Original Article

Assessment of the quality of life of patients with lung cancer using the Medical Outcomes Study 36-item Short-Form Health Survey*

Avaliação da qualidade de vida em pacientes com câncer de pulmão através da aplicação do questionário *Medical Outcomes Study 36-item Short-Form Health Survey*

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Abstract

Objective: To assess the quality of life of patients with lung cancer and to compare it with that of individuals without cancer. **Methods:** The Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) was administered to 57 patients diagnosed with lung cancer, treated at the Lung Cancer Outpatient Clinic of the *Hospital São Paulo*, and to a control group of 57 individuals recruited from the *Extra Penha* workout group. The Mann-Whitney test was used to compare the groups, domain by domain. The first model of logistic regression was adjusted for male gender, nonsurgical treatment, Karnofsky performance status and smoking, which were included as predictors. The second model was adjusted for each SF-36 domain in order to identify increases in the proportions of patients in stage IIIB or IV. **Results:** The lung cancer group and the control group presented the following mean scores, respectively, for the SF-36 domains: role limitations due to physical health problems, 29.39 ± 36.94 and 82.89 ± 28.80; role limitations due to emotional problems, 42.78 ± 44.78 and 86.55 ± 28.77; physical function, 56.49 ± 28.39 and 89.00 ± 13.80; vitality, 61.61 ± 23.82 and 79.12 ± 17.68; bodily pain, 62.72 ± 28.72 and 81.54 ± 19.07; general health, 62.51 ± 25.57 and 84.47 ± 13.47; emotional well-being, 68.28 ± 23.46 and 82.63 ± 17.44; and social functioning, 72.87 ± 29.20 and 91.67 ± 17.44. The logistic regression model showed that role limitations due to physical health problems, physical function and emotional well-being were predictors of stages IIIB and IV. **Conclusion:** The patients with lung cancer had a poorer quality of life, especially regarding physical aspects, than did the control subjects.

Keywords: Lung neoplasms; Quality of life, Health status.

Resumo

Objetivo: Avaliar a qualidade de vida de pacientes com câncer de pulmão e compará-la com a qualidade de vida de indivíduos sem câncer. **Métodos:** O questionário *Medical Outcomes Study 36-item Short-Form Health Survey* (SF-36) foi aplicado em 57 pacientes com diagnóstico de câncer de pulmão provenientes do Ambulatório de Oncopneumologia do Hospital São Paulo e em um grupo controle de 57 indivíduos participantes do Grupo de Ginástica Extra Penha. O teste de Mann-Whitney foi utilizado para comparar cada domínio entre os grupos. O primeiro modelo de regressão logística foi ajustado para sexo masculino, tratamento não cirúrgico, índice de Karnofsky e tabagismo, que foram incluídos como preditores. O segundo modelo foi ajustado para cada domínio do SF-36 para identificar aumento na proporção de estádios IIIB e IV. **Resultados:** O grupo com câncer de pulmão e o grupo controle apresentaram, respectivamente, as seguintes pontuações médias para os domínios do SF-36: aspectos físicos, 29,39 ± 36,94 e 82,89 ± 28,80; aspectos emocionais, 42,78 ± 44,78 e 86,55 ± 28,77; capacidade funcional, 56,49 ± 28,39 e 89,00 ± 13,80; vitalidade, 61,61 ± 23,82 e 79,12 ± 17,68; dor, 62,72 ± 28,72 e 81,54 ± 19,07; estado geral de saúde, 62,51 ± 25,57 e 84,47 ± 13,47; saúde mental, 68,28 ± 23,46 e 82,63 ± 17,44; e aspectos sociais, 72,87 ± 29,20 e 91,67 ± 17,44. O modelo de regressão logística demonstrou que aspectos físicos, capacidade funcional e saúde mental foram preditores de estádios IIIB e IV. **Conclusões:** Os pacientes com câncer de pulmão apresentaram pior qualidade de vida em relação ao grupo controle, principalmente em relação aos aspectos físicos.

Descritores: Neoplasias pulmonares; Qualidade de vida; Nível de saúde.

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Introduction

Characterizing quality of life has become one of the main objectives in the assessment of patients with cancer in general. This increasing interest is due to the fact that quality of life has become more highly valued than is quantity of life for individuals with limiting or incapacitating conditions.[1]

According to the World Health Organization, quality of life is the perception that the individual has regarding his/her present life situation, including his/her objectives, expectations, patterns and preoccupations.[2] Therefore, quality of life encompasses not only aspects related to health, but also those that have an influence on it, such as social, cultural and economic aspects.[3]

Lung cancer is one of the most prevalent tumors and is responsible for high mortality rates worldwide.[4] The quality of life of these patients is affected by various factors, such as the stage of the disease, treatment characteristics and aspects related to each individual.[5] However, regardless of these factors, the initial quality of life is a relevant measure for the assessment of prognosis and survival.[6,7]

Therefore, the objective of this study was to assess the quality of life of patients with lung cancer, comparing it to that of a control group (individuals without cancer), and to identify the aspects that caused greater limitations, as well as determining the influence that clinical parameters have on this measure.

Methods

This was a prospective, cross-sectional study including patients with confirmed lung cancer and treated at the Lung Cancer Outpatient Clinic of the Federal University of São Paulo *Hospital São Paulo*. Individuals without cancer, recruited from the *Extra Penha* workout group, were included in the control group.

This protocol was previously approved by the Ethics in Clinical Research Committee of the *São Camilo* University Center.

The selected patients were evaluated on the day of their outpatient medical visit and were interviewed individually to determine whether or not they could be considered clinically stable. All interviews were carried out by the same professional. Individuals in the control group were interviewed by the same professional in the morning of the day of their workout session, prior to the beginning of their activities. The data collection process included the following:

- An evaluation chart containing personal data and information related to comorbidities, respiratory symptoms, smoking habit, as well as, in the case of patients with lung cancer, previous history of cancer and treatment.
- Data regarding cancer: Karnofsky performance status, staging and histological type of tumor. The tumor-node-metastasis staging was conducted in accordance with the guidelines established by the International System for Staging Lung Cancer.[8]
- Assessment of the quality of life of patients by means of the Medical Outcomes Study 36-item Short-Form Health Survey (SF-36), which is a generic, multidimensional, reliable and easily administered questionnaire. The SF-36 has been translated, adapted and validated for use in Brazil.[9]

The SF-36 questionnaire comprises eight domains (subscales):

1) The *physical function* domain assesses the incidence and extent of limitations in physical capacity.
2) The *role limitations due to physical health problems* domain assesses limitations regarding the type and quality of work, as well as to what extent such limitations impair work performance and activities of daily living.
3) The *bodily pain* domain assesses the incidence and the intensity of physical pain, as well as to what extent such pain interferes with the ability to perform activities of daily living.
4) The *general health* domain evaluates how patients feel regarding their overall health.
5) The *vitality* domain evaluates aspects related to energy level and fatigue.
6) The *social functioning* domain assesses the integration of the individual in social activities.
7) The *role limitations due to emotional problems* domain assesses the impact of psychological aspects on the well-being of the patient.
8) The *emotional well-being* domain includes questions related to anxiety, depression, behavioral changes, emotional stability and psychological well-being.

The SF-36 scores range from 0 to 100, obtained from a list of questions on various aspects related to quality of life. Higher scores indicate better quality of life.[10,11]

In the statistical analysis, results were expressed as means, standard deviations and proportions. We used the following tests to compare the two groups: the chi-square test to compare categorical variables, the Student's t-test to compare parametric continuous variables and the Mann-Whitney test to compare non-parametric continuous variables.[12] The comparison between the group with advanced staging (IIIB and IV) and the reference group (from IA to IIIA) with localized form of the disease for undifferentiated small cell lung cancer was carried out by means of logistic regression analysis in order to determine significant differences in the clinical variables in the first model, as well as in the SF-36 domains in the second model. The following independent exposure variables were included in the first model: male gender (reference group: female gender); histological type: adenocarcinoma, categorized by the non-adenocarcinoma reference group; Karnofsky performance status as a continuous variable; and smokers (reference group: nonsmokers). In the second logistic regression model, we used as independent variables the following domains: *physical function, role limitations due to physical health*

Table 1 - Characteristics of the individuals in both groups, together with characteristics of histological type, staging and treatment of individuals in the lung cancer group.

Variable	Lung cancer	Control	p
Age (years), mean ± SD	61.3 ± 16.4	60.0 ± 12.2	ns*
Male gender, n (%)	32 (56.1%)	23 (40.4%)	ns*
Smoking habit	-	-	ns*
Smokers, n (%)	3 (5.3%)	2 (3.5%)	-
Former smokers, n (%)	44 (77.2%)	17 (29.8%)	-
Nonsmokers, n (%)	10 (17.5%)	38 (66.7%)	-
Tobacco intake (pack-years), mean ± SD	56.5 ± 40.1	11.4 ± 12.3	<0.0001**
Histological type	-	-	-
Adenocarcinoma, n (%)	27 (47.4%)	-	-
SCC, n (%)	19 (33.3%)	-	-
SCLC, n (%)	3 (5.3%)	-	-
Other, n (%)	8 (14.0%)	-	-
Karnofsky performance status, mean ± SD	90.4 ± 9.8	-	-
Staging	-	-	-
IA, n (%)	7 (12.3%)	-	-
IB, n (%)	8 (14.0%)	-	-
IIB, n (%)	3 (5.3%)	-	-
IIIA, n (%)	9 (15.8%)	-	-
IIIB, n (%)	12 (21.1%)	-	-
IV, n (%)	11 (19.2%)	-	-
Limited (SCLC), n (%)	2 (5.3%)	-	-
No staging, n (%)	4 (7.0%)	-	-
Treatment	-	-	-
Chemotherapy, n (%)	22 (38.5%)	-	-
Surgery, n (%)	9 (15.7%)	-	-
Surgery + adjutant treatment, n (%)	15 (26.3%)	-	-
Chemotherapy + radiotherapy, n (%)	5 (8.8%)	-	-
No treatment, n (%)	6 (10.7%)	-	-

SD: standard deviation; ns: not significant; SCC: spinocellular carcinoma; and SCLC: small cell lung cancer. *chi-square test. **Student's t-test.

problems, bodily pain, general health, role limitations due to emotional problems and *emotional well-being*, all from the SF-36. Statistical analyses were carried out using the Statistical Package for the Social Sciences, version 13.0 (SPSS Inc., Chicago, IL, USA). All statistical tests were two-tailed, and the level of significance was set at 5%.

Results

In total, 114 individuals agreed to participate in the study: 57 in the control group and 57 in the group diagnosed with lung cancer. The basic characteristics of the individuals in both groups, as well as the characteristics related to lung cancer, are described in Table 1.

No differences were found between the groups regarding age, gender or smoking habit, although the control group had a greater number of nonsmokers (66.7%), whereas the study group had a greater number of former smokers (77.2%). Tobacco intake in pack-years was statistically higher among patients with lung cancer than among individuals in the control group.

In our sample, distribution regarding histological type of cancer showed a predominance of adenocarcinoma (47.4%) and spinocellular carcinoma (33.3%). In addition, as expected, the majority of the cases (56.2%) presented locally advanced staging of the disease.

Table 2 summarizes the quality of life scores for both groups, by SF-36 domain. The patients with lung cancer had lower scores in all of the SF-36 domains than did the individuals in the control group, and the differences were statistically significant.

The patients with lung cancer presented with the following respiratory symptoms: 54% reported dyspnea, 30% reported fatigue, and 16% reported cough. Individuals in the control group reported no respiratory symptoms.

After being adjusted for male gender, adenocarcinoma, Karnofsky performance status and smoking, the first logistic regression model, which included clinical variables, revealed no significant association with the lung cancer stages IIIB or IV (Table 3). As can be seen in Table 4 and Figure 1, the second adjusted logistic regression model revealed that the domains *physical function, role limitations due to physical health problems* and *emotional well-being* presented significant associations with the more advanced stages of lung cancer (IIIB and IV).

Discussion

All of the SF-36 quality of life domains were negatively affected by lung cancer. Differences of more than five points, which can be interpreted as clinically and socially significant,[13] were found between the study group and the control group. All of these domains represent fundamental aspects of the autonomy of individuals regarding their ability to perform activities of daily living. The domains *role limitations due to physical health problems, physical function* and *emotional well-being* presented statistically significant associations with the more advanced stages of the disease. Therefore, lower scores in the domains *physical function* and *role limitations due to physical health problems*, as well as higher scores in the *emotional well-being* domain, increased the probability of presenting the more advanced stages of the disease.

Table 2 - Scores in the Medical Outcomes Study 36-item Short-Form Health Survey domains, by group.

Domain	Lung cancer group	Control group	p*
PF, mean ± SD	56.49 ± 28.39	89.00 ± 13.80	<0.0001
RLP, mean ± SD	29.39 ± 36.94	82.89 ± 28.80	<0.0001
GH, mean ± SD	62.51 ± 25.57	84.47 ± 13.47	<0.0001
V, mean ± SD	61.61 ± 23.82	79.12 ± 17.68	<0.0001
RLE, mean ± SD	42.78 ± 44.78	86.55 ± 28.77	<0.0001
BP, mean ± SD	62.72 ± 28.72	81.54 ± 19.07	<0.0001
EWB, mean ± SD	68.28 ± 23.46	82.63 ± 17.44	<0.0001
SF, mean ± SD	72.87 ± 29.20	91.67 ± 17.44	<0.0001

PF: physical function; SD: standard deviation; RLP: role limitations due to physical health problems; GH: general health; V: vitality; RLE: role limitations due to emotional problems; BP: bodily pain; EWB: emotional well-being; and SF: social functioning. *Mann-Whitney test.

Table 3 - Adjusted logistic regression model for male gender, adenocarcinoma, Karnofsky performance status and smoking in patients in the advanced stages (IIIB or IV) of lung cancer (n = 57).

Variable	Odds ratio	95% CI	p
Male gender	3.24	0.94-11.24	0.06
Adenocarcinoma	1.67	0.49-5.70	0.41
Karnofsky performance status	0.99	0.93-1.05	0.69
Smoking	0.60	0.28-1.33	0.21

CI: confidence interval.

According to the logistic regression analysis, the clinical variables under study (gender, histological type, performance status and smoking) showed no relationship with the more advanced stages of the disease. Except for Karnofsky performance status, none of the clinical variables that were included in the model are typical predictors of severity.

Various for the assessment of quality of life and of the functional status of patients with cancer have been available. The SF-36 is a generic instrument that can help assess the quality of life of individuals with a wide range of diseases. Various authors consider the SF-36 a useful questionnaire for the assessment of quality of life in patients with lung cancer.[14-17] In addition, the SF-36 combines good psychometric properties and good responsiveness, as well as being better able to detect worsening than improvement in quality of life.[18]

Role limitations due to physical health problems showed the lowest scores when compared to all of the SF-36 domains, even in the control group. These low scores might be related to reduced pulmonary function and dyspnea upon exertion.[19] Although we did not use a scale to quantify dyspnea, it was reported by 54% of the patients with lung cancer, and this fact contributed to the worsening of quality of life, since dyspnea limits the ability to perform activities of daily living and to work. However, nonphysical factors, related to difficulties to carry out work and domestic activities, might have contributed to the worsening of quality of life of patients with lung cancer.[20]

The *physical function* domain, which encompasses the incidence and the extent of limitations due to physical capacity, showed the same trend toward lower scores seen in the group with lung cancer.

In this study, the second worse score in the group with lung cancer was found in *role limitations due to emotional problems*, which assesses the impact of psychological aspects on the well-being of the patient. The decreased scores of these aspects might have been due to the impact of the diagnosis of cancer and fear of death. The patients suffer not only from physical symptoms but also from a life crisis due to their impending death, since these patients are commonly diagnosed with depression, especially those with advanced disease and functional limitations.[21-23] However, a relationship between this domain and advanced stages of the disease, by means of the analysis of the logistic regression model, was not found in the present study.

The *emotional well-being* domain, which includes questions on anxiety, depression, changes in behavior, lack of emotional control and psychological well-being, also showed a significant difference between the study and control groups. The impact of cancer on *emotional well-being* showed that the diagnosis and treatment can be accompanied by anxiety and depression.[24,25] Curiously, in the logistic regression analysis of our study, the scores of patients in the more advanced stages of lung cancer in the *emotional well-being* domain were slightly higher than those of other patients, possibly indicating better acceptance of the diagnosis of cancer or the comforting effect of the adjuvant care offered to patients in the more advanced stages of the disease.

The incidence of pain was also higher in the group with cancer. A common cause for greater pain is advanced staging, with which most of the patients included in this study presented. However, this association was not found in the logistic regression model.

General health assesses how the patient feels regarding his/her global health. Although the scores of this domain were also decreased in the patients with lung cancer when compared to the control group, no correlation with more advanced stages of the disease was found.

The patients with lung cancer presented lower scores in the *social functioning* and *vitality* domains. However, these scores were the closest to normal limits.[18] Patients with severe, potentially fatal diseases probably receive greater support from

Table 4 - Adjusted logistic regression model for the Medical Outcomes Study 36-item Short-Form Health Survey domains regarding quality of life of patients in the advanced stages (IIIB or IV) of lung cancer (n = 57).

Domain	Odds ratio	95% CI	p
PF	0.95	0.91-0.99	0.01
RLP	0.98	0.96-0.99	0.02
BP	1.02	0.99-1.05	0.24
GH	0.97	0.93-1.01	0.18
RLE	0.99	0.97-1.00	0.14
EWB	1.05	1.01-1.10	0.02

CI: confidence interval; PF: physical function; RLP: role limitations due to physical health problems; BP: bodily pain; GH: general health; RLE: role limitations due to emotional problems; and EWB: emotional well-being.

family and friends. They also learn how to value life in a different way.

It is important to emphasize that, since the SF-36 is a generic instrument, these domains are multidimensional and are correlated with one another.[26]

Despite being relatively small, the size of our sample was sufficient to show relevant differences between patients and controls. Another relevant consideration is that the control group included healthy individuals who practiced physical activities

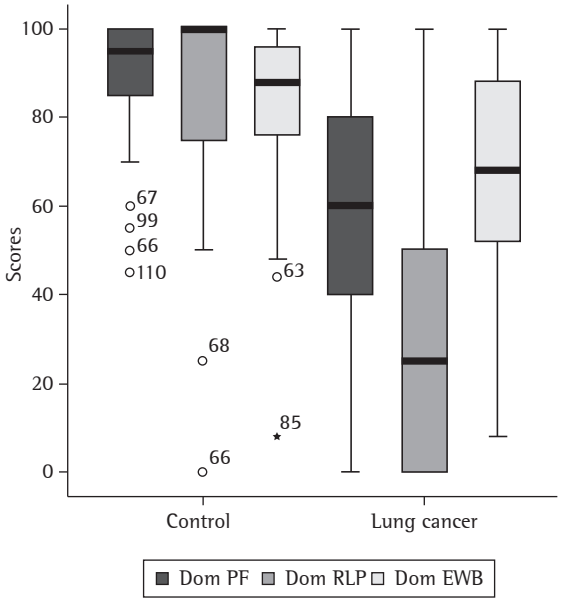

Figure 1 - Distribution of scores in the control and lung cancer groups for three quality of life domains: *physical function* (PF), *role limitations due to physical health problems* (RLP) and *emotional well-being* (EWB).

on a regular basis, which is known to be a factor related to better quality of life.[27] However, the relationship between physical activity and improved quality of life has a limited effect in elderly people, depending on individual factors and variations in the responses.[28,29] The SF-36 scores of the control group are similar to the normal scores described by Bouchet et al.[18]

The incidence, number and intensity of comorbidities can influence the quality of life of individuals. However, this was not specifically studied in our sample. Nevertheless, our patients presented good Karnofsky performance status (≥70), and the individuals in the control group practiced physical activities, probably without any limiting comorbidities.

We concluded that the individuals with lung cancer had a poorer quality of life than did those without cancer. Therefore, the SF-36 proved to be a useful instrument for comparing these two groups in terms of their quality of life.

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