Depression in elderly outpatients with disabling chronic obstructive pulmonary disease

AbeBW M. Yohannes, Jamal Roomi, Robert C. Baldwin, Martin J. Connolly

Departments of Geriatric Medicine and Psychiatry for the Elderly, Manchester Royal Infirmary, Oxford Road, Manchester M13 9WL, UK

Address correspondence to M. J. Connolly, Robert Barnes Rehabilitation Centre, Barnes Hospital, Kingsway, Cheadle, Stockport SK8 2NY, UK. Fax (+44) 161 276 3541

Abstract

Introduction: depression is common in both young adults and elderly people with chronic obstructive pulmonary disease (COPD).

Methods: we compared the prevalence of depressive symptomatology in elderly outpatients with stable disabling COPD with that in healthy controls and age-matched patients with other disabilities, and also assessed the relation between degree of disability, quality of life and depressive symptoms. The subjects were 96 older people with COPD [56 men; aged 70–93 (mean 78) years], 55 normal controls [23 men; aged 70–90 (mean 78) years] and 53 disabled controls [27 men; aged 70–92 (mean 78) years]. Exclusion criteria were acute respiratory exacerbation or use of oral steroids in the last 6 weeks, known previous psychiatric disorder and acute or chronic confusion.

Results: mean (and SD) values for 1-s forced expiratory volume (FEV₁) were 51 (20)% in COPD subjects, 107 (24)% in normal controls and 82 (13)% in disabled controls. Forty-four subjects with COPD (46%), six normal controls (11%) and 14 disabled controls (26%) scored in the ‘caseness’ range for depressive ideation on the Brief Assessment Schedule Depression Cards (BASDEC screening questionnaire. A multiple regression analysis was performed for the COPD group to identify factors predictive of BASDEC score. Predictive variables were total quality of life score [P<0.0001], Chronic Respiratory Questionnaire and level of activities of daily living (Nottingham extended activities of daily living scale) [P = 0.001]. Spirometry results and exercise tolerance (6-min walk distance) did not help predict BASDEC score (R² = 0.50).

Conclusions: depressive symptoms are common in elderly patients with COPD; prevalence and/or severity of depressive symptoms may be greater in those who are most disabled.

Keywords: chronic obstructive pulmonary disease, depression, outpatients

Introduction

The chief symptom of chronic obstructive pulmonary disease (COPD) is dyspnoea but other commonly reported problems include tiredness, lethargy, anergia and altered libido and sexual function [1]. Depression is also common. It too may be disabling, ranking in its impact on quality of life alongside eight common and seriously disabling conditions, including diabetes, ischaemic heart disease and arthritis [2]. Depression in COPD is associated with additional disability [3] and a poorer quality of life [4].

The wide range of reported prevalence rates for depression in COPD reflects the difficulty in disentangling symptoms arising from COPD from similar symptoms caused by depression. Gift and McCrone [5] quote a median value of around 40% (point-prevalence) but it is unclear whether this rate is higher than that associated with other debilitating diseases. The combination of unpredictable exacerbations and the burden of chronic illness may lead to more negative ideation and hence more depression than some other disabling conditions. Elderly people are most prone to COPD and sick older people are especially vulnerable to depression [6, 7]. This study examined the prevalence of depressive symptoms in elderly patients with COPD using a depression scale devised for use in older people with major physical illness.

Comparisons were made with similarly disabled
elderly patients without COPD and a normal elderly control group. The null hypothesis was that depression is no more common in patients with COPD than in those with other chronic illnesses and that the prevalence in both groups is no higher than controls of equivalent ages. The study also explored the relationship between baseline measures of respiratory function, activities of daily living and disease-specific measures of quality of life and depression.

Methods

Subject selection

Subjects comprised 96 outpatients (including 85 attending day hospital) with symptomatic irreversible COPD (chronic asthma and smoking-related chronic airways obstruction). Fifty-six were men and the age range was 70–93 (mean 78) years. COPD was defined as the best 1-s forced expiratory volume (FEV1) being less than 70% of the predicted level and rising by less than 15% after 5mg nebulized salbutamol. COPD subjects were included if they were clinically stable with no change in medication for 1 month and no hospital admission in the previous 6 weeks.

Exclusion criteria for the subjects were acute or chronic confusion (Hodkinson Abbreviated Mental Test Score <7/10 [8]), prior non-depressive psychiatric disease, use of oral steroids with past 6 weeks and refusal of consent.

Normal control subjects were chosen at random from those who had recently participated in a community survey in our department [9]. Of these, 55 (23 men) aged 71–90 (mean 78) years agreed to participate. Of the 16 who did not attend, three had died of non-respiratory problems, four were awaiting minor surgery and nine declined without giving a reason. The subjects in the original community survey were representative of the Central Manchester population who are in that age range in all respects except that there was a slight excess of women [9]. Disabled controls were 53 (27 men) aged 71–92 (mean 78) years attending day hospital because of Parkinson's disease, stroke, arthritis and amputation and who had normal lung function.

All subjects gave written witnessed informed consent. The study was approved by the medical ethics committee of the Central Manchester Health Care Trust and Bury Health Authority.

Study design

The design was single blinded. History, examination and physiological measurements were performed by a consultant geriatrician and questionnaires were administered by a research physiotherapist. Investigators were blinded to each others' results during the study period. Subjects were seen as outpatients at the geriatric day hospital. FEV1 and forced vital capacity (FVC) were measured using a compact C spirometer (Vitalograph, Buckingham, UK). Three reproducible readings (±5% FEV1) were taken at 1-min intervals and the best result recorded. The physiotherapist administered the Chronic Respiratory Questionnaire (CRQ) and Brief Assessment Schedule Depression Cards (BASDEC).

Most subjects self-completed the Nottingham extended activities of daily living scale (NEADL) questionnaire. For those who had difficulty reading or writing, the physiotherapist read out the questionnaires and recorded their responses. The physiotherapist supervised and gave advice to the subjects on how to complete the questionnaires, but gave no advice either directly or indirectly that might influence their response to the questions.

We used a well-validated measure of activities of daily living, the NEADL, to quantify the degree of disability [10]. Likewise a disease-specific quality of life questionnaire, the CRQ, was used to ascertain the impact of airways obstruction on quality of life [11]. Validation of the CRQ was originally performed in random groups of COPD patients not selected for age (including elderly subjects) [11]. The 6-min walk test was used to assess exercise tolerance [12]. The BASDEC [13] was administered to investigate the prevalence of depressive ideation in all subjects. BASDEC has been previously employed as a screening tool for depression in elderly inpatients. A score of ≥7 on BASDEC is suggestive of depression (termed a 'case') with a sensitivity of 71% and a specificity of 88% [13].

Instruments

BASDEC

The BASDEC scale has demonstrated good response when tested against the Geriatric Depression Score (GDS) [14] which is recommended as an assessment scale for elderly people by the British Geriatrics Society and the Royal College of Physicians [15]. It consists of a 19-item deck of cards, to elicit a response of 'true', 'false' or 'I do not know'. Two items are weighted to give two points, with a maximum score of 21. A score of seven or above suggests a 'case' of depression, i.e. depressive symptoms of sufficient severity to warrant intervention. BASDEC is user-friendly and can be administered by non-medical staff at the bedside.

6-min walking test

Exercise tolerance was evaluated by a 6-min walking test [12] which was performed in a level, enclosed, warm (22–24°C) hospital corridor 29 m long with vinyl flooring. Before the test, subjects sat for 30 min after performing the respiratory function tests. They were transported to the start of the course by wheelchair.
Depression in elderly outpatients with COPD

Table 1. Characteristics of the 96 subjects with chronic obstructive pulmonary disease (COPD), 55 normal controls (NC) and 53 disabled controls (DC)

<table>
<thead>
<tr>
<th></th>
<th>COPD</th>
<th>NC</th>
<th>DC</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>78 (5)</td>
<td>78 (5)</td>
<td>78 (5)</td>
<td>NS</td>
</tr>
<tr>
<td>FEV₁ (%)</td>
<td>0.95 (0.36)</td>
<td>1.96 (0.52)</td>
<td>1.43 (0.46)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>FEV₁ (% of predicted level)</td>
<td>51 (20)</td>
<td>107 (24)</td>
<td>82 (25)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>6-min walk (m)</td>
<td>212 (96)</td>
<td>373 (84)</td>
<td>-b</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>NEADL</td>
<td>12.9 (4.9)</td>
<td>19.1 (2.2)</td>
<td>9.6 (4.2)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Total CRQ</td>
<td>78 (23.2)</td>
<td>116 (17.3)</td>
<td>102 (25)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

FEV₁ (%), forced expiratory volume in 1-s percentage; NEADL, Nottingham extended activities of daily living score; CRQ, Chronic Respiratory Questionnaire score.

*COPD vs NCs and vs DCs.

They were asked to walk as far as possible in 6 min at their own pace using any walking aid they usually used. The researcher acted as a time-keeper and followed the patient. No encouragement was given during the test. The 6-min walk test is reproducible and responsive in COPD subjects in this age group [12].

CRQ

The CRQ disease-specific quality of life questionnaire is valid, responsive and reproducible in young COPD subjects [16, 17]. It comprises 20 items and measures four domains: dyspnoea (five items), fatigue (seven items), emotion (four items) and mastery (the level to which a subject feels control over the disease; four items). The domains, which are scored separately, result in a total score of between 20 and 140. Low scores signify reduced quality of life and high scores correspond to good quality of life. Subjects rate their responses using a Likert 7-point category scale: for example, 1 = 'extremely short of breath', 7 = 'not at all short of breath'.

NEADL

The NEADL consists of 21 activities of daily living, self-report questions, which are divided into four categories with subsections of mobility (six activities), kitchen (five activities), domestic (four activities) and leisure (six activities). It has been used as a postal questionnaire to monitor the progress of improvement or deterioration in stroke patients who live at home [10].

Statistical analysis

Analysis were performed using EcStatic program (SomeWare in Vermont, VT, USA). Comparison between means was by Student's t-test. The X² test was used to examine differences in prevalence of depressive symptoms between groups. To identify the variables most predictive of depressive symptoms, multiple regression analysis was performed using BASDEC as the dependent variable in COPD subjects. Significance was defined at the 5% level.

Results

Table 1 shows demographic data, spirometry, walk test, activities of daily living and quality of life.

Table 2 shows 'caseness' of BASDEC scores. Forty-four of the 96 COPD subjects (46%) had 'depressive' symptom scores ≥7. Conversely, six of the 55 normal controls (11%) and 14 of the 53 disabled controls (26%) had 'depressive' symptom scores. Only five of the COPD subjects and none of the disabled controls or normal controls were receiving antidepressant medication.

Table 3 shows multiple regression analysis to identify variables that best predict BASDEC score in COPD subjects. The dependent variable was BASDEC and the independent variables were dyspnoea score, total

<table>
<thead>
<tr>
<th>Group</th>
<th>No. (and %) of subjects</th>
<th>By BASDEC score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;7</td>
<td>≥7</td>
</tr>
<tr>
<td>COPD</td>
<td>52 (55)</td>
<td>44 (45)a,b</td>
</tr>
<tr>
<td>NC</td>
<td>49 (89)</td>
<td>6 (11)</td>
</tr>
<tr>
<td>DC</td>
<td>39 (76)</td>
<td>14 (26)</td>
</tr>
</tbody>
</table>

COPD, chronic obstructive pulmonary disease; NC, normal control; DC, disabled control.

*aX² and P vs NCs: X² = 17.7; P < 0.0001.

bX² and P vs DCs: X² = 4.6; P = 0.031.
**Discussion**

Previous studies have suggested a prevalence of depression in mixed-aged populations of COPD patients of around 40% [3]. In this study it was 46%. Here, the prevalence of depression exceeded that associated with other disabling conditions in patients of the same age and similar or greater levels of disability, and both were in excess of that found in normal elderly people living in the community. The null hypothesis was thus rejected.

However, it is arguable whether certain illnesses are associated with an unusually high risk for depression. For example, some studies of patients with idiopathic Parkinson's disease have found a prevalence of depression similar to that found for COPD patients in this study. It is uncertain whether the rate in idiopathic Parkinson's disease exceeds that of other chronic disorders (reviewed by Cummings [18]). In this study there was a clear difference, with an excess in COPD patients. The use of an heterogeneous comparison group may have accentuated differences but the study supports the notion of an increased vulnerability to depression in patients with COPD.

The concept of particular depressive syndromes associated with types of medical disorders has also been proposed, for example in stroke [19] and Parkinson's disease [18], but this too is controversial. Clearly being a 'case' on a depression rating scale such as the BASDEC tells us little about the nature of the depression experienced and the interventions most likely to alleviate it. We are currently examining in more detail the profile of depressive symptoms in these patients using the Geriatric Mental Status Schedule [20], a structured in-depth psychiatric interview.

Our prevalence figure is close to the figure of 42% found in a 'younger' elderly outpatient COPD study by Light et al. [21], which also failed to find an association between exercise tolerance and lowered mood. In the present study, poor quality of life and reduced activities of daily living were most closely associated with depression on the BASDEC. Unfortunately a cross-sectional study cannot address the direction of causality (i.e. whether poor quality of life and reduced activities of daily living lead to depression or depression leads to poor quality of life and reduced function).

One of the four dimensions of the CRQ, emotional function, contains some questions which overlap slightly with the BASDEC questionnaire. However, as the CRQ concentrates on symptoms during the 2-week period up to the day of assessment, it is unlikely that any artefactual interaction between BASDEC and CRQ would be of enough magnitude to explain the close relationship between the two scores.

The possibility that recruitment of different subject groups from different settings influenced the results is an important one. However, 85 of the 96 COPD subjects came from the same 'source' as the disabled controls (the geriatric day hospital). The fact that the normal controls (and not those with COPD or the disabled controls) came from outside hospital may be a

---

**Table 3. Results of multiple regression analysis factors predicting Brief Assessment Schedule Depression Cards score**

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>t-score</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total CRQ</td>
<td>-0.10</td>
<td>0.02</td>
<td>-4.29</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>NEADL</td>
<td>-0.36</td>
<td>0.11</td>
<td>-3.16</td>
<td>0.001</td>
</tr>
<tr>
<td>FEV$_1$ (%)</td>
<td>0.01</td>
<td>0.07</td>
<td>0.62</td>
<td>0.53</td>
</tr>
<tr>
<td>Age</td>
<td>-0.05</td>
<td>0.07</td>
<td>-0.81</td>
<td>0.41</td>
</tr>
<tr>
<td>Household composition$^a$</td>
<td>1.19</td>
<td>0.74</td>
<td>1.62</td>
<td>0.10</td>
</tr>
<tr>
<td>Dyspnoea CRQ</td>
<td>0.06</td>
<td>0.07</td>
<td>0.85</td>
<td>0.39</td>
</tr>
<tr>
<td>Body mass index</td>
<td>0.004</td>
<td>0.06</td>
<td>0.06</td>
<td>0.95</td>
</tr>
<tr>
<td>Sex</td>
<td>1.02</td>
<td>0.71</td>
<td>1.43</td>
<td>0.15</td>
</tr>
<tr>
<td>6-min walking test</td>
<td>0.005</td>
<td>0.004</td>
<td>1.17</td>
<td>0.24</td>
</tr>
<tr>
<td>Previous occupation$^b$</td>
<td>-0.38</td>
<td>0.49</td>
<td>-0.78</td>
<td>0.43</td>
</tr>
</tbody>
</table>

Total $R^2 = 0.50$.

CRQ, Chronic Respiratory Questionnaire score; NEADL, Nottingham extended activities of daily living score; FEV$_1$ (%), forced expiratory volume in 1 s percentage.

$^a$Household composition: 1, alone, living alone; 2, together, living with partner, child(ren) or brother(s)/sister(s).

$^b$Previous occupation (social class scale).
confounding variable, but we do not feel that this detracts from the message of this study. Using a standardised diagnostic algorithm in a large epidemiological survey, Copeland et al. [22] found that 11.3% of elderly people had depressive symptoms with 3% qualifying as cases of depressive illness. These figures typify what is known of the community prevalence of depression in elderly people [23]. Little is known of the prevalence of depression in geriatric day hospitals, although Agbayewa [24] found that in Canada 15% of day hospital attendees (29 of 195) had clinically important depressive symptoms. Our disabled comparison group are probably unrepresentative of those typical day hospital attendees.

Elderly patients with COPD may present with reduced level of energy, unhappiness and difficulties in performing daily activities and in participating in social activities. Attributing such symptoms purely to the effects of COPD may mean that the diagnosis of depression is overlooked. Furthermore, depression in elderly COPD patients may reduce independence, resulting in a growing dependence on medical care as well as being a source of concern for caregivers. This is consistent with our finding that 50% of the variance in BASDEC score was accounted for by variability in activities of daily living level and quality of life measures limited by respiratory symptoms. Since we purposely studied an older age group, many of whom have had to negotiate role loss and lowered social interaction, these effects may be additive with COPD-related disability, thus creating an increased susceptibility to depression.

In conclusion, depressive symptomatology (and possibly clinical depression) is common in elderly subjects with stable, disabling COPD. The prevalence and severity of such symptoms is greatest in those who are most disabled. Further work is needed to assess the predictive values of the BASDEC as a screening test in this population, the nature of the depression and the effect of treating depression on perceived disability, quality of life, dyspnoea and exercise tolerance in these subjects.

Key points
- Depressive ideation affects over 40% of elderly patients with disabling chronic obstructive pulmonary disease.
- Prevalence and/or severity of depression in such patients is probably greater in those who are most disabled.
- Depression relates to quality of life and to ability to perform activities of daily living.

References


20. Copeland JR, Kelleher MJ, Kellet JM et al. A semi-structured clinical interview for the assessment of diagnosis...
A. M. Yohannes et al.


Received 13 February 1997