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Chronic obstructive pulmonary disease: daily life activity and quality of life

Doença pulmonar obstrutiva crônica: atividade de vida diária e qualidade de vida

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RESUMO | INTRODUÇÃO: A qualidade de vida (QV) é um instrumento relevante para o contexto funcional na doença pulmonar obstrutiva crônica (DPOC), a escala *London Chest Activity of Daily Living* (LCADL) avalia a atividade de vida diária (AVD) em pacientes com DPOC. **OBJETIVO:** avaliar a capacidade em realizar AVD e a QV dos pacientes com DPOC que buscam serviço público de reabilitação pulmonar (RP). **MÉTODOS:** Pesquisa transversal, realizada de 2014 até 2017, 27 pacientes diagnósticados DPOC leve a grave de acordo os critérios GOLD, de ambos os sexos, estáveis, sem exacerbações recentes. Foi utilizado ANOVA para analisar diferença entre as médias de LCADL e *Saint George's Respiratory Questionnaire* (SGRQ) em seguida o teste pos- HOC de Turkey para delimitar o impacto de cada preditor separadamente. Utilizou-se o teste de Spearmann para correlacionar LCADL e SGRQ. **RESULTADOS:** Encontrada limitação leve para todos os domínios da escala LCADL 22,7 ± 8,4 pontos com 30,2% de limitação. A QV é impactada em todos os domínios (31,2 ± 11,6 pontos) de forma moderada a grave com 41,6% de redução. A dispnéia e a fadiga interferem de forma correlata na AVD, r = 0,78 (p < 0,05). O escore LCADL correlaciona-se diretamente com a QV, r =0,59 (p < 0,05). **CONCLUSÃO:** Os pacientes apresentam limitação na atividade de vidade diária e impacto na qualidade de vida, além de forte correlação entre o índice de dispneia da escala LCADL e seus domínios.

PALAVRAS-CHAVE: Doença pulmonar obstrutiva crônica. Atividade de vida diária. Qualidade de vida.

ABSTRACT | INTRODUCTION: Quality of life (QoL) is an important tool for the functional context in chronic obstructive pulmonary disease (COPD), the scale London Chest Activity of Daily Living (LCADL) evaluates the activities of daily living (ADL) in patients with COPD. **OBJECTIVE:** to evaluate the ability to perform ADL and QoL of patients with COPD seeking public pulmonary rehabilitation (PR) service. **METHODS:** Cross-sectional study, carried out from 2014 to 2017, 27 patients diagnosed COPD mild to severe according to the GOLD criteria, of both sexes, stable, without recent exacerbations. ANOVA was used to analyze difference between the means of LCADL and Saint George's Respiratory Questionnaire (SGRQ) followed by Turkey's post-HOC test to delimit the impact of each predictor separately. The Spearmann test was used to correlate LCADL and SGRQ. **RESULTS:** Light limitation was found for all domains of the LCADL scale, 22.7 ± 8.4 points with a 30.2% limitation. QoL is affected in all domains (31.2 ± 11.6 points) in a moderate to severe manner, with a 41.6% reduction. Dyspnea and fatigue correlate with ADL, r = 0.78 (p <0.05). The LCADL score correlated directly with the QoL, r = 0.59 (p <0.05). **CONCLUSION:** Patients present a limitation in daily activity and impact on quality of life, as well as a strong correlation between the dyspnea index of the LCADL scale and its domains.

KEYWORDS: Chronic obstructive lung disease. Activity of daily living. Quality of life.

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is characterized by the persistence of airflow limitation that is usually progressive and associated with an advanced chronic inflammatory response in the airways and lungs to harmful particles or gases, however, some determinants such as pulmonary function are used to assess the degree of disease and prognosis.[1-4]

In view of the global impact on the health of patients with COPD, and considering the respective diseases, in addition to the reduction of public pulmonary rehabilitation services in Brazil and Bahia, it is necessary to evaluate the activities of daily living (ADLs) and the quality of life (QoL) of these patients.

Researchers define ADLs as occupational performance tasks that the individual performs every day. It is part of these AVDs, tasks such as personal hygiene, answering a telephone, body mobility, sitting, among others.[5] Thus, in order to verify the daily life activity of patients with COPD, the scale6 London Chest Activity of Daily Living (LCADL), aims to evaluate ADLs in the face of the functional incapacity of patients with COPD, helping in the treatment and making it more efficient, by identifying and specifying the individual difficulties of the patients.[6]

The QoL assessed by the Saint George's Respiratory Questionnaire (SGRQ) is a relevant topic in the social and scientific context and reflects the assessment of the individual's health condition. It presents several concepts and approaches, used for the understanding of the subject that is subjective. According to the World Health Organization the term quality of life reflects the individual's perception that their needs are being met, or that they are being denied opportunities to achieve happiness and self-fulfillment, regardless of their state of health physical or social conditions.[7]

The objective of this research was to evaluate the capacity to perform daily life activity and the quality of life of patients with COPD seeking public pulmonary rehabilitation service.

Methods

This is a cross-sectional descriptive study, consecutive sampling, performed at the Clinical School of Physiotherapy of the Health Sciences Institute of the Federal University of Bahia (CEF-UFBA), Salvador-Bahia, from 2014 to 2017, in patients diagnosed with COPD , who voluntarily sought the pulmonary rehabilitation service.

Twenty-seven patients were surveyed based on a sample calculation carried out in the laboratory's epidemiology and statistics program, with a survey[8] that showed a standard deviation for the SGRQ test of 20.0 and a significance level of 1% and considering a 20% sample loss and instituted test power 80%.

Patients with COPD were included, with stage of mild to severe disease according to the criteria of GOLD,1 without exacerbations in the last three months of disease. Patients with cognitive impairment and body perception that influence the ability to perform the study protocol and patients who did not consent to study participation were excluded.

Research approved in ethics and research committee of the Health Sciences Institute of the Federal University of Bahia, number 924.919 (CAAE: 38378714.8.0000.5662). All the participants received clarification on the research and signed the Informed Consent Term.

Instruments

For weight and height measurement, an anthropometric mechanical scale was used 150 kg x 100 g, platform 30 x 40 cm, Micheletti Balancas brand – M . The patients were without footwear and light clothing. From these values, the Body Mass Index (BMI) was calculated. A cut-off point was considered normal BMI (18.5 to 24.9 kg / m²) for the overweight category (25.0 to 29.9 kg / m²) and obesity (> 30 kg / m²). following the recommendation of the World Health Organization[9] and by the National Heart, Lung, and Blood Institute of the National Institute of Healt.[10] The socio-demographic variables of individuals as follows: schooling, gender, age and associated diseases as self- reported.

The perception of ADLs and QoL in the patients was evaluated through the LCADL scale and the SGRQ questionnaire, respectively, performed in a quiet and reserved environment, by a previously trained team.

The LCADL scale is divided into four domains, totaling fifteen items with scores ranging from 0 to 5. Domains are related to personal care, physical activities, domestic activities and leisure. These items satisfy the activities most practiced in the patient's daily life. The higher the value, whose maximum is equal to 75 points in the scale, the greater the limitation in the ADLs.[11-12]

The evaluation of ADLs through the LCADL scale covers fifteen items, subdivided into four domains: personal care (4 items with a maximum score of 20 points); domestic activities (6 items with a maximum score of 30 points); physical activities (2 items with a maximum score of 10 points) and leisure (3 items with a maximum score of 15 points), resulting in a maximum of 75 points. For each item is considered values from 0 to 5 corresponding: (0) I do not perform this activity; (1) I do not feel any breath when performing this activity; (2) I feel moderate shortness of breath when performing this activity; (3) I feel a lot of breath when performing this activity; (4) I can no longer perform this activity due to lack of air and I have no one who can do it for me; (5) I can not perform this activity anymore and I need someone to do it for me because of the lack of air.

Scores were used to analyze the LCADL scale data to diagnose the level of limitation for ADLs. The score was calculated for each domain and with the total, each item has a specific "weight", with a variation of 0 - 100%. Values below 20% are considered normal, 21-40% (mild limitation for ADLs); of 41-60% (moderate limitation for ADLs); of 61-80% (severe limitation for ADLs) and 81-100% (very severe limitation for ADLs). For global analysis of the impact of dyspnea on ADLs, the values 5 were considered "very", 3 for "little" and 0 for "nothing").

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The SGRQ validated in Brazil in 2000 developed in order to evaluate the QoL of patients with chronic obstructive pulmonary disease. This questionnaire contains three domains: symptoms, activities and psychosocial impacts that inflict the individual with respiratory disease on COPD, divided into two parts, subdivided into seven sections with seventy-six items, obtaining the maximum score of 75 points.[13]

The symptom domain corresponding to part 1 with a maximum score of 28 points; activities, corresponding to part 2, section 2 and 6 with a maximum score of 16 points; impacts, corresponding to part 2, section 1, 3, 4, 5 and 7 with a maximum score of 31 points, totaling 75 points. The score was calculated for each domain and with the total, each item has a specific "weight", with a variation of 0 - 100%. Values below 10% are considered normal; 11-25% (slight impact on QoL); of 26-45% (moderate impact on QoL); (severe impact on QOL) and 76-100% (very severe impact on QOL).

Statistical analysis

Assembly of the database and statistical analysis was performed in SPSS software for Windows (version 21.0). To evaluate the normality in the distribution of the variables of interest, a Shapiro-Wilk test was used. Continuous variables with normal distribution were expressed as mean and standard deviation. Already the nominal and ordinal variables were expressed in absolute and relative frequency. The Wilcoxon test was used to analyze differences between the means of the LCADL and SGRQ domains with known risk predictors for loss of functionality and quality of life, the Turkey post-HOC test to delimit the impact of each predictor separately, and the Spearmann test was used to correlate the variables of all domains of LCADL and SGRQ, expressed by the value of "r". The intensity of the correlation was small ("r" up to 0.25), low ("r" between 0.26-0.49), moderate ("r" between 0.50-0.69), high "R" between 0.70-0.89) and very high ("r" above 0.90).[14] Considered a $p < 0.05$ as a statistically significant difference.

Results

The study was conducted with 27 patients from the Clinical School of Physiotherapy of the Health Sciences Institute of the Federal University of Bahia with mild to severe COPD according to the criteria of GOLD1 and participants in a pulmonary rehabilitation program. Data on sociodemographic characteristics are shown in table 1.

Table 1. Socio-demographic and clinical data of the 27 patients.

	Mean ± SD	n (%)
Age, years	67.4 ± 7.2	
Gender, Male		17 (63)
BMI	24.5 ± 7,0	
FEV1	1.25 ± 0.54	
FVC	2.17 ± 0.80	
FEV_1/FVC	0.57 ± 0.1	
Education:		
Illiterate		07 (25.9)
Fundamental		02 (7.4)
Medium		02 (7.4)
Higher		16 (59.2)
Retired, yes:		13 (48.1)
Comorbidity, yes:		20 (74%)
Respiratory comorbidity (non-exacerbated asthma)		02 (7.4)
Cardiopathy		04 (14.8)
Obesity		02 (7.4)
SAH		08 (29.6)
Diabetes Mellitus		02 (7.4)
Orthopedic Comorbidity		02 (7.4)

BMI: Body mass index; FEV1: Forced expiratory volume in the first second; FVC: Forced vital capacity; SAH: Systemic arterial hypertension.

Table 2 shows the points of perception of dyspnea and the domains of the LCADL scale.

Table 2. Results of LCADL scale, expressed as mean with standard deviation and in percentage of impact on quality of life.

	Mean ± SD	Limitations of ADLs	Score
LCADL (Total):	22.7 ± 8.4	30.2%	LL
Domain Personal Care	5.6 ± 2.3	28%	LL
Domain Domestic Activities	8.4 ± 6.0	28%	LL
Physical Activities Domain	4.0 ± 1.6	40%	LL
Leisure Domain	4.5 ± 1.7	30%	LL
MRC dyspnea	3.2 ± 1.5	-	

ADLs: Activities of daily living; LCADL: London Chest Activity of Daily Living; MRC: Medical research council; LL: light limitation for ADLs.

Table 3 shows the domains of the SGRQ scale with the respective impact of COPD on patients' quality of life.

Table 3. Result of the SGRQ questionnaire, expressed as mean with standard deviation and percent impact.

	Points	Impact on QOL	Score
SGRQ (Total):	31.2 ± 11.6	41.6 %	MI
Domain Symptoms	12.4 ± 5.1	44.3 %	MI
Domain Activities	8.5 ± 3.9	53.1 %	SI
Domain Impacts	10.9 ± 6.2	35.2 %	MI

QoL: Quality of life; SGRQ: Saint George's Respiratory Questionnaire; MI: Moderate impact on quality of

The LCADL dyspnea score was 3.2 ± 1.5, using the medical research council (MRC), whose score varies from 0-5 points, and it is considered light how much the lack of air affects the ADL of these patients, meaning that the patient is able to perform the activity, in a more time-consuming way, until it is finished.

Table 4 and 5 present, respectively, the correlations of the evaluation instruments and the impact of the independent variables on the variables of interest of the LCADL and the SGRQ.

Table 4. Correlation between the LCADL scale and the SGRQ questionnaire.

		SGRQ DOMAINS POINTS			
		Symptoms	Activity	Impacts	Total
LCADL DOMAINS POINTS	DP	0.35	0.57*	0.6*	0.77*
	DD	0.20	0.27	0.23*	0.33
	PA	0.0	0.60*	0.43*	0.40*
	Recreation	0.08	0.40*	0.17	0.28*
	Dyspnea	0.33	0.78*	0.62*	0.67*
	Total	0.26	0.57*	0.40*	0.59*

SGRQ: Saint George's Respiratory Questionnaire; LCADL: London Chest Activity of Daily Living; DP: Domain care Personnel, DD: Domestic domain, PA: Physical activity domain. * P <0.05.

Table 5. Impact of the independent variables on the variables of interest for the sample.

	n (%)	LCADL	*p*	SGRQ	*P*
Dyspnea -MRC	27 (100)	9.9 ± 2,0	<0.01*	10.8 ± 2,1	<0.01*
Sex, male\female	17 (63%)	-4.8 ± 3,5	0.20	-2.4 ± 5,3	0.66
Retired, yes - no	13 (48,1)	10.3 ± 3,3	0.01*	4.0 ± 5,5	0.43
Illiterate, yes - no	7 (25,9)	5.2 ± 4,8	0.45	6.0 ± 8,2	0.47
SAH, yes - no	8 (29,6)	2.9 ± 3,3	0.42	4.7 ±3,8	0.35
Diabete mellitus, yes - no	2 (7,4)	5.0 ± 4,3	0.40	- 5.6 ± 8,6	0.64
Obese, yes - no	2 (7,4)	8.7 ± 3,1	0.02*	2.7 ± 6,0	0.71
Respiratory comorbidity, yes - no	2 (7,4)	-0.9 ± 4,4	0.83	-2.4 ± 5,4	0.66
Orthopedic Comorbidity, yes - no	2 (7,4)	0.9 ± 6,3	0.97	-10.5 ± 7,8	0.22
Cardiopathy, yes - no	4 (14,8)	3.7 ± 2,4	0.14	5.9 ± 5,0	0.38

MRC: Medical Research Council; LCADL: London Chest Activity of Daily Living; SGRQ: Saint George's Respiratory Questionnaire; SAH: Systemic arterial hypertension; Post HOC of Tukey demonstrate difference with statistical significance for LCADL or SGRQ between MRC 1-3 (p = 0.01) and MRC1-5 (p = 0.01).

In a more detailed analysis of the correlation of dyspnea index of the LCADL scale with the respective domains, we found a high correlation with personal care r = 0.77 (p <0.05), moderate correlation with physical activity r = 0.53 (p <0.05) and the total of the scale r = 0.66 (p <0.05), low corelation with domestic activities r = 0.37 (P = 0.20) and leisure r = 0.34 (p = 0.34). In spirometry, we found a statistically significant correlation between forced expiratory volume in the first second r = 0.50 (p <0.05) and forced vital capacity r = 0.50 (p <0.05) with disease impact on the SGRQ questionnaire.

Discussion

Considering that there is no gold standard instrument for the functional evaluation of patients with COPD, we sought in this research to understand and evaluate the limitation for the ADL and QOL of patients with COPD. In general, we found patients with mild limitation for the performance of ADLs and moderate to severe impact on quality of life, with moderate correlation to the functional aspects of spirometry. In the comparison of age in relation to the LCADL and SGRQ instruments, we found a lower daily physical activity for the elderly group, which can be explained by the presentation of COPD-associated cormobidity and the prevalence of dyspnea in the study population.

Regarding BMI, it was observed that the sample analyzed presented a normality score, as well as, identified in a research[15] with the same demographic characteristic (BMI of 24.8 ± 5), this index can be explained by the multidisciplinary follow-up of the patients in this study, which may nutritional awareness of this population. An inverse result was seen in a platinum study in the city of São Paulo, which identified almost two-thirds of the sample (62.7%) of COPD subjects being overweight or obese.[16] For the authors Pitta et al.,[17] BMI can not be a However, it is perceived that the risk of chronic diseases, such as cardiovascular diseases, is directly associated with BMI.

It was found light limitation for all domains of the LCADL scale, similar to research,[18] with the greatest impact (40%) on physical activities. The study observes that patients with COPD spend most of their time in inactive posture, showing sedentary lifestyle, justified by the consequences of the disease, such as airflow obstruction, dynamic hyperinflation and reduction of peripheral muscle strength leading to reduced functional capacity and exercise.

Dyspnea and fatigue interfere in a correlated way in the ADL of these patients. We found a moderate correlation between dyspnea on physical activity and total LCADL scale and high correlation with personal care. Dyspnea is a symptom that limits exercise capacity in patients with COPD, this is due to the greater degree of effort required and directed to muscles with reduced muscle strength which leads to reduced daily activity such as combing, dressing , washing, brushing and even talking.[19] It is important to note that a minimum change of four points on the LCADL scale after pulmonary rehabilitation is indicative of an improvement in the functional status for the ADLs of these patients.[20]

However, when analyzed how much breathlessness affects ADL such patients, LCADL found, on average, mild impact of dyspnea to perform these activities. Pitta et al.[21] demonstrated that the degree of dyspnea and worsening of functional capacity caused by physical inactivity detects QOL in patients with COPD.

The World Health Organization[22] states that reduced mobility, a situation that often occurs in patients with respiratory disorders, worsens well-being and self-sufficiency, resulting from impairment, in the ability to perform in ADLs. The accumulation of fat in the thoracic and abdominal region leads to important respiratory changes, such as increased ventilatory work, decreased thoracic complacency and, consequently, increased dyspnea.[23]

In the SGRQ questionnaire analysis, QOL is moderately to severely impacted in all domains, according to research that demonstrated that QOL is impaired in COPD patients and deteriorates considerably with the increase in disease severity and is associated with a significant increase in QOL SGRQ score.[24]

SGRQ and LCADL were correlated, since in both the higher the score the worse the patient's limitation and

QoL, respectively. We demonstrated a moderate and statistically significant correlation in the total score of these evaluative indicators, with a greater impact on the personal care and dyspnea of the LCADL and on the physical activity in the SGRQ, clearly indicating that the impact of dyspnea on the ADL leads to a worse QOL in patients with COPD of this study. Factors related to activity limitation can contribute negatively pre-emptively in the life of these patients. Barusso et al.[25] demonstrated that patients staged with level 4 GOLD1 have more disabilities in LCADL and SGRQ.

High reproducibility and effectiveness in the application of the LCADL scale is perceived, since all domains present a positive correlation with the scale total. On average, SGRQ domains show that patients' quality of life is moderately aggravated with emphasis on physical activity. Influence of this fact is a great contribution to injury in QOL. Older patients are more susceptible to COPD injuries, which directly influence the performance of AVDS.

Conclusion

We conclude that there is a limitation in daily activity and impact on quality of life, as well as a strong correlation between the dyspnea index of the LCADL scale with the respective domains such as personal care, physical activity and total scale. Regarding spirometry, we found a moderate correlation between forced expiratory volume in the first second and forced vital capacity with the disease impact domain in the SGRQ questionnaire.

Author contributions

Silva CMS participated in the conception, data collection, statistical analysis and writing. Pinto Neto AC participated in the design and writing. Nepomuceno Junior BRV participated in the analysis of statistical data, results and contributed to the discussion of the results. Teixeira HP participated in the design, data collection and writing. Saquetto MB participated in the design of the study, analysis of statistical data, writing of results and discussion. Souza-Machado A supervised the research, contributed to the discussion and the results.

Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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