The acceptance of illness, the intensity of pain and the quality of life in patients with lung cancer

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Background: Lung cancer is the major cause of cancer related deaths worldwide. The overall 5-year survival rate is very low and accounts for only 15%. Poor quality of life is considered a prognostic factor for shorter survival in lung cancer patients. The aim of the study was to examine the relationships between pain, the acceptance of illness and quality of life in patients with lung cancer.

Methods: The study included 155 patients with lung cancer with mean age of 62.23 [standard deviation (SD)=9.86] years. We used the Acceptance of Illness Scale (AIS) and the Visual Analog Scale (VAS) for pain, and the Short Form Health Survey (SF-8) for the assessment of quality of life. For statistical analysis, Spearman's rank correlation coefficient and linear regression method were used.

Results: Mean score of the acceptance of illness was 27.1 (SD=9.2). Mean score of the pain severity as measured by the VAS was 4.07 (SD=1.83). The acceptance of illness was significantly positively correlated with all the domains of quality of life. Both the AIS and the VAS were independent determinants of physical and mental components of quality of life. Age and World Health Organization (WHO) performance status were additional predictors of physical component of quality of life.

Conclusions: The knowledge about the acceptance of illness, consequences of the decreased acceptance of illness, and factors affecting its level in patients with lung cancer is still insufficient. Relationships among acceptance of illness, quality of life, and pain should be further investigated.

Keywords: Acceptance of illness; quality of life; pain; lung cancer

Introduction

Lung cancer is one of the most frequently diagnosed cancer and the leading cause of cancer-related mortality. In 2012, an estimated number of new lung cancer cases reached 1.8 million which translated into 13% of total cancer diagnoses (1). The onset of the disease is usually discreet without any signs and symptoms; thus, it is diagnosed at late stages. A survey conducted in frames of the VITAL study showed that only 22.6% respondents were diagnosed with local/*in situ* lung cancer (2). In the Abdel-Rahman's analysis based on SEER database, 55.2% of patients aged above 70 years were classified as stage IV according to American Joint Committee on Cancer (AJCC) staging (3). The overall

5-year survival rate accounts for 15%, but it is strongly dependent on stage at diagnosis (4). The 5-year survival rate for patients with AJCC stage IA non-small cell lung cancer is about 49%, while for patients with metastases or AJCC stage IV, it is only 1% (5,6). Delayed diagnosis, distressing symptoms, and severity of this disease have a significant influence on treatment possibilities, mortality and quality of life.

According to World Health Organization (WHO), "*health is a state of complete physical, mental and social well-being and not merely the absence of disease*" (7). In view of this definition, the disease management should not be limited to the improvement of health condition, but it should also be focused on patient well-being and quality of life related to health care. Quality of life encompasses many aspects of daily living. Assessment of quality of life in patients burdened by a disease helps to draw attention to limitations imposed by the disease. It is especially important in patients with lung cancer who experience lower quality of life as well as lower acceptance of illness than patients with other cancers (8).

Measurement of quality of life consists of the evaluation of several aspects related to physical, emotional and social functioning which in turn may be affected by severity of symptoms experienced by patients, diseases progression, and type of treatment among others. Research shows that improvement in quality of life components reduces the risk of death in patients with lung cancer. Quality of life is an important factor because it affects survival; thus, it can be considered as a prognostic factor for shorter survival (9-11). Pain is one of the most important symptoms reported by cancer patients. It appears during the course of this disease and accompanies many medical procedures and surgery. Pain is also one of the components of quality of life and additionally, it may serve as a prognostic factor for shorter survival in cancer patients; however, this association was not confirmed for lung cancer (12). Another factor closely related to quality of life is acceptance of illness. Many studies confirm positive correlation between acceptance of illness and quality of life in patients with chronic diseases but little is known about the association between acceptance of illness and quality of life in cancer patients (13,14). Thus, the aim of our study was to evaluate the relationships between pain, the acceptance of illness and quality of life in patients with lung cancer.

Methods

For the study, 155 patients with lung cancer hospitalized between January and December 2015 in the Department of Internal Medicine of Lower Silesian Centre for Pulmonary Diseases in Wroclaw were recruited. A total of 180 patients were invited into the study, then 15 patients resigned, and 10 questionnaires were filled out improperly. All patients gave written informed consent to participate in the study, to answer the questionnaires, and to publish their information. The study was approved by the Commission of Bioethics at Wroclaw Medical University (approval no. KB-507/2015). First, the patients answered questions about demographics and their socioeconomic condition. Next, they completed the Acceptance of Illness Scale (AIS), the Visual Analog Scale (VAS) for pain, and the Short Form Health Survey (SF-8). The clinical data were retrieved from medical records.

The acceptance of illness was measured with the AIS which was developed by Felton *et al.* (15) and adapted to Polish conditions by Juczyński (16,17). The scale consists of eight statements which are related to the limitations imposed by the illness, lack of independence due to the illness, the feeling of being dependent of others, and reduced self-esteem. Participants indicated on a 5-point scale whether they agree with these statements, where 1 means strongly agree; 2—agree; 3—undecided; 4—disagree; 5—strongly disagree. The total score of the scale ranges from 8 to 40; the higher score, the better acceptance of illness.

The intensity of pain was assessed with a single-item the VAS scale. The scale is simple and widely used among patients suffering from pain including those undergoing surgical treatment (18). It has to be self-completed by patients who select a point between 0 score value (no pain) and 10 score value (the worst pain ever) on a 10-cm horizontal line corresponding to their pain intensity. Results between 1 and 4 were classified as mild pain, between 5 and 6 as moderate pain, and 7 and 10 as severe pain (19).

The general health related quality of life was assessed with the Medical Outcome Study 8-items SF-8, developed by QualityMetric Incorporated. The SF-8 is comprised of eight questions. Each of the eight items evaluates a different dimension of health: general health, physical functioning, vitality, mental health, role-physical, social functioning, role emotional, and bodily pain. The scale is summarized into physical component (PCS) and mental component (MCS) continuous summary scores (20).

Statistical analysis

The data were statistically analyzed. The data were analyzed for normality using the Shapiro-Wilk test.

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Table 1 Characteristics of the TNM staging (n=155)

TNM staging	N (%)
Primary tumor (T)	
1	36 (23.23)
2	66 (42.58)
3	18 (11.61)
4	33 (21.29)
x	2 (1.29)
Regional lymph nodes (N)	
0	57 (36.77)
1	40 (25.81)
2	39 (25.16)
3	8 (5.16)
x	11 (7.10)
Distant metastasis (M)	
0	109 (70.32)
1	27 (17.42)
2	4 (2.58)
3	1 (0.65)
x	14 (9.03)

Quantitative variables were given as a mean with standard deviation (SD) of the mean or median with interquartile rage (IQR). Categorical data were presented as number and percentage. Answers for the SF-8 questionnaire had distribution other than normal. The raw score of answers to each question of the questionnaire SF-8 was converted into a 0–100 scale, so that a score of 0 indicated the worst result, while a score of 100 the best quality of life. Correlations between the SF-8 results and the AIS and the VAS score were described as Spearman's rank correlation coefficient. To evaluate the predictive value of the independent variables in relation to the dependent variables, linear regression method was used. The criteria for statistical significance were set at $P<0.05$. For the purpose of the statistical analysis, the R Package for Statistical Computing v. 3.2.2 was used.

Results

The study groups included 155 patients with mean age of 62.23 (SD=9.86) years (48.4% women and 51.6% men). Spirometric parameters were as follows: FEV1, 2.32 (SD=0.77); FVC, 2.95 (SD=0.93) and FEV1/FVC (%), 70.2 (SD=8.67). The most frequently presented symptoms were chronic cough (87.7%), dyspnea (69%), pain in the chest (43.2%), and blood in sputum (33.6%). Of these patients, 45.2% were classified as having WHO performance status grade 1 and 32.9% as grade 2. Most of the patients lived in the urban area (75%) and had vocational or pre-university education (82%). Almost the same number of patients lived alone and with a partner. Nearly 60% of cases had no family history of a cancer. Only 20% of patients had primary tumor of stage I, 37% had no metastases to regional lymph nodes, and 70% had no distant metastasis. Exposure to smoke was frequent in the study group: 39% of patients were current smokers and 37% smoked in the past. Many patients from the study group were burdened with comorbidities among which diabetes was the most frequent (32.3%) and was followed by heart failure/asthma/chronic obstructive pulmonary disease (COPD) (21.3%) and ischemic heart disease (15.5%). Majority of patients received surgical treatment (75.5%). Radiotherapy was given to 32.3% of patients and chemotherapy to 54.8% of patients. Characteristics of the TNM staging (n=155) is presented in *Table 1*. Mean score of acceptance of illness was 27.1 (SD=9.2). Mean score of pain severity as measured by the VAS was 4.07 (SD=1.83).

The acceptance of illness significantly correlated with all the domains of quality of life as measured by the SF-8 questionnaire. Correlations between quality of life domains and both the acceptance of illness and the intensity of pain are presented in *Table 2*.

The linear regression model was used to find determinants of quality of life (*Table 3*). The model showed that the AIS and the VAS are independent determinants of PCS with $P<0.05$ for both variables. The other independent determinant of PCS were age and WHO performance status where grade 2 decreased PCS in comparison to grade 1. For this model R^2 coefficient was 63.20%, which means that the model explained 63.20% of the variation of PCS, while remaining 36.80% depended on variables not included in the model and random factors.

Additionally, the linear regression model showed that the AIS and the VAS are independent determinants of MCS with $P<0.05$ for both variables. Those two are the only independent determinant of MCS. R^2 coefficient was 62.16%, thus 62.16% of the variation of MCS was explained by examined factors, while remaining 37.84% depended on variables not included

Table 2 SF-8 scores and their correlations with AIS and VAS results

SF-8*	Mean (SD)	Median [IQR]	AIS		VAS	
			R	P value	R	P value
General health	28.71 (22.40)	25 [0–75]	0.658	<0.001	−0.499	<0.001
Physical functioning	53.87 (36.72)	50 [50–100]	0.562	<0.001	−0.416	<0.001
Vitality	31.94 (37.31)	0 [0–50]	0.668	<0.001	−0.614	<0.001
Mental health	46.45 (50.04)	0 [0–100]	0.732	<0.001	−0.564	<0.001
Role-physical	47.74 (50.11)	0 [0–100]	0.621	<0.001	−0.516	<0.001
Social functioning	49.03 (50.15)	0 [0–100]	0.680	<0.001	−0.569	<0.001
Role-emotional	58.71 (49.40)	100 [0–100]	0.463	<0.001	−0.388	<0.001
Bodily pain	54.68 (37.23)	75 [0–75]	0.304	<0.001	−0.427	<0.001
PCS	42.30 (27.68)	37.50 [18.75–68.75]	0.636	<0.001	−0.579	<0.001
MCS	50.48 (44.09)	50 [0–100]	0.697	<0.001	−0.566	<0.001

*, the raw score of answers to each question of the questionnaire SF-8 was converted into a 0–100 scale, so that a score of 0 indicated the worst result and a score of 100 the best one. R, Spearman's rank correlation coefficient; P, probability; SF-8, Short Form Health Survey; SD, standard deviation; AIS, Acceptance of Illness Scale; VAS, Visual Analog Scale; PCS, physical component score; MCS, mental component score; IQR, interquartile range.

Table 3 A model of linear regression with significant determinants of quality of life domains

Variables	Regression coefficient	Standard error	T value	P value
Significant determinants of physical component of quality of life				
Age (years)	−0.443	0.190	−2.328	0.022
WHO performance status				
0	–	–	–	–
1	−3.267	5.023	−0.650	0.517
2	−12.524	5.857	−2.138	0.034
3	−9.969	9.905	−1.006	0.316
4	4.810	26.170	0.184	0.854
AIS (score)	1.205	0.289	4.166	<0.001
VAS (score)	−5.114	1.168	−4.378	<0.001
Significant determinants of mental component of quality of life				
AIS (score)	2.385	0.467	5.107	<0.001
VAS (score)	−4.597	1.887	−2.436	0.016

AIS, Acceptance of Illness Scale; VAS, Visual Analog Scale.

in the model and random factors. Other variables such as sex, spirometric parameters, education, number of hospitalization, disease stage, the presence of symptoms, received treatment did not determined quality of life.

Discussion

Our study showed that both the level of the acceptance of illness and the severity of pain were correlated with the level of quality of life. Both the AIS and the VAS

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were independent determinants of physical and mental component of quality of life. Age and WHO performance status were additional predictors of physical components of quality of life.

In lung cancer patients, health related quality of life affects the survival and for this reason understanding factors that may influence components of quality of life are crucial for disease management. The EORTC 08975 study including patients with advanced non-small-cell lung cancer subjected to chemotherapy showed that a high level of symptoms presented by patients at baseline was associated with a poor prognosis. Higher scores of physical functioning, pain, dysphagia as components of health-related quality of life and WHO performance status were associated with lower risk of death (9,11). In another study by Braun et al., the physical function was predictive of survival independent of other components of quality of life. They also found that 10-point increase in physical function improved survival by 10% (10). The results of these studies drew attention to the fact that the decrease in physical functioning and increase in symptom severity in patients with lung cancer affect overall quality of life and translate into worse prognosis.

Our study reveals that the severity of pain, age and WHO performance status determine quality of life. Other studies from the literature also show that quality of life is worsened in patients with lung cancer due to severity of symptoms specific for this disease. Over 90% of patients with advanced lung cancer experience pain and fatigue which are recognized predictors of the quality of life (21). The majority of our study group (75%) received lung cancer surgery which may be associated with higher level of pain perceived by these patients, which should encourage health care providers for proper pain management, support and choosing less extent of intervention where possible. Zhao et al. showed that psychological intervention in the perioperative period decrease the level of perceived pain and this in turn increases quality of life despite no impact on physical domain. In their study, pain as measured with the VAS was lower in patients given psychological intervention both before and after surgery than in patients given conventional nursing intervention. The opposite relation was observed for quality of life as measured with Quality of Life Questionnaire-C3 (QLQ-C3) (22). Additionally, choosing a type of surgery burdened with less pain, less invasiveness and shorter hospital stay results in better short-term postoperative quality of life (23-25).

The acceptance of illness is one of significant factors affecting the level of quality of life in patients with chronic diseases. Kocjan assessed the relation between the acceptance of illness and quality of life in cardiac patients. He found that in patients with normal level of the acceptance of illness scores of every domain of quality of life as measured with the SF-36 questionnaire, except for physical functioning and pain, were significantly higher than in those with low acceptance of illness (26). Also, Obiegło et al. reported that patients with chronic heart failure may not accept their disease due to deteriorated quality of life (27). Patients with chronic respiratory diseases present many pulmonary symptoms. Patients with COPD partially experience similar symptoms to patients with lung cancer and more, they report the lowest scores in physical domain of quality of life than in other domains (13,28). Jankowska-Polańska et al. and Mroczek et al. reported that in COPD patients, higher scores of all domains of the quality of life were associated with a higher degree of acceptance of illness (28,29). To the best of our knowledge, the association between the quality of life and the acceptance of illness in lung cancer patients has not been studied; however, some authors published their studies on the acceptance of illness in this group of patients reporting low level of the acceptance of illness among lung cancer patients (3,30,31). Karczmarek-Borowska et al. reported that 60% of the patients accepted the disease at the time of diagnosis and this rate increased over time. Significantly higher level of acceptance was presented by patients below 60 years of age than those over 60 (30). Our study showed that the acceptance of illness is one of predictors of poor quality of life.

Limitations of the current study include moderate size and rather heterogeneous character of the study group as it included patients with different comorbidities and various stages of lung cancer. The study is based on three self-reported questionnaires, so to assess quality of life we had chosen the SF-8 questionnaire. This questionnaire is short with comparable results to widely used questionnaires such as SF-36 or SF-12. Using SF-8 allowed us to shorten patient time spent on answering questionnaires used in the study (32). Due to the cross-sectional design, we were not able to establish a causality of the observed relationships, which would bring beneficial information for the improvement of health care procedures. Despite limitations, this study provided evidence for the associations between the level of acceptance of illness and pain and quality of life in lung cancer patients. The overall acceptance of illness and perception of pain determine quality of life which is a

recognized predictor of survival. Understanding the role of acceptance of illness and perception of pain among lung cancer patients may help to develop intervention programs and improve care procedure in this group of patients.

Conclusions

The knowledge about the acceptance of illness, consequences of decreased acceptance of illness, and factors affecting its level in patients with lung cancer is still insufficient. Relationships among acceptance of illness, quality of life, and pain should be further investigated.

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Footnote

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