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ORIGINAL RESEARCH

Activities of daily living in patients with chronic obstructive pulmonary disease with depressive symptoms

Atividades de vida diária em pacientes com doença pulmonar obstrutiva crônica com sintomas depressivos

Actividades de la vida diaria en pacientes con enfermedad pulmonar obstructiva crónica y síntomas depresivos

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ABSTRACT | This cross-sectional study assessed the activities of daily living (ADL) and risk factors for developing depressive symptoms in patients with chronic obstructive pulmonary disease (COPD) and was carried out at the pulmonology outpatient clinic of the Hospital Universitário Oswaldo Cruz. Two hundred two (202) patients with COPD participated in the study. We evaluated the sociodemographic and anthropometric data, the ADL by means of Pulmonary Functional Status and Dyspnea Questionnaire – Modified version (PFSDQ-M), and the presence of depressive symptoms using the Beck Depression Inventory (BDI). All domains (dyspnea, fatigue and activity changes) of PFSDQ are compromised in patients with depressive symptoms. The prevalence of depressive symptoms was 38.6%. The chance of developing these symptoms was higher for those who used more than one bronchodilator (OR: 2.82, CI 95%: 1.47-5.38, p=0.002), presented dyslipidemias (OR: 2.74, CI95%: 1.24-6.07, p=0.012), had a heart disease (OR: 2.82, CI 95%: 1.18-6.74, p=0.020), presented expectoration (OR: 2.44, CI 95%: 1.2-4.95, p=0.014) or did not have a partner (OR: 2.58, CI 95%: 1.36-4.9, p=0.004). COPD patients with depressive symptoms had all domains of ADL compromised compared to patients without these symptoms.

Keywords | Pulmonary Disease, Chronic Obstructive; Dyspnea; Depression; Efficiency.

RESUMO | O objetivo foi avaliar as atividades de vida diária (AVD) e fatores de risco para o desenvolvimento de sintomas depressivos nos pacientes com doença pulmonar obstrutiva crônica (DPOC). Estudo transversal realizado no ambulatório de Pneumologia do Hospital Universitário Oswaldo Cruz. Participaram do estudo 202 pacientes com DPOC. Foram avaliados os dados sociodemográficos e antropométricos; as AVD, através do *Pulmonary Functional Status and Dyspnea Questionnaire – Modified version* (PFSDQ-M); e a presença de sintomas depressivos por meio do inventário de depressão de Beck. Todos os domínios (dispneia, fadiga e mudanças de atividades) do PFSDQ-M se apresentaram comprometidos nos pacientes com sintomas depressivos. A prevalência de sintomas depressivos foi de 38,6%. As chances de desenvolvimento desses sintomas ocorreram para aqueles que utilizavam mais de um broncodilatador

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(OR: 2,82, $IC_{95\%}$: 1,47-5,38, p=0,002), que apresentavam dislipidemias (OR: 2,74, $IC_{95\%}$: 1,24-6,07, p=0,012), que possuíam cardiopatia (OR: 2,82, $IC_{95\%}$: 1,18-6,74, p=0,02); que apresentavam expectoração (OR: 2,44, $IC_{95\%}$: 1,2-4,95, p=0,014); e não tinham companheiros (OR: 2,58, $IC_{95\%}$: 1,36-4,9, p=0,004). Pacientes com DPOC com sintomas depressivos apresentaram todos os domínios das AVD comprometidos em relação aos pacientes sem esses sintomas.
Descritores | Doença Pulmonar Obstrutiva Crônica; Dispneia; Depressão; Eficiência.

RESUMEN | El objetivo fue evaluar las actividades de la vida diaria (AVD) y los factores de riesgo para el desarrollo de síntomas depresivos en pacientes con enfermedad pulmonar obstructiva crónica (EPOC). Estudio transversal realizado en el ambulatorio de Neumología del Hospital Universitario Oswaldo Cruz. En el estudio, participaron 202 pacientes con EPOC. Se evaluaron los datos sociodemográficos y antropométricos, las AVD por medio de *Pulmonary Functional Status and Dyspnea Questionnaire: Modified version* (PFSDQ-M), y la presencia de síntomas depresivos por medio del Inventario de depresión de Beck. Todos los dominios (disnea, fatiga y cambios en las actividades) del PFSDQ-M estuvieron comprometidos en pacientes con síntomas depresivos. La prevalencia de síntomas depresivos fue del 38,6%. Las posibilidades para el desarrollo de estos síntomas ocurrieron para aquellos que utilizaban más de un broncodilatador (OR: 2,82, $IC_{95\%}$: 1,47-5,38, p=0,002), que tenían dislipidemias (OR: 2,74, $IC_{95\%}$: 1,24-6,07, p=0,012), que tenían enfermedad cardiaca (OR: 2,82, $IC_{95\%}$: 1,18-6,74, p=0,02), que tenían expectoración (OR: 2,44, $IC_{95\%}$: 1,2-4,95, p=0,014), y no tenían parejas (OR: 2,58, $IC_{95\%}$: 1,36-4,9, p=0,004). Los pacientes con EPOC y síntomas depresivos tuvieron todos los dominios de las AVD afectados en comparación con los pacientes sin estos síntomas.
Palabras clave | Enfermedad Pulmonar Obstructiva Crónica; Disnea; Depresión; Eficiencia.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) associated with depression leads to a poor prognosis for patients and a consequent decrease in quality of life[1,2]. Although depressive symptoms are relatively prevalent in these patients, they are not easily diagnosed by health professionals, since they are subthreshold[3-5].

Depressive symptoms are associated with mortality[6,7], disease exacerbation, dyspnea[8], decreased physical performance, inactivity[9] and functional limitations in activities of daily living (ADL)[10-13]. Functional limitation is experienced through progressive loss of physical conditioning, with decreased ability to carry out ADL and reduced muscle strength due to systemic manifestations of disease which may become more severe if associated with depressive symptoms[14-16].

Considering that ADL may be involved in COPD, it is necessary to know how these activities are manifested in patients with depressive symptoms and which factors could be increasing the chances for developing these symptoms.

Thus, this study assessed the activities of daily living (ADL) and risk factors for developing depressive symptoms in patients with chronic obstructive pulmonary disease (COPD).

METHODOLOGY

This cross-sectional study involved patients with functional clinical diagnosis of COPD recruited from the Pneumology outpatient clinic of the Hospital Universitário Oswaldo Cruz between March and September 2015. This study was approved by the Ethics Committee for Institutional Research and is in accordance with the Declaration of Helsinki.

Considering the approximate number of 640 patients with COPD in the ambulatory of Hospital Universitário Oswaldo Cruz and the prevalence of depressive symptoms of 28.57% obtained in the study by Carvalho et al.[17], the total sample included 194 patients obtained by convenience sampling. Sample size calculation was carried out with an alpha of 0.05 and a 95% confidence interval.

The study included patients with clinical and functional COPD diagnosis according to the Global Initiative for Chronic Obstructive Lung Disease[14], and aged over 40 years old. We excluded patients with COPD who presented cognitive, auditory and visual changes which would make it impossible for them to respond to the implemented questionnaires, patients diagnosed with depression, and patients with other lung diseases.

Eligible patients had their anthropometry data (weight and height) and spirometry forced expiratory volume in one second (FEV_1), forced vital capacity (FVC) and ratio

FEV_1/FVC] collected directly from the patient's medical record during medical consultation (last spirometry). All the data were performed in the Pneumology outpatient clinic itself. The spirometric data will presented by GOLD classification[14].

ADL assessment

We used the Pulmonary Functional Status and Dyspnea Questionnaire – Modified version (PFSDQ-M) for assessing limitations in activities of daily living. It consists of three domains: dyspnea, fatigue during ADL and changes in ADL compared to the period before the disease[18]. A partial score was computed ranging from 0 to 100 for each of the three domains, and a total score was formed by summing the partial scores of the three domains for a total value ranging from 0 to 300. Higher values on the scale indicate greater limitations in ADL[18].

Assessment of depressive symptoms

The Beck Depression Inventory (BDI) was used to evaluate the presence of depressive symptoms. It consists of 21 sets of statements about depressive symptoms in the last 15 days, which are classified in ordinal scale from 0 to 3, producing total scores ranging from 0 to 63. Severity levels are identified from 0-13 (no depression), 14-19 (mild depression), 20-28 (moderate depression) and 29-63 (severe depression)[19,20]. We adopted a cut-off point from 0 to 13 (without symptoms) and 14 to 63 (with symptoms) for the purposes of classifying the presence/absence of depressive symptoms for this study.

STATISTICAL ANALYSIS

We initially conducted distribution of normality and variance homogeneity using the Kolmogorov-Smirnov and Levene tests, respectively. Numerical variables are presented by central tendency and dispersion measurements, and absolute and relative frequencies. Pearson's Chi-Squared or Fisher's Exact tests were used to assess the association between the categorical variables. A comparison between groups with and without depressive symptoms was conducted through the Student's t-test for independent samples or the Mann-Whitney test.

Logistic regression was performed considering the presence of depressive symptoms (yes/no) as the dependent variable. Bivariate analysis was used for the association between the dependent variable and the sociodemographic data, spirometry, kind of medication used and the presence of comorbidities, and the variables with $p \leq 0.20$ in the bivariate analysis were then included in the logistic regression model. Regression analysis was performed by the Backward Lr method. The analysis was conducted using SPSS version 13.0 (SPSS Inc., Chicago, IL) considering a p-value <0.05 as significant. A 95% confidence interval with an error margin of 5% was applied for all tests.

RESULTS

Two hundred seventy-nine (279) patients were recruited for the study, but 77 were excluded for not meeting the inclusion criteria, rendering 202 participants. Patients with depressive symptoms had increased chance of dyslipidemia (62.8%, 27 patients, p<0.001), diabetes (61.5%, 16 patients, p=0.012) and heart disease (62.5%, 20 patients, p=0.003) than individuals without these symptoms. Prevalence of depressive symptoms was identified in 79 (38.6%) of the patients studied. The characteristics of individuals with and without depressive symptoms are shown in Table 1.

Table 1. Characterization of individuals with COPD with and without depressive symptoms

Variables	With Symptoms (n=79)	CI 95%	Without Symptoms (n=123)	CI 95%	p-value
	n (%)		n (%)		
Gender					
Female	44 (42.7)		59 (57.3)		0.284
GOLD Rating					
GOLD 2 (80%<FEV_1≥50%)	21 (31.8)		45 (68.2)		0.048
GOLD 3 (50%<FEV_1≥30%)	42 (38.5)		67 (61.5)		
GOLD 4 (FEV_1<30%)	16 (59.3)		11 (40.7)		

(continues)

Table 1. Characterization of individuals with COPD with and without depressive symptoms

Variables	With Symptoms (n=79)	CI 95%	Without Symptoms (n=123)	CI 95%	p-value
	n (%)		n (%)		
Age	64.44±10.71	(62.04-66.84)	66.81±9.77	(65.07-68.56)	0.107
Weight	68.82±2.36	(64.10-73.53)	66.19±1.2	(63.8-68.57)	0.279
Height	1.58±0.01	(1.56-1.61)	1.6±0	(1.58-1.62)	0.330
BMI	27.02±6.66	(25.53-28.52)	25.81±4.96	(24.93-26.70)	0.142
Smoke					
Years of smoking	21.51±14.27	(18.31-24.7)	19.88±12.46	(17.65-22.11)	0.394
Packs per year	24.60±2.62	(19.37-29.84)	22.72±1.94	(18.87-26.56)	0.558

GOLD: Global Initiative for Chronic Obstructive Lung Disease; CI: confidence interval; FEV_1: forced expiratory volume in the first minute; BMI: body mass index. Chi-Squared Test and Student's t-test, $p<0.05$.

Changes in the assessment of activities of daily living have been identified in all areas of PFSDQ-M (dyspnea, fatigue and activity changes), which were compromised in patients with depressive symptoms (Figures 1, 2 and 3).

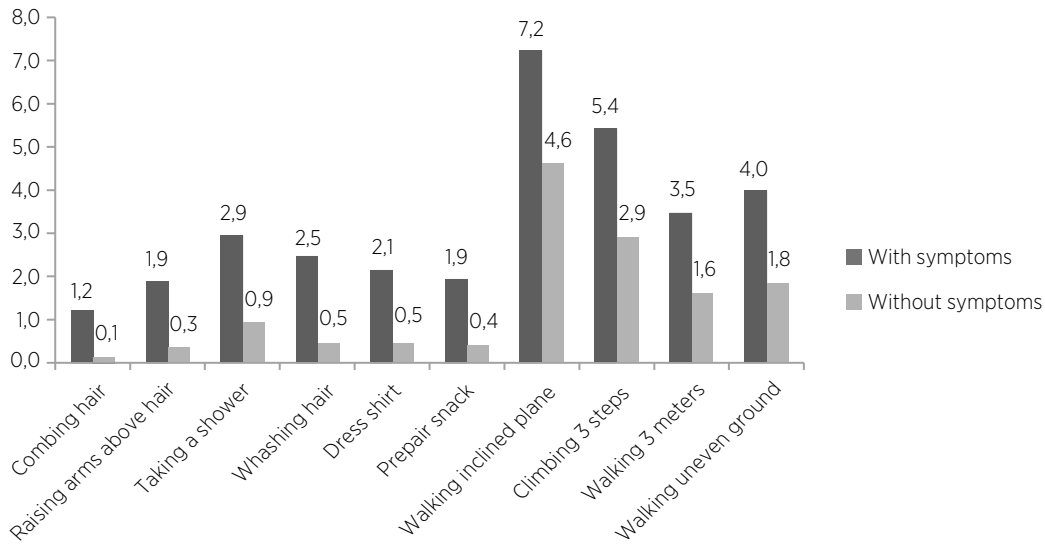

Figure 1. Limitations in activities of daily living imposed by dyspnea according to the PSFDQ in the presence and absence of depressive symptoms

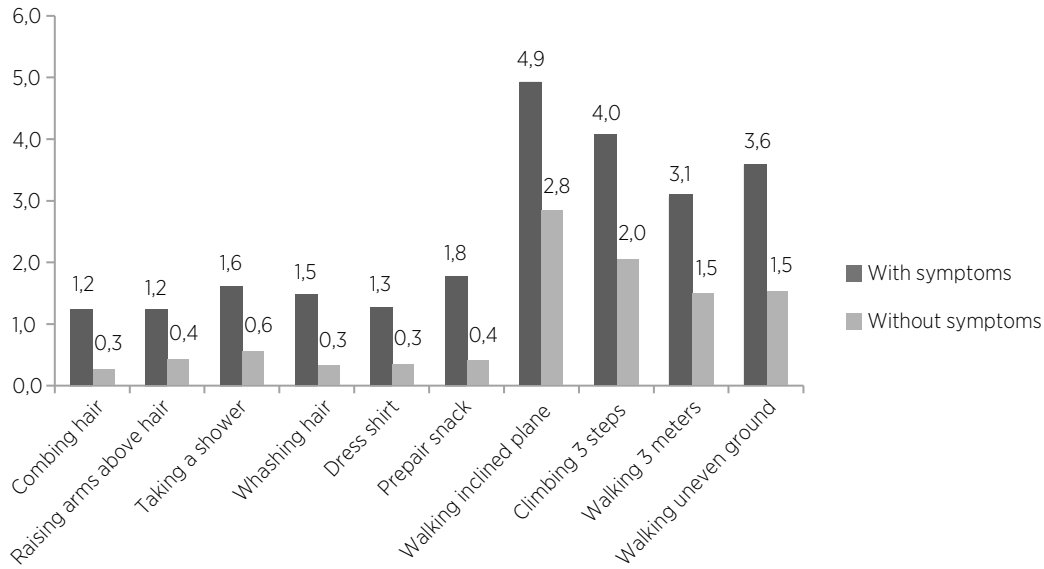

Figure 2. Limitations in activities of daily living imposed by fatigue according to the PSFDQ in the presence and absence of depressive symptoms

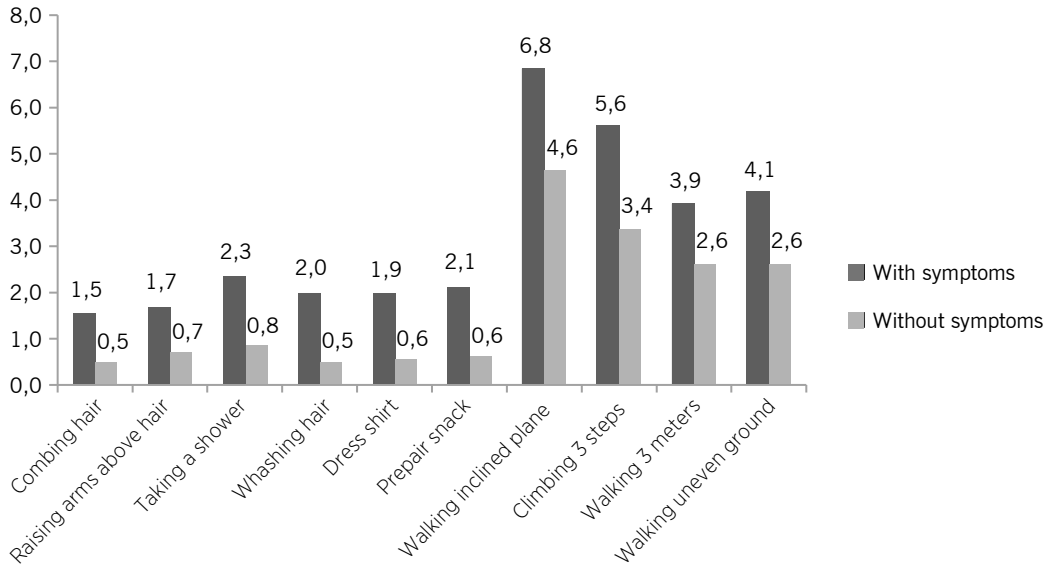

Figure 3. Changes in daily living activities before and after COPD according to the PSFDQ in the presence and absence of depressive symptoms

According to the logistic regression analysis, not having a partner (OR=2.58, p=0.004), using more than one bronchodilator (OR=2.82, p=0.002), presenting dyslipidemias (OR=2.74, p=0.0012), heart diseases (OR=2.82, p=0.02), and expectoration (OR=2.44, p=0.014) increased the odds of developing depressive symptoms in patients with COPD and ADL impairment (Table 2).

Table 2. Logistic regression of the individuals who participated in the study

Variables	OR	CI 95%	p-value
Marital Status			
With partner	1	–	0.004
Without partner	2.58	1.36-4.9	
Expectoration			
Yes	2.44	1.2-4.95	0.014
No	1	–	
Bronchodilator			
Yes	2.82	1.47-5.38	0.002
No	1	–	
Heart Disease			
Yes	2.82	1.18-6.74	0.02
No	1	–	
Dyslipidemia			
Yes	2.74	1.24-6.07	0.012
No	1	–	

OR: Odds ratio; CI: confidence interval. Logistic regression by Backward Lr method.

DISCUSSION

This study identified a 38.6% prevalence of depressive symptoms in patients with COPD and changes in all areas of the PFSDQ-M questionnaire in these patients. Factors which increased odds for developing depressive symptoms for ADL impairment in COPD patients in our study were: not having a partner, presenting expectoration, dyslipidemia and heart disease, and using more than one bronchodilator.

The presence of depressive symptoms can be defined as the existence of depressed mood, and loss of interest or pleasure in activities which can cause damage in social, occupational and functional actions of an individual[21]. Depressive symptoms among patients with COPD are considered the main psychiatric comorbidity of this group, representing the systemic and extra pulmonary disease stage[3,21-23] capable of determining a decrease in functionality, development of activities[24,25], and quality of life[5].

The occurrence of depressive symptoms in patients with COPD may be due to chronic disease, decreased physical capacity and occupational performance, anticipation of retirement, functional limitations related to the execution of daily activities, and low self-esteem[26].

Our study showed a 38.6% prevalence of depressive symptoms, a little higher than that found in the study by Zhang et al.[16], which identified a 24.6% prevalence of depressive symptoms in patients with COPD compared to the control group, and also found that patients with COPD were 2.8 times more likely to have depressive symptoms. Oliveira and Gonçalves[21] showed that depressive symptoms compromise 10-60% of these individuals, and factors such as smoking, social isolation, use of medications for COPD treatment (corticosteroids, bronchodilators) can cause psychiatric symptoms or intensify problems such as depressive mood, mania, psychosis, delirium, or behavioral changes, which is similar to the findings in our study.

Comorbidities in patients with COPD are a common feature when dealing with an inflammatory disease[23,27,28]. Depressive symptoms in patients with COPD are an important and prevalent comorbidity associated with mortality[7,29], thereby worsening the health condition and functional status of the individual[30]. According to our results, patients with depressive symptoms had more comorbidities, which can worsen the clinical course of COPD due to their inflammatory nature[28].

Compromised ADL were high in the group with depressive symptoms, indicating worse performance for all related activities, showing greater restriction in the execution of activities and loss of functional autonomy. ADL are related to actions which are performed daily by a person and correspond to an individual's ability to dress, feed, bathe, groom, and move[31], and when involved with depressive symptoms can result in a patient's loss of functionality[11-13,32,33], autonomy and independence[21].

Altenburg[11] and Mauoa[32] reported difficulties for patients with anxiety and depression in performing daily physical activities[11], and they also found that the presence of comorbidities and depression are associated with significant impairment in the quality of life of these individuals[32].

Bendixen et al.[12] also found inefficiency in performing tasks involving patients with COPD, and about 90% reported tiredness and more effort in order to perform such activities; this is similar to our study, although the patients with COPD had no depressive symptoms. Functional limitations in activities of daily living may not only be perceived by patients due to the severity of lung disease, because their level of physical activity, which is required for ADL, is hindered by dyspnea[3,34].

Reduced exercise capacity is a common complaint among patients with COPD and this restriction in performing activities of daily living can be explained by extra-pulmonary manifestations of the disease and musculoskeletal dysfunction. The latter can be attributed to the presence of the systemic inflammatory process of the disease, chronic inactivity, malnutrition, smoking, hypoxemia, and use of medication for treatment, which favor the individual's poor physical conditioning[35].

Although all areas of PFSDQ are compromised, it is observed that the activities related to patient mobility (walking on an inclined plane, climbing 3 steps, walking on uneven ground and walking 3 meters) were proven to be more limited, requiring greater effort in their lower limbs. This fact may be related to patients with COPD having peripheral muscle dysfunction and reduced ability to exercise, which is associated with changes in strength and musculoskeletal structure (reduced muscle strength and atrophy of muscle fibers), as well as psychological repercussions[36].

The main limitation of this study was that we did not perform spirometry evaluation, but, in order to compensate this, we report the last spirometry achieved in the medical records.

The presence of depressive symptoms was relatively high among patients with COPD, and ADL were compromised in this group of patients. A lack of screening to detect these symptoms may contribute to the maintenance or worsening of clinical symptoms of the disease and increase the number of comorbidities, since COPD is an inflammatory systemic disease with extra-pulmonary manifestation.

IMPLICATIONS FOR THE PRACTICE OF PHYSICAL THERAPY

Suffering from ADL may result in loss of functional autonomy and worsening of depression symptoms, making it necessary to investigate and treat them. Lastly, we suggest that the assessment of ADL must be part of clinical practice so that changes in this area can be detected and treated at an early stage.

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