms further, since female patients with COPD are a rapidly increasing patient category, and this will likely require more attention from the primary care provider. At present, there seems to be a great disparity between prevalence of anxiety and depression symptoms in COPD patients and the recognition and treatment of these symptoms by primary care providers.[25] Indeed, there is an inverse relationship between the patients' perceived access to health care and depressive symptoms in chronic pulmonary disease.[26]

Can we achieve better results? Especially in primary care, the answer must be sought in integrated care models when taking care of these complex patients.[27] Compared with control groups, decline in depressive symptoms and increased exercise capacity occurred in patients with COPD after a brief rehabilitation of 3 weeks.[28] Moreover, treating depression in primary care setting can prevent unnecessary hospitalizations and reduce health care costs.[29]

Conclusions

These data suggest that in primary care, depressive symptoms in COPD seem to be related to female gender and the presence of dyspneic complaints, while patients with an elevated BMI report less depressive symptoms. Based on our findings and previous reports in the literature we hypothesize that females with COPD may express a different disease coping pattern, including more depressive symptoms, which deserves further research. In this study, lung function, exacerbation rate, smoking behaviour, age and comorbidity are not independently associated with depressive symptoms in COPD of mild to moderate severity.

Declaration

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