Influence that sociodemographic variables, clinical characteristics, and level of dependence have on quality of life in COPD patients on long-term home oxygen therapy*

Influência das características sociodemográficas e clínicas e do nível de dependência na qualidade de vida de pacientes com DPOC em oxigenoterapia domiciliar prolongada

Simone Cedano, Angélica Gonçalves Silva Belasco, Fabiana Traldi, Maria Christina Lombardi Oliveira Machado, Ana Rita de Cássia Bettencourt

Abstract

Objective: To evaluate and correlate the quality of life (QoL) of COPD patients on long-term home oxygen therapy (LTOT) with their sociodemographic/clinical characteristics and level of dependence. **Methods:** This was a cross-sectional analytical study involving COPD patients on LTOT followed at the Oxygen Therapy Outpatient Clinic of the Federal University of São Paulo *Hospital São Paulo*, in the city of São Paulo, Brazil. Sociodemographic, clinical, and biochemical data were collected. We assessed QoL and level of dependence using the Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) and the Katz index, respectively. Multiple linear regression models were constructed in order to determine the influence of these variables on QoL. **Results:** We included 80 patients in the study. The mean age was 69.6 ± 9.1 years, and 51.3% were female. The lowest SF-36 scores were for the physical functioning and role-physical domains. All sociodemographic characteristics (except gender) were found to correlate significantly with the SF-36 domains mental health, vitality, role-physical, and social functioning. We also found that body mass index, PaO_2, post-bronchodilator FEV_1, hemoglobin, and Katz index correlated significantly with the physical functioning, mental health, role-physical, and bodily pain domains. In addition, oxygen flows were found to correlate negatively with the physical functioning, mental health, vitality, and role-emotional domains. **Conclusions:** Low scores for SF-36 domains, as well as the variables that negatively influence them, should be considered and analyzed during the development and implementation of strategies for improving the QoL of COPD patients on LTOT.

Keywords: Pulmonary disease, chronic obstructive; Quality of life; Oxygen inhalation therapy.

Resumo

Objetivo: Avaliar e correlacionar a qualidade de vida (QV) de pacientes com DPOC em uso de oxigenoterapia domiciliar prolongada (ODP) com suas características sociodemográficas/clínicas e o nível de dependência. **Métodos:** Estudo transversal analítico com portadores de DPOC em ODP acompanhados no Ambulatório de Oxigenoterapia do Hospital São Paulo, Universidade Federal de São Paulo, em São Paulo (SP). Os pacientes foram avaliados quanto aos dados sociodemográficos, clínicos e laboratoriais. A qualidade de vida e o nível de dependência foram avaliados pelo *Medical Outcomes Study 36-item Short-Form Health Survey* (SF-36) e índice de Katz, respectivamente. Modelos de regressão linear múltipla foram construídos para verificar a influência dessas variáveis na QV. **Resultados:** A média de idade dos 80 pacientes incluídos foi 69,6 ± 9,1 anos, e 51,3% eram do sexo feminino. Os escores dos domínios do SF-36 mais baixos foram capacidade funcional e função física. Correlações significantes foram encontradas entre características sociodemográficas (exceto gênero) e os domínios saúde mental, vitalidade, função física e aspectos sociais, assim como entre várias características clínicas/laboratoriais (índice de massa corpórea, PaO_2, VEF_1 pós-broncodilatador, hemoglobina e índice de Katz) e os domínios capacidade funcional, saúde mental, função física e dor corporal. Houve correlações negativas entre os fluxos de oxigênio e os domínios capacidade funcional, saúde mental, vitalidade e função emocional. **Conclusões:** Os baixos escores nos domínios do SF-36 e as variáveis que os influenciam negativamente devem ser considerados e analisados na elaboração e implementação de estratégias para a melhoria da QV de portadores de DPOC em ODP.

Descritores: Doença pulmonar obstrutiva crônica; Qualidade de vida; Oxigenoterapia.

---

* Study carried out at the Universidade Federal de São Paulo/Escola Paulista de Enfermagem – UNIFESP/EPE, Federal University of São Paulo/Paulista School of Nursing, São Paulo, Brazil.
Correspondence to: Simone Cedano. Rua Napoleão de Barros, 754, Vila Clementino, CEP 04039-002, São Paulo, SP, Brasil. Tel. 55 11 5088-8452. E-mail: simone.cedano@ig.com.br
Financial support: This study received financial support from the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior/Demanda Social (CAPES/DS, Office for the Advancement of Higher Education/Social Demand).
Submitted: 1 November 2011. Accepted, after review: 8 March 2012.

Introduction

A respiratory disease characterized by chronic airflow obstruction that is not fully reversible, COPD is preventable and treatable.[1] Parameters for the diagnosis and staging of COPD are currently available in a consensus document developed by the Global Initiative for Chronic Obstructive Lung Disease (GOLD), a collaborative project of the World Health Organization (WHO) and the US National Heart, Lung, and Blood Institute.[2]

According to the GOLD, spirometry is required in order to diagnose COPD and classify the severity of the disease into one of four stages. An FEV_1/FVC ratio < 70% of predicted confirms the diagnosis of COPD in the presence of risk factors, especially a history of exposure to tobacco smoke, dust, and occupational chemicals, or in the presence of clinical features consistent with COPD, such as dyspnea, chronic cough, and mucus production.[2]

In Brazil, COPD ranks fifth among the leading causes of death, and its prevalence has been estimated to be 12% in individuals over 40 years of age.[1] Various aspects of the symptoms of COPD result from respiratory dysfunction caused by hypoxemia. Although continuous oxygen therapy is one of the recommended strategies to prevent chronic hypoxemia, the use of long-term home oxygen therapy (LTOL) does not translate to full independence in activities of daily living (ADL); this is due to the extent of airflow limitation and to restriction in movements imposed by the stationary device, which are factors that can affect the quality of life (QoL) of patients on LTOL.[3]

According to the WHO, QoL is "the perception that individuals have of their position in life, in the context of the culture and system of values in which they live and in relation to their objectives, expectations, standards, and concerns".[4]

The instruments used in order to measure QoL can be generic or specific. Generic instruments may or may not address the health status of individuals (in an attempt to cover all important aspects related to health) and reflect the impact of a given disease on the individual. Generic instruments can be used for studying individuals in the general population or those in specific groups, such as patients with chronic diseases.

For the present study, we chose to use the Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) in order to assess general aspects of the lives of the patients included, as well as to allow future comparisons with other groups of patients.

The SF-36 was developed in the USA in the late 1980s. The instrument was translated to Brazilian Portuguese and validated for use in Brazil with the objective of assessing the QoL of patients with rheumatoid arthritis, having proved to be appropriate for the socioeconomic and cultural conditions of the Brazilian population,[5] which is why we used this questionnaire.

In order to assess the degree of dependence in ADL, we used the index of independence in activities of daily living, developed by Katz, because of its ease of use and reliability, which have been demonstrated in similar studies.[6,7] The Katz index, developed in 1963, is one of the instruments that measure performance in ADL, i.e., the self-care ability of patients and their ability to meet their basic needs.[6,7]

Although clinical data and treatment are essential to increase the survival of COPD patients, determining QoL and the variables that affect it can provide a basis for interventions by health professionals in order to preserve health and promote well-being.[6] Therefore, the objective of the present study was to assess and correlate the QoL of COPD patients on LTOT with their sociodemographic, clinical, and biochemical characteristics, as well as with their degree of dependence in ADL.

Methods

This was a cross-sectional analytical study conducted between July of 2009 and June of 2011 and involving a convenience sample of COPD patients on LTOT followed at the *Hospital São Paulo* Oxygen Therapy Outpatient Clinic, which is coordinated by the Pulmonology Department of the *Universidade Federal de São Paulo* (UNIFESP, Federal University of São Paulo), located in the city of São Paulo, Brazil.

The study protocol was approved by the UNIFESP Research Ethics Committee (Protocol no. 0730/09), and all participants gave written informed consent.

We selected patients who had been diagnosed with COPD in accordance with the GOLD criteria, who were on LTOT, and who had been under outpatient follow-up treatment for at least three months.

At the medical visit, we interviewed all patients and collected sociodemographic data

(gender, age, level of education, marital status, and per capita income), as well as clinical and biochemical data (duration of oxygen therapy, oxygen flow rate, body mass index [BMI], Katz index, hemoglobin level, spirometric values [FEV_1 and FEV_1/FVC], together with blood gas values [PaO_2, $PaCO_2$, and SaO_2]).

In order to assess QoL, we used the SF-36, which was completed in a quiet environment and without the presence of companions. The interviews were conducted by two previously trained researchers, in accordance with the recommendations of the authors of the instrument. The SF-36 consists of 36 items, which are divided into eight domains: physical functioning; role-physical; bodily pain; general health; vitality; social functioning; role-emotional; and mental health. Scores range from zero (worst result) to 100 (best result).

The degree of dependence in ADL was assessed by the Katz index, which was developed in order to assess functioning in ADL. The instrument measures the ability of individuals to perform a given activity, as well as the independence or degree of dependence of patients in ADL.[7] We used the modified scale, developed by Katz & Akpom in 1976 and assessing six ADL (bathing, dressing, feeding, toileting, transferring, and continence), scores ranging from zero (independence in ADL) to 6 (dependence in all ADL).[7]

Data were analyzed with JMP statistical software, version 8.0.2 (SAS Institute, Cary, NC, USA). The Shapiro-Wilk goodness-of-fit test for normality was used. The correlation between categorical variables and the SF-36 domains was determined by the Wilcoxon test and the chi-square test, whereas continuous variables were analyzed by ANOVA and Pearson's correlation coefficient. Multiple linear regression models were constructed in order to determine the influence of the characteristics studied and the Katz index on the QoL domains. For all analyses performed, the level of significance was set at 5%.

Results

Table 1 shows the sociodemographic, clinical, and biochemical characteristics of the 80 patients evaluated in the present study, as well as the Katz index.

No significant gender predominance was found. Most of the patients were married, had a mean age of 69.6 years, and had a low level of education. Most of the patients were hypoxemic, with reduced lung capacity, and had to remain connected to the source of oxygen for long periods. The patients had a low degree of dependence in ADL, as determined by the Katz index (mean, 0.47 ± 0.98).

Disease severity was classified as stage I or mild COPD, stage II or moderate COPD, stage III or severe COPD, and stage IV or very severe COPD, as defined by the GOLD criteria,[2] in 2.50%, 3.75%, 48.75%, and 45.00%, respectively.

Table 1 - Distribution of the patients by sociodemographic, clinical, and biochemical characteristics, as well as by the Katz index.[a]

Characteristics	Patients (n = 80)
Gender	
Female	41 (51.3)
Male	39 (48.7)
Age, years	69.6 ± 9.1 (48.0-89.0)
Level of education	
Illiterate	14 (17.5)
9 years of schooling	51 (63.7)
High school	12 (15.0)
College	3 (3.8)
Marital status	
Married	44 (55.0)
Widowed	26 (32.5)
Single	10 (12.5)
Per capita income, number of times the MW	1.6 ± 1.6 (0.2-11.1)
BMI, kg/m^2	25.6 ± 6.6 (13.8-52.2)
Duration of oxygen use, h/day	20.1 ± 5.1 (6.0-24.0)
Duration of oxygen therapy, months	45.3 ± 34.8 (3.0-132.0)
Oxygen flow rate, L/min	
At rest	2.0 ± 0.7 (0.0-5.0)
Nocturnal	3.0 ± 0.8 (1.0-5.0)
On exertion[b]	4.0 ± 1.1 (1.0-7.0)
Spirometry	
Post-BD FEV_1 % of predicted	37.4 ± 14.1 (14.0-87.0)
Post-BD FEV_1/FVC, % of predicted	57.3 ± 15.0 (14.0-112.0)
PaO_2, mmHg	54.8 ± 7.9 (36.0-72.4)
Katz index	0.47 ± 0.98 (0.00-4.00)
Hemoglobin, g/dL	14.7 ± 2.2 (10.1-18.9)

MW: (national) minimum wage; BMI: body mass index; and post-BD: post-bronchodilator. aValues expressed as n (%) or as mean ± SD (range). bSix-minute walk test.

All patients were on LTOT. The patients with mild or moderate COPD were hypoxemic and showed evidence of cor pulmonale, as defined by the GOLD criteria.[2]

Of the 80 patients studied, 12 (15.0%), 30 (37.5%), 28 (35.0%), and 10 (12.5%), respectively, were obese, overweight, normal-weight, and underweight, as defined by the WHO BMI classification.

The mean SF-36 domain scores and their standard deviations are shown in Table 2. The lowest scores were for the physical functioning and role-physical domains. The role-emotional, mental health, and bodily pain domain scores were above 50.

Table 2 - Scores on the Medical Outcomes Study 36-item Short-Form Health Survey domains for the 80 patients studied.

Domain	Mean ± SD
Physical functioning	20.1 ± 18.5
Role-physical	23.2 ± 35.3
Bodily pain	61.2 ± 27.4
General health	40.4 ± 25.1
Vitality	43.4 ± 25.0
Social functioning	48.6 ± 32.5
Role-emotional	52.6 ± 46.1
Mental health	57.7 ± 24.4

Some of the sociodemographic, clinical, and biochemical characteristics were found to correlate with the SF-36 domains, as was the Katz index. The results of the multiple linear regression analysis investigating the correlation between the study variables and the SF-36 domains are shown in Table 3.

Discussion

The results of the present study revealed impairment in all SF-36 domains, and the lowest mean scores were for the physical functioning and role-physical domains (20.1 and 23.2, respectively). Similar data were found in a study conducted in Portugal and involving 37 patients on LTOT: a mean score of 6.9 for the physical functioning domain and a mean score of 28.4 for the role-physical domain.[8] Likewise, a study conducted in Brazil found mean scores of 16.9 and 9.7, respectively, for those two domains.[9] In other studies involving similar samples, major changes have also been found in those two domains, which indicates that patients with those characteristics have physical limitations that compromise the performance of ADL.[10,11]

In the present study, the bodily pain domain, despite being impaired, had the highest mean score (61.2) of all eight SF-36 domains, probably

Table 3 - Correlation of the Medical Outcomes Study 36-item Short-Form Health Survey domains with sociodemographic variables, clinical variables, and the Katz index.[a]

Variable	Domain													
	PF		MH		V		RP		RE		SF		BP	
	p	r	p	r	P	r	p	r	p	r	p	r	p	r
Gender														
Age					0.008	−0.29	0.0021	−0.25						
Per capita income					0.02	−0.24								
Marital status			0.04	−0.08							0.031	−0.12		
Level of education					0.045	0.08								
BMI			0.04	−0.24										
Oxygen flow rate														
At rest	0.031	−0.24			0.045	−0.22			0.044	−0.22				
On exertion			0.008	−0.28										
Nocturnal	0.05	−0.21	0.007	−0.29	0.029	−0.24			0.047	−0.22				
PaO_2													0.003	−0.33
Post-BD FEV_1	0.0305	0.24												
Hemoglobin							0.01	0.23					0.02	0.31
Katz index	0.0076	−0.29					0.048	−0.22						

PF: physical functioning; MH: mental health; V: vitality; RP: role-physical; RE: role-emotional; SF: social functioning; BP: bodily pain; BMI: body mass index; and post-BD: post-bronchodilator. [a]Blank cells in the table indicate no statistically significant correlation.

because pain is a symptom that is not specific to the clinical profile of COPD.[8-11]

Contrary to the literature, which shows a predominance of males among COPD patients in less developed countries, our study sample followed the trend seen in studies conducted in developed countries and reporting a similar prevalence of COPD in males and females, which can be explained by changes in smoking patterns.[2,12] In addition, no significant correlation was found between gender and the SF-36 domains, which is consistent with the findings of other studies.[13,14].

With regard to age, most COPD patients are elderly.[8,14] In the present study, age had a significant influence on the vitality domain ($r = -0.29$; $p = 0.008$) and on the role-physical domain ($r = -0.25$; $p = 0.002$). Advancing age translates to greater impairment in ADL and decreased energy levels. Likewise, in a study conducted in Sweden and involving 202 COPD patients, and in which the SF-36 and the Saint George's Respiratory Questionnaire (SGRQ) were used, lower QoL scores were obtained for patients of more advanced age.[14] Contrary to these results, a study of 30 female patients with COPD showed that QoL was worse in the patients who were younger than in those who were older.[15]

The patients in the present study were found to have a low per capita income (1.6 times the national minimum wage), a finding that is in accordance with those reported in the literature. The influence of income on the QoL of COPD patients remains a subject of controversy. In a recent study conducted in the USA and involving 1,202 COPD patients, low income was found to have been an obstacle to seeking appropriate treatment since the diagnosis of COPD, which was delayed, there being few social support mechanisms.[16] In the present study, the patients with a lower per capita income had lower scores on the vitality domain. Another study, conducted in São Paulo, Brazil, showed that the per capita income had no influence on the QoL domains in the COPD patients studied.[13]

With regard to marital status, most of our patients had a partner. Having a partner correlated with the social functioning and mental health domains, as well as with higher levels of anxiety and depression. Contrary to these results, a study of patients with chronic diseases showed that having a partner had a positive influence on QoL.[17] However, in a recent study involving a similar sample, marital status had no significant influence on QoL.[13] During data collection, our patients constantly spoke of suffering, which was due to the fact that, in most cases, their partners dealt with the disease only because they felt that they had no choice other than to help and support the patients during the course of the disease. In an anthropological study of suffering among COPD patients, the analysis of the discourse of the interviewees revealed that the married patients experienced suffering because they felt that they were a burden on their partners because of the limitations in their sexual life and the disruption of their dreams as a couple, at a time when they should be living their relationship more fully and enjoying their family after having raised their children.[18]

The population of the present study had a low level of education, which influenced the SF-36 vitality domain. This suggests that patients with a higher level of education have more energy and less fatigue, therefore having increased ability to perform ADL. The same finding was reported in another study of COPD patients, in which 15.7% were illiterate and 65.7% had had 9 years of schooling, factors that negatively influenced all QoL domains measured by the SGRQ.[13] Likewise, two other studies involving similar populations showed that a low level of education resulted in worse QoL.[19,20]

Most of the patients in the present study were overweight or obese. Having a higher BMI correlated negatively with the mental health domain. A study conducted in Spain and involving 204 COPD patients showed a negative correlation between BMI and the emotional function domain of a disease-specific QoL questionnaire (the Chronic Respiratory Disease Questionnaire), whereas another study found a negative correlation between BMI and the emotional components of a generic QoL questionnaire.[21,22] These findings are suggestive of emotional instability (anxiety, depression, or behavioral changes) in COPD patients with a high BMI.

The dose of oxygen to be administered should be established on a case-by-case basis by titration of the oxygen flow rate required in order to achieve a PaO_2 of at least 60 mmHg or an SaO_2 greater than 90%, with the patient at rest.[23] In the present study, the oxygen flow rate at rest and the nocturnal oxygen flow rate were

found to correlate with the physical functioning, vitality, and role-emotional domains. In addition to translating to lower scores on the abovementioned domains, the need for a higher oxygen flow rate at night or on exertion influenced the mental health of our patients. To our knowledge, there have been no studies of the relationship between oxygen titration and QoL.

Our patients were hypoxemic, with a mean PaO_2 of 54.8 ± 7.9 mmHg. There was a negative correlation between PaO_2 and the bodily pain domain ($r = -0.33$; $p = 0.003$), which corroborates the results of a study conducted in Germany and involving COPD patients, in which PaO_2 levels were also found to correlate with the SF-36 bodily pain domain, showing that the patients who were more hypoxemic had more pain ($r = 0.23$).[24] A study of 42 COPD patients demonstrated a correlation between PaO_2 and the physical components of the SF-36 ($r = 0.23$; $p < 0.05$).[9]

In the present study, 87.5% of the patients had severe or very severe COPD. Lower post-bronchodilator FEV_1 correlated with lower physical functioning domain scores ($r = 0.24$; $p = 0.03$). In a study conducted in England and involving COPD patients, FEV_1 was found to correlate with the physical functioning, role-physical, social functioning, and general health domains, whose r values ranged from 0.15 to 0.25 ($p < 0.001$ for all).[25] In two other studies, FEV_1 was found to correlate with the SF-36 physical component summary ($r = 0.38$; $p = 0.012$),[10] as well as with a visual analog scale that rates health status ($r = 0.19$; $p < 0.05$).[26]

Anemia, in addition to being a predictor of mortality in COPD patients on LTOT, can contribute to increasing dyspnea and cause exercise limitation. In the present study, serum levels of hemoglobin were found to correlate positively with the role-physical and bodily pain domains ($r = 0.23$; $p = 0.01$ and $r = 0.31$; $p = 0.02$, respectively). We found only one study (conducted in the USA) in which the hemoglobin levels of COPD patients correlated positively with the physical components of the SF-36 ($r^2 = 0.0850$; $p = 0.003$).[27] A study conducted in Brazil and involving renal failure patients on hemodialysis also showed that decreased hemoglobin levels correlated with pain ($r = 0.22$; $p = 0.018$),[28] suggesting that, regardless of the type of disease, low hemoglobin levels can increase the levels of bodily pain.

One means of assessing the impairment and functional disability caused by LTOT in COPD patients is the administration of functional assessment questionnaires. In the present study, we used the Katz index, which revealed a low degree of dependence in ADL, a finding that is consistent with those of other studies.[29,30] However, the Katz index was found to correlate negatively with the physical functioning and role-physical domains, i.e., lower scores on those domains translated to greater dependence in ADL.[29,30]

The results of the present study allow us to conclude that this sample of COPD patients on LTOT had very low scores on the QoL domains of the SF-36, showing significantly impaired QoL.

The low QoL scores correlated significantly with several clinical, biochemical, and sociodemographic characteristics, as well as with the functional assessment, indicating that the planning and implementation of activities or programs aimed at COPD patients on LTOT should be based on their real needs and should involve a multidisciplinary team in order to preserve the health and promote the well-being of such patients.

References

1. Sociedade Brasileira de Pneumologia e Tisiologia. II Consenso Brasileiro sobre Doença Pulmonar Obstrutiva Crônica (DPOC). J Pneumol. 2004;30(Suppl 5):1-42.
2. Pauwels RA, Buist AS, Calverley PM, Jenkins CR, Hurd SS; GOLD Scientific Committee. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. NHLBI/WHO Global Initiative for Chronic Obstructive Lung Disease (GOLD) Workshop summary. Am J Respir Crit Care Med. 2001;163(5):1256-76. PMid:11316667.
3. Okubadejo AA, O'Shea L, Jones PW, Wedzicha JA. Home assessment of activities of daily living in patients with severe chronic obstructive pulmonary disease on long-term oxygen therapy. Eur Respir J. 1997;10(7):1572-5. PMid:9230249. http://dx.doi.org/10.1183/09031936.97.10071572
4. Fleck MP, Louzada S, Xavier M, Chachamovich E, Vieira G, Santos L, et al. Application of the Portuguese version of the instrument for the assessment of quality of life of the World Health Organization (WHOQOL-100) [Article in Portuguese]. Rev Saude Publica. 1999;33(2):198-205. PMid:10413938.
5. Zanei SS. Análise dos instrumentos de avaliação de qualidade de vida WHOQOL-bref e SF-36: confiabilidade, validade e concordância entre pacientes de Unidade de Terapia Intensiva e seus familiares [thesis]. São Paulo: Universidade de São Paulo; 2006.
6. Pinto MF, Barbosa DA, Ferreti CE, Souza LF, Fram DS, Belasco AG. Qualidade de vida de cuidadores de idosos com doença de Alzheimer. Acta Paul Enferm. 2009;22(5): 652-7. http://dx.doi.org/10.1590/S0103-21002009000500009

7. Duarte YA, Andrade CL, Lebrão ML. O Índex de Katz na avaliação da funcionalidade dos idosos. Rev Esc Enferm USP. 2007;41(2):317-25. http://dx.doi.org/10.1590/S0080-62342007000200021
8. Vieira T, Belchior I, Almeida J, Hespanhol V, Winck JC. Efficacy and patterns of ambulatory oxygen usage - experience of a university hospital [Article in Portuguese]. Rev Port Pneumol. 2011;17(4):159-67. PMid:21620641. http://dx.doi.org/10.1016/j.rppneu.2011.03.012
9. Sant'Anna CA, Stelmach R, Zanetti Feltrin MI, Filho WJ, Chiba T, Cukier A. Evaluation of health-related quality of life in low-income patients with COPD receiving long-term oxygen therapy. Chest. 2003;123(1):136-41. PMid:12527614. http://dx.doi.org/10.1378/chest.123.1.136
10. Pereira ED, Pinto R, Alcantara M, Medeiros M, Mota RM. Influence of respiratory function parameters on the quality of life of COPD patients. J Bras Pneumol. 2009;35(8):730-6. PMid:19750324. http://dx.doi.org/10.1590/S1806-37132009000800003
11. Boueri FM, Bucher-Bartelson BL, Glenn KA, Make BJ. Quality of life measured with a generic instrument (Short Form-36) improves following pulmonary rehabilitation in patients with COPD. Chest. 2001;119(1):77-84. PMid:11157587. http://dx.doi.org/10.1378/chest.119.1.77
12. Global Initiative for Chronic Obstructive Lung Disease – GOLD [homepage on the Internet]. Bethesda: Global Initiative for Chronic Obstructive Lung Disease. [cited 2012 Feb 2]. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease 2006. [Adobe Acrobat document, 100p.] Available from: http://www.goldcopd.org/uploads/users/files/GOLDReport2006_0122.pdf
13. Silva MS. Qualidade de vida relacionada à saúde de pacientes com Doença Pulmonar Obstrutiva Crônica [dissertation]. São Paulo: Universidade de São Paulo; 2011.
14. Ståhl E, Lindberg A, Jansson SA, Rönmark E, Svensson K, Andersson F, et al. Health-related quality of life is related to COPD disease severity. Health Qual Life Outcomes. 2005;3:56. PMid:16153294 PMCid:1215504. http://dx.doi.org/10.1186/1477-7525-3-56
15. Mangueira NM, Viega IL, Mangueira Mde A, Pinheiro AN, Costa Mdo R. Correlation between clinical parameters and health-related quality of life in women with COPD. J Bras Pneumol. 2009;35(3):248-55. PMid:19390723.
16. Eisner MD, Blanc PD, Omachi TA, Yelin EH, Sidney S, Katz PP, et al. Socioeconomic status, race and COPD health outcomes. J Epidemiol Community Health. 2011;65(1):26-34. http://dx.doi.org/10.1136/jech.2009.089722
17. Sprangers MA, de Regt EB, Andries F, van Agt HM, Bijl RV, de Boer JB, et al. Which chronic conditions are associated with better or poorer quality of life? J Clin Epidemiol. 2000;53(9):895-907. http://dx.doi.org/10.1016/S0895-4356(00)00204-3
18. Pinto JM. Vida sufocada: sofrimentos de pessoas com pneumopatias crônicas e a promoção da saúde pelo autocuidado [dissertation]. Fortaleza: Universidade de Fortaleza; 2005.
19. Keroski E, Borenstein MS, Silva DM. Percepção de idosos com doença pulmonar obstrutiva crônica sobre a qualidade de vida. Esc Anna Nery. 2010;14(4):825-32. http://dx.doi.org/10.1590/S1414-81452010000400024
20. Moy ML, Reilly JJ, Ries AL, Mosenifar Z, Kaplan RM, Lew R, et al. Multivariate models of determinants of health-related quality of life in severe chronic obstructive pulmonary disease. J Rehabil Res Dev. 2009;46(5):643-54. http://dx.doi.org/10.1682/JRRD.2008.09.0127
21. Carrasco Garrido P, de Miguel Díez J, Rejas Gutiérrez J, Centeno AM, Gobartt Vázquez E, Gil de Miguel A, et al. Negative impact of chronic obstructive pulmonary disease on the health-related quality of life of patients. Results of the EPIDEPOC study. Health Qual Life Outcomes. 2006;4:31. PMid:16719899 PMCid:1488827. http://dx.doi.org/10.1186/1477-7525-4-31
22. de La Fuente Cid R, de La Iglesia Martínez F, Ramos Polledo V, Pellicer Vázquez C, Nicolás Miguel R, Diz-Lois Martínez F. Factor analysis of the health related quality of life of patients with stable chronic obstructive pulmonary disease [Article in Spanish]. Arch Bronconeumol. 2001;37(10):411-6. Pmid:11734121.
23. Sociedade Brasileira de Pneumologia e Tisiologia. Oxigenoterapia domiciliar prolongada (ODP). J Pneumol. 2000;26(6):341-50. http://dx.doi.org/10.1590/S0102-35862000000600011
24. Stavem K, Boe J, Erikssen J Health status, dyspnea, lung function and exercise capacity in patients with chronic obstructive pulmonary disease. Int J Tuberc Lung Dis. 1999;3(10):920-6. Pmid:10524591.
25. Spencer S, Calverley PM, Sherwood Burge P, Jones PW; ISOLDE Study Group. Inhaled Steroids in Obstructive Lung Disease. Health status deterioration in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med. 2001;163(1):122-8. Pmid:11208636.
26. Pickard AS, Yang Y, Lee TA. Comparison of health-related quality of life measures in chronic obstructive pulmonary disease. Health Qual Life Outcomes. 2011;9:26. PMid:21501522 PMCid:3096892. http://dx.doi.org/10.1186/1477-7525-9-26
27. Krishnan G, Grant BJ, Muti PC, Mishra A, Ochs-Balcom HM, Freudenheim JL, et al. Association between anemia and quality of life in a population sample of individuals with chronic obstructive pulmonary disease. BMC Pulm Med. 2006;6:23. PMid:16953872 PMCid:1569869. http://dx.doi.org/10.1186/1471-2466-6-23
28. Santos PR. Correlação Entre Marcadores Laboratoriais e Nível de Qualidade de Vida em Renais Crônicos Hemodialisados. J Bras Nefrol. 2005;27(2):70-5.
29. Sant'Anna CA, Stelmach R, Zanetti Feltrin MI, Filho WJ, Chiba T, Cukier A. Evaluation of health-related quality of life in low-income patients with COPD receiving long-term oxygen therapy. Chest. 2003;123(1):136-41. PMid:12527614. http://dx.doi.org/10.1378/chest.123.1.136
30. Teixeira C, Cabral Cda R, Hass JS, Oliveira RP, Vargas MA, Freitas AP, et al. Patients admitted to the ICU for acute exacerbation of COPD: two-year mortality and functional status. J Bras Pneumol. 2011;37(3):334-40. PMid:21755188. http://dx.doi.org/10.1590/S1806-37132011000300009

About the authors

Simone Cedano
Nurse. *Universidade Federal de São Paulo/Escola Paulista de Enfermagem* – UNIFESP/EPE, Federal University of São Paulo/Paulista School of Nursing, São Paulo, Brazil.

Angélica Gonçalves Silva Belasco
Adjunct Professor. *Enfermagem* – UNIFESP/EPE, Federal University of São Paulo/Paulista School of Nursing, São Paulo, Brazil.

Fabiana Traldi
Nurse. *Universidade Federal de São Paulo/Escola Paulista de Enfermagem* – UNIFESP/EPE, Federal University of São Paulo/Paulista School of Nursing, São Paulo, Brazil.

Maria Christina Lombardi Oliveira Machado
Pulmonologist. *Universidade Federal de São Paulo/Escola Paulista de Medicina* – UNIFESP/EPM, Federal University of São Paulo/Paulista School of Medicine – *Hospital São Paulo*, São Paulo, Brazil.

Ana Rita de Cássia Bettencourt
Adjunct Professor. *Enfermagem* – UNIFESP/EPE, Federal University of São Paulo/Paulista School of Nursing, São Paulo, Brazil.