

Assessment of patients with functional chronic obstructive pulmonary disease through WHODAS

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ABSTRACT

Measurement of Activities of daily living (ADLs) in patients with COPD is a commonly used instrument and supported by the International Classification of Functioning (ICF). **Objective:** Evaluate the functional disability in patients with chronic obstructive pulmonary disease (COPD) by the World Health Organization Disability Assessment Schedule (WHODAS). **Methods:** This cross-sectional study that evaluated 24 patients at the beginning of a pulmonary rehabilitation program with WHODAS 2.0 questionnaire. The statistical analysis was descriptive and inferential analysis with the Spearman correlation coefficient with 5% significance level. **Results:** The data obtained with the total scores of domains and scales in the evaluation of patients were compared using the Mann-Whitney test. Patients had mild functional disability. The total score WHODAS 2.0 was higher in younger than 60 years (35.3 ± 16 vs 14.4 ± 8.6 ; $p = 0.05$) and males (12.1 ± 6.7 vs 25.2 ± 15.1 ; $p = 0.03$) part will introduce greater disability. There was also a correlation between the domain "daily activities" with the domain "participation" ($r = 0.771$; $p < 0.001$). **Conclusion:** The 2.0 WHODAS was rated as a feasible tool for the assessment of disability in activities of daily living (ADL's) of COPD patients. The results also revealed that community patients out of the COPD crisis, have moderate to mild difficulty in mobility to social participation domains.

Keywords: Pulmonary Disease, Chronic Obstructive, Activities of Daily Living, Physical Therapy Modalities, International Classification of Functioning, Disability and Health

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INTRODUCTION

The Pulmonary Obstructive Chronic Disease (COPD) is characterized by a persistent limitation to the aerial flow which is generally progressive and associated to a chronic inflammatory response of the respiratory tract and lungs towards particles or toxic gases. It is estimated that until 2020, COPD will be the third cause of mortality around the world.¹⁻³

The spirometry measures the seriousness of the disease,⁴ whereas the forced expiratory volume in the first second (FEV1) is the best predictor of the respiratory tract obstruction, however it presents weak correlation to dyspnea⁵ and to the performance of the activities of daily living.⁶

The gas exchange deficit and the mechanical deprivation evoked by the pulmonary degradation of COPD promote a reduction in the respiratory muscle strength and in the dyspnea threshold, as well as a reduction in the tolerance to physical exercise and in quality of life.³ The physical rehabilitation targets mainly the control of the pulmonary hyperinflation due to air imprisonment and the dyspnea reduction. The benefits obtained with physiotherapy in patients with COPD include the tolerance to the physical exercise and the capacity to execute the activities of daily living (ADL).⁷

Some studies have evidenced the progressive and devastating impact of COPD over the respiratory capacity and the tolerance of physical exercise due to muscle mass loss. Consequently, there is a reduction in quality of life and ADL, increasing the risk for mortality, hospitalization, and survival reduction. Evaluation tools, upheld in objective scores for stratifying the magnitude of the functional disability and its impact on health condition and social interaction of the patient, must be encouraged.

Measuring the ADL of patients with COPD is a commonly performed activity, once it is cheap and easily reproducible. Its objective is to identify, characterize, and evaluate the capacity to execute elementary functional activities. The tools for measuring the ADL are included in the domains of the International Classification of Functioning, Disability and Health (ICF) that is published by the World Health Organization (WHO).⁸⁻¹⁰

The World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0), developed by the WHO, is a general instrument that evaluates the limitations and restrictions of participation in ADL, independently on the disease.⁸

In the literature, the number of quantitative scores for quantifying the impact of the physical disability onto functionality and ADL of COPD patients is limited.

OBJECTIVE

The objective of the present study is to evaluate the functional disability of patients with chronic obstructive pulmonary disease by applying the WHODAS.

METHODS

This is a cross sectional study, which was executed in the *Clínica Escola de Fisioterapia* of the *Instituto de Ciências da Saúde da Universidade Federal da Bahia* - Brazil from October 2014 to May 2015. Prior to the study, the sample size was estimated by the Statistics and Epidemiology Laboratory (LEE), based on the study of Simon KM et al.,⁹ whose objective was to verify the association between the score of the daily living activities scale and the mortality predictor BODE of patients with COPD, assuming an alpha error of 5%, statistical power of 80%, and the standard deviation of 9.8%.

The inclusion criteria were: Patients with COPD as diagnosed per the criteria of GOLD (Global Initiative for Chronic Obstructive Lung Disease),¹ aging from 40 to 85 years, and without any aggravation of the disease three months prior to inclusion. Patients with cognitive disorders or with disorders of corporal perception which hindered the execution of the protocol, and those who did not sign the Informed Consent Form were excluded.

The study was approved by the Ethics Review Board of the *Instituto de Ciências da Saúde/UFBA*, approval no. 924.919, and was executed per the regulations for research with humans, to the resolution 466/12-MS - Brazil. Before any procedure, all the patients signed the Informed Consent Form, allowing their participation in the study.

Scales and evaluation flow

All patients included in the study were previously evaluated by pneumologists and were diagnosed with COPD. The evaluation procedure was performed in a climatized room, prepared for this purpose, by a trained team for minimizing measurement bias. The anthropometric evaluation was implemented by the Anthropometric Scale model Micheletti

(Ítaca Com. Equip. Ltd, São Paulo/Brasil). For calculating the Body Mass Index (BMI), the weight was measured in kilograms and divided by the squared height, in square meters. The reference values were: normal weight (20.0 - 24.9 kg/m²), overweight (25.0 - 29.9 kg/m²), and obese (> 30.0 kg/m²).¹⁰ After the anthropometric measures, a questionnaire on sociodemographic data was applied followed by the WHODAS 2.0.

The WHODAS 2.0 is a tool developed by WHO, already validated in Brazil, for evaluating the limitations in activities and participation restrictions.⁸ In the WHODAS 2.0, the disability is assessed, independently on the severity of the disease or the previous health condition. The questionnaire is composed of six domains, matching the ICF: 1) Cognition: it measures the capacity of formulating thoughts and communication; 2) Mobility: it measures the capacity to stand, move around the house, stay outdoors and walk long distances; 3) Self-care: it measures the capacity for grooming, dressing, feeding and staying alone; 4) Relationship: It measures how hard it is to deal with others due to the health condition and it evaluates the interpersonal interactions; 5) Daily activities: it measures the capacity of executing daily activities embedded in the homebased responsibilities, leisure, work and study; 6) Participation: it measures the social condition in which the patient is inserted such as community activities, barriers and obstacles, as well as other aspects affected by the health condition of the patient.⁸

The WHODAS 2.0 was designed to evaluate the functionality in 6 activity domains: Cognition (maximum of 20 points), Mobility (maximum of 16 points), Self-care (maximum of 10 points), Interpersonal Relations (maximum of 12 points), Daily Activities (maximum of 10 points), and Participation (maximum of 24 points), forming a total of 92 points, adapted per instruction of Üstün et al.¹¹ For scoring each domain, 1 is attributed for no disability, 2 for mild disability, 3 for moderate disability, 4 for severe disability and 5 for extreme disability.

For analyzing the total result, the sum of all domains, the scale was categorized as follows: 0 - 4% (no difficulty); 5 - 24% (mild difficulty); 25 - 49% (moderate difficulty); 50 - 95% (severe difficulty); and 96 - 100% (complete difficulty/disability).¹²

For the statistical analysis, the software Statistical Package for Social Sciences (SPSS) for Widows, version 17.0 was used. The normality and distribution of the sample was tested

with Shapiro-Wilk statistics. The correlation among the studied variables, as to identify the degree of correlation as expressed by the “r” value, was verified by the Spearman statistics test. The correlation was graded as slight ($r < 0.25$), mild ($0.26 < r < 0.49$), moderate ($0.50 < r < 0.69$), strong ($0.70 < r < 0.89$), and very strong ($r > 0.90$), as suggested by Gloss et al.¹³ The total score of WHODAS 2.0, all the socio-demographic variables, and specific domains of the WHODAS 2.0 were correlated. The tables present only the variables which were considered statistically significant. The level of statistical significance established for the study was 5%. The non-parametric Mann-Whitney statistics was used or evaluating the difference of age and sex, with p -value < 0.05 .

RESULTS

The study was performed with 24 patients of the *Clínica Escola de Fisioterapia* of the *Instituto de Ciências da Saúde da Universidade Federal da Bahia* - Brazil, who were diagnosed with moderate or severe COPD per GOLD criteria,¹ composed of 14 men (59%) and 10 women (41%). The Table 1 presents the characteristics of these patients. Amongst the concomitant diseases reported by the patients, 11 (45.8%) had systemic hypertension, 5 (20.8%) had pneumopathy such as asthma and bronchiectasis, and 5 (20.8%) had cardiac arrhythmia and coronary artery disease. The most frequent educational level was college graduation (37.5%) and the average schooling time was 11.1 ± 5.5 years.

In the Table 2, the WHODAS 2.0 results are presented, organized according to the domains: cognition, mobility, self-care, interpersonal relations, daily activities (homebased and work), participation and total score.

It is possible to observe straight correlations between the total WHODAS 2.0 score, its domains and the male group of the sample. There were no significant correlations between the WHODAS and the other sociodemographic variables (Table 3).

No relation between FEV1 (forced expiratory volume in the first second) and FVC (forced vital capacity) was found with the domains of the scale. The patients younger than 60 years of age (35.3 ± 16) presented broader disability ($p = 0.005$) when compared to patients above 60 years of age (14.4 ± 8.6). In the analysis between the sexes, men presented higher functional capacity (12.1 ± 6.7 vs 25.3 ± 15.1 ; $p = 0.03$) as compared to women.

Table 1. Sociodemographic characteristics of the 24 COPD patients included in the sample

	Mean \pm SD	N (%)
Sex, male		14 (58.3)
Age	68.0 \pm 7.7	
BMI	25.8 \pm 4.8	
FEV1	1.25 \pm 0.54	
FVC	2.16 \pm 0.83	
FEV1/FVC	0.58 \pm 0.1	
Concomitant diseases:		
Systemic Hypertension		11 (45.8)
Pneumopathy		05 (20.8)
Cardiopathy		05 (20.8)
Diabetes Mellitus		02 (8.3)
Lower limbs arthritis		02 (8.3)
Education:		
College		09 (37.5)
Secondary school		05 (20.8)
Primary school		09 (37.5)
Illiterate		01 (4.2)
Schooling time (years)	11.1 \pm 5.5	
Retired		19 (79.2)

Table 2. WHODAS 2.0 total scores and disability scores followed by the classification

	Mean \pm SD	Disability %	Score
Cognition	2.54 \pm 2.3	12.7	S.D.
Mobility	3.9 \pm 3.3	24.5	S.D.
Self-care	0.9 \pm 2.1	9.2	S.D.
Interpersonal relations	1.6 \pm 2.2	13.9	S.D.
Homebased activities ^a	2.5 \pm 2.8	25.4	M.D.
Work activities ^b	2.8 \pm 2.6	23.8	S.D.
Participation	7.1 \pm 5.1	29.9	M.D.
WHODAS _{total} ^c	18.7 \pm 13.3	20.4	S.D.

WHODAS 2.0: World Health Organization Disability Assessment Schedule 2.0. ^a Domain score without the item “homebased”. ^b Domain score without the items “work”. Disability (%) expresses the percentage of loss in each domain. Score: Disability score in the WHODAS2.0: S.D. (slight difficulty); M.D. (moderate difficulty).

Table 3. Spearman correlation between WHODAS 2.0, its domains and the sociodemographic variables

	DPC	DM	DSC	DIR	DDA	DP	WHODAS _t
Cognition	-						
Mobility	0.238	-					
Self-care	0.195	0.624 ^b	-				
Interpersonal relations	0.545 ^b	0.397	0.179	-			
Daily activities	0.224	0.429 ^a	0.334	0.062	-		
Participation	0.427 ^a	0.365	0.351	0.322	0.771 ^b	-	
WHODAS total	0.603 ^b	0.634 ^b	0.533 ^b	0.529 ^b	0.691 ^b	0.879 ^b	-
Sex, Male	0.539 ^b	0.37	0.514 ^a	0.254	0.548 ^b	0.436 ^a	0.539 ^b

DPC: Domain Personal Care; DM: Domain mobility; DSC: Domain self-care; DIR: Domain interpersonal relations; DDA: Domain daily activities; DP: Domain participation; WHODAS_t: Total of all WHODAS domains; WHODAS: World Health Organization Disability Assessment Schedule; M: male. 2.0; ^a $p < 0.05$; ^b $p < 0.01$.

DISCUSSION

The present study has evidenced that the patients with mild to severe COPD had slight difficulty to perform their daily life activities, except for the homebased domains and participation with moderate condition. It is possible to observe that women and patients younger than 60 years of age presented higher disability.

The sample was mostly composed by aged patients (75%), with mean age of 68 ± 7 years, age group which is more susceptible to health complications when compared to other age groups. Another important fact is that, as reported by the *National Policy on Health for the Aged Person* (PNSPI), established in 2006 by the Brazilian Ministry of Health, the main issue that affects the aged people is the loss of functional capacity.¹⁴

The evaluated patients, whose mean BMI was 25.7 km/m^2 , were classified as overweight. This finding sets these individuals apart from he estimates that 30 to 70% of the chronic obstructive sick patients have cachexia, also not relating them to higher mortality rate.¹⁵ Debigaré et al. assures that low BMI represents decrease of the peripheral muscle mass, and consequently a decrease in the capacity to execute the ADL.¹⁶ Nonetheless, the BMI may not be a good marker of the level of daily activities,⁶ since there are many variables that interfere in quantifying the index.

The evaluated sociodemographic data have shown a variety of diseases among the patients, most of them related to aging, a common finding in the aging population. However, concomitant diseases in COPD patients is not significantly associated with the aggravation of the disease as to request a new hospitalization,¹⁷ a sign that the concomitant diseases may not have hindered the application of WHODAS 2.0, in which the principal outcome is to verify e respiratory impact over the performance of the ADL.

Considering that the present study is the second to evaluate the functional disability of patients with COPD measures with WHODAS 2.0, Cuesta et al.¹² find, in a sample of 102 patients with COPD, a total functional disability score of 26.4 points, with a proportion of no/mild difficulty of 50% of the population.¹² This finding agrees with the finding of our study, 18.7 points of total WHODAS, and assures he low impact of the COPD in the global functional capacity of the patients.

The statistical difference of total WHODAS found among aged patients (> 60 years of age)

compared to other age group, had already been published by a WHO study executed in 59 countries, evidencing that functional disability is more prevalent in aged patients and population of developing countries.¹⁸ Only women achieved scores above 30 points in total WHODAS, reflecting the difference between the sexes when assessed by WHODAS, what can be explained by the higher life expectancy in the female group, given that the life expectation is also associated to the increase of the functional disability.¹⁹ There is also evidence that the feminine population with CPD totally differs from the masculine population, once their diagnosis is faster due to the early clinical manifestations of the disease in women.²⁰

In the Spearman correlation analysis of WHODAS 2.0, there was moderate correlation between the domains "mobility" and "self-care", whereas "cognition" has shown to be related to incapacities in the "interpersonal relation" and "social participation". This result demonstrates that the functional changes have direct correlation to disability, activities, and social participation.

As domains of strong correlation of WHO-DAS 2.0, there is "daily activities" with "interpersonal relations", where both domains are related activities, the act of getting involved and interacting with the community. And, between the domain "participation", that measures the difficulties and obstacles in the social context of the patient with "daily activities", that evaluates the difficulties of ADL of the living responsibilities, leisure and work. The correlation is explained by the proximity of both domains with the social participation as suggested by the International Classification of Functioning, Disability and Health (ICF).¹⁰

In the individual analysis of the questionnaire and their domains, it is possible to observe a stronger impact in the participation, daily activities (homebased) and mobility. A study demonstrates that patients with COPD in Brazil are less active in their ADL when compared to aged healthy subjects, once the patients tend to stay most of their time lying or sitting, as well as they tend to walk with lower movement intensity.²¹ This study pioneers in the adoption of WHODAS 2.0 as a tool for evaluating the disability of a sample of patients with COPD. Its application is feasible, given this is a low-cost tool with easy reproduction and application.

The limiting factors of this study are the convenience sample, restricted to the patients who would voluntarily attend the

physiotherapy clinic where the study was performed, as well as the lack of a control group. The evaluation tool is applied as an interview, what may be confounded by memory bias.

CONCLUSION

The WHODAS 2.0 have been a suitable instrument for evaluating the disability in the ADL of patients with COPD. It has also been found that community patients, out of the COPD crisis, present moderate to mild difficulty in mobility and social participation. These data reassure the need to immerse this population in physiotherapy and occupational therapy programs, preventing greater functional limitations.

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