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QUALITY OF LIFE IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) IN OUTPATIENT CARE

Jakość życia chorych z przewlekłą obturacyjną chorobą płuc (POChP) w opiece ambulatoryjnej

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Abstract (in Polish):

Cel pracy

Celem pracy była ocena jakości życia chorych na POChP w warunkach ambulatoryjnych z perspektywy nasilenia obturacji oskrzeli i objawów chorobowych.

Materiał i metody

Badania przeprowadzono u 319 pacjentów z POChP leczonych w poradni chorób płuc. Badania przeprowadzono metodą sondażu diagnostycznego, wykorzystując standaryzowany kwestionariusz Szpitala Świętego Jerzego (SGRQ), Test Oceny POChP (CAT) oraz wyniki badania spirometrycznego

Wyniki

Uzależnienie od tytoniu dotyczyło 99,4% badanych. Globalna ocena jakości życia (QoL) życia chorych badanej grupy uzyskała wynik średni 44,67±8,94. Najniższa QoL dotyczyła podskali Objawy ze średnią wyników 76,46±8,80. W podskali Aktywność średni wynik kształtował się na poziomie 47,14±12,75. Najwyższą QoL pacjenci uzyskali w podskali Wpływ na życie, gdzie średnia wyników była równa 31,45±11,18. Ogólna jakość życia była istotnie ujemnie skorelowana z ciężkością obturacji oskrzeli ($p<0,001$) oraz nasileniem objawów związanych z POChP w ocenie testem CAT tj. kaszlem ($p<0,001$), zaleganiem śluzu w oskrzelach ($p<0,001$), uciskiem w klatce piersiowej ($p<0,001$), zadyszką ($p<0,001$), brakiem poczucia pewności ($p<0,001$), gorszym snem ($p<0,001$), brakiem energii do działania ($p<0,001$), trudnościami związanymi z czynnościami życia codziennego ($p<0,004$)

Wnioski

Pacjenci z POChP wymagają działań w zakresie edukacji zdrowotnej ukierunkowanej na eliminację palenia tytoniu, a także profilaktyki trzeciorzędowej związanej z chorobą zasadniczą, a także chorobami układu krążenia i cukrzycą. Jakość życia badanych pacjentów jest determinowana głównie stanem klinicznym związanym z nasileniem objawów i stopniem upośledzenia czynności płuc.

Abstract (in English):

Aim

The objective of the study was to assess the quality of life of COPD patients in outpatient care from the perspective of increased bronchial obturation and disease symptoms.

Material and methods

The study was performed in 319 patients with COPD receiving outpatient care at a clinic for pulmonary diseases. The study was conducted by means of a diagnostic survey using the standardized St. George's Respiratory Questionnaire (SGRQ), the COPD Assessment Test (CAT), and spirometry test results.

Results

Smokers accounted for 99.4% of the subject population. The average overall quality of life (QoL) score for patients in the study group was 44.67 ± 8.94. The lowest QoL scores, averaging at 76.46 ± 8.80, were reported for the symptoms subscale. The average score for the activities subscale was 47.14 ± 12.75. The highest QoL scores, averaging at 31.45 ± 11.18, were reported for the impact subscale. The overall quality of life was significantly inversely correlated with severe bronchial obturation $p<0.001$) and the severity of COPD symptoms as assessed using the CAT scale, i.e. cough ($p<0.001$), phlegm ($p<0.001$), chest tightness

(p<0.001), breathlessness (p<0.001), confidence (p<0.001), sleep (p<0.001), lack of energy (p<0.001), and limitations regarding everyday activities (p<0.004).

Conclusions
Patients with COPD require health education to address tobacco control, as well as tertiary prevention of the primary disease, cardiovascular diseases, and diabetes. The quality of life of the study patients is determined mainly by the clinical condition associated with the severity of the symptoms and the degree of lung function impairment.

Keywords (in Polish): jakość życia, przewlekła obturacyjna choroba płuc, SGRQ.

Keywords (in English): quality of life, chronic obstructive pulmonary disease, SGRQ.

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Introduction

Chronic obstructive pulmonary disease (COPD) is referred to as the civilization disease of the 21st century. It is the most common chronic respiratory disease as well as third most common cause of death due to chronic diseases worldwide [1]. According to the research on the global disease burden, a total of 3.2 million individuals were affected with COPD in Poland in 2017. At the same time, COPD was the seventh most important cause of the loss of disability-adjusted life-years (DALY) in Poland. In the European Union, the lowest COPD incidence rate is observed in France (256 cases per 100,000 individuals) while the highest rate is observed in Hungary (565 cases per 100,000 individuals). Compared to EU countries with the same Sustainable Development Index (SDI), Poland has the highest incidence and prevalence rates. At the same time, Poland and the UK are the only countries where a downward trend has been observed in recent years [2].

In view of its widespread prevalence and socioeconomic impact, COPD is a particular area of interest for researchers assessing the health-related quality of life. The interdependency between the severity of symptoms and the patients' ability to function in different areas of life contributes to comprehensive assessment of the efficacy of patient managements. The disease has a significant negative impact on the health, mental and social functioning of patients, requiring them to seek assistance from other individuals [3]. Painful symptoms and the chronic nature of the disease have a negative effect on professional activity. Patients are more likely to be on sick leave due to infections which often lead to exacerbation of COPD symptoms [8]. As the result, patients tend to develop sense of disability and

helplessness [4-5]. They may feel anxious and depressed which contributes to deterioration in their social functioning. Cognitive impairment and emotional volatility may cause nervousness or indifference, making the therapy much more difficult [6-7]. Symptoms of the disease affect the quality of sleep, for example by causing problems with falling asleep and worsening the mood during the day [9-10].

In accordance with clinical experience and research findings, compliance with recommendations among the patients with chronic diseases is improved through organized treatment, patient education and preparation for self-monitoring, as well as by regular checkups and involvement from specially trained health professionals [11-14].

Objective

The overall objective of the study was to assess the quality of life in patients with chronic obstructive pulmonary disease receiving outpatient care from the perspective of the severity of disease symptoms and the degree of airway obturation.

Material and methods

The study group was recruited from among patients of a clinic for pulmonary diseases in Ostrowiec Świętokrzyski. The study was conducted between May 2014 and December 2018. The first stage of the study consisted in identification and verification of all COPD patients registered at the clinic as of March 2014. A review of a total of 4,200 medical records led to the identification of 2,156 patients meeting the study inclusion criteria which included the diagnosis of COPD, the age of over 40, and the informed consent to participate in the study being provided by the patient. Patients were proposed to participate in the study at their routine medical appointments, with a total of 319 patients agreeing to take part. At this stage, the patients had been familiarized with the course of the study and provided their informed consent for study participation. Following inclusion, patients completed the St. George's Respiratory Questionnaire (SGRQ) and the COPD Assessment Test (CAT) and were subsequently subjected to a spirometry test.

The study was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [15].

The study methods included a measurement, documentation analysis, and a diagnostic survey using a proprietary questionnaire and standardized tools including the St. George's Respiratory Questionnaire (SGRQ) and the COPD Assessment Test (CAT). The SGRQ questionnaire is a specific tool for the assessment of COPD patients and comprised of a total of 50 questions in three subscales pertaining to symptoms (S), activity (A), and life impact (I). Results for individual subscales could be scored in the range between 0 and 100 points, with zero corresponding to the highest and 100 to the lowest quality of life [16]. Validation of the Polish language version of the questionnaire had fully reflected the results obtained using other language versions. This research tool is characterized by high reliability, repeatability and effectiveness in assessing the quality of life. The Cronbach's α for the entire questionnaire was 0.93 [17].

The other questionnaire, namely the COPD Assessment Test (CAT), consists of eight questions that relate to the symptoms of cough, breathlessness, phlegm, chest tightness as well as to the everyday functioning of patients, namely to everyday activities, social functioning, sleep, and energy. The tool measures the severity of symptoms using a scale of 0 to 5 where 0 means no symptom within the particular area and 5 corresponds to the most severe symptom or inability to perform. The maximum total score is 40. CAT results were divided into four categories of low, medium, high and very high depending on the

level of disease impact [18]. The Cronbach's α for the Polish language version of the CAT questionnaire was 0.87 for the general test ranged between 0.83 and 0.86 for individual questions [19-20].

The proprietary questionnaire consisted of seven questions providing sociodemographic information including data on the patients' educational background, smoking addiction, comorbidities, as well as age, gender and area of residence.

The next step consisted in spirometry tests being conducted during qualification visits. The results were used to classify patients into different disease stage groups. All patients in the study were subjected to spirometry tests using the LungTest 1000 apparatus to obtain three repeatable flow-volume curves. Patients with COPD were identified in accordance with the international COPD guidelines as having FEV1/FVC of < 0.7 (70%). The severity of COPD was classified on the basis of spirometry test results according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) classification: Grade I: Mild, FEV1 > 80% of the predicted value; Grade II: Moderate, FEV1 50–80% of the predicted value; Grade III: Severe, FEV1 30–50% of the predicted value; Grade IV: Very severe, FEV1 < 30% of the predicted value [2]. According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines, patients with a history of asthma were excluded from the study [21].

The study protocol was approved by the Bioethics Committee at the Jan Kochanowski University in Kielce (decision number KB-14/2019). The study was carried out in accordance with the ethical guidelines of the Helsinki Declaration [22].

The survey data were collected into Microsoft Excel spreadsheets. Statistical analyses were carried out using the IBM SPSS Statistics Package (ver. 25), with percentage frequencies being calculated for qualitative variables and means, standard deviations, and variability ranges (extreme values) being determined for quantitative variables. The assumption of the normality of data distribution was verified by the Shapiro-Wilk's test while the equality of variances was verified using the Levene's F test. A decision to use non-parametric methods was made. Mann-Whitney's U-test aka Wilcoxon rank-sum test was used for comparisons between two groups. One-way Anova Kruskal–Wallis test by ranks was used for comparisons between more than two groups. McNemar-Bowker test of symmetry was used to compare the obtained spirometry parameters. The statistical significance level for this study was set at $p < 0.05$.

Results

The analysis included data from 319 patients, with 246 male and 73 female patients. The mean age of the study patients was 68 years. The largest age groups included patients aged up to 65 (n=130, 40.8%) and above 71 years (n=102; 32%). The remaining figure of 27.2% (n=87) was made up of patients at the age of 66 to 70. Only 3 individuals (0.9%) had a college level educational background while another 65 patients (20.4%) had a secondary educational background. The remaining percentage of respondents had either vocational (n=195; 61.1%) or primary (n=56; 17.6%) educational background. Patients were more likely to live in urban (n=222; 69.6%) rather than rural (n=97; 30.4%) areas.

The additional disease burden in the study group on top of the chronic obstructive pulmonary disease consisted in smoking (n=317; 99.4%) and concomitant diseases such as hypertension (n=214; 67.1%), hyperlipidemia (n=182; 57.1%), diabetes (n=56; 17.6%), coronary artery disease (n=55; 17.2%) and stroke (n=19, 6%).

The first stage of the study consisted in the assessment of COPD severity by means of spirometry tests. In a majority of patients, the disease was either moderate (n=217; 68%) or severe (n=91; 28.5%). Details are presented in Table 1.

Table 1. Spirometry test outcomes in the group of COPD patients

Bronchial obturation severity	FEV 1	
	n	**%**
Mild	4	1.3
Moderate	217	68.0
Severe	91	28.5
Very severe	7	2.2
Overall	319	100.0

The average overall quality of life (QoL) score for patients in the study group was 44.67 ± 8.94. The results of empirical analyses are divided into three sub-scales of Symptoms (S), Activity (A), and Impact (I). Notably, the lowest quality of life was determined by the severity of clinical symptoms (S), with the average score of 76.46 ± 8.80. The average score for the activities (A) subscale was at a moderate level of 47.14 ± 12.75. The highest quality of life scores were reported by patients for the impact (I) scale, with the results averaging at 31.45 ± 11.18. Details are presented in Table 2.

Table 2. Overall quality of life in the patient group as assessed using the SGRQ

Quality of life SGRQ	n	M	SD	Min	Max	Q_1	Me	Q_3
Symptoms (S)	319	76.46	8.80	34.64	90.13	73.37	78.08	82.75
Activity (A)	319	47.14	12.75	5.91	81.29	36.47	43.21	54.97
Impact on life (I)	319	31.45	11.18	4.52	78.93	23.76	28.16	37.34
Total score (T)	319	44.67	8.94	14.47	75.55	38.75	42.45	49.67

Abbreviations: n — number of subjects in the study group; M — arithmetic mean, Me — median, SD — standard deviation, min — minimum; max — maximum, Q1 — first quartile; Q3 — third quartile

The next stage of the study consisted in the analysis of the relationship between the quality of life in COPD patients and the severity of bronchial obturation. Patients with lower obturation severity reported significantly better quality of life scores within the Activity ($p < 0.001$) and Impact ($p < 0.001$) subscales as well as with regard to the overall score ($p < 0.001$) (Table 3).

Table 3. The severity of obturation and overall assessment of the quality of life on the SGRQ scale.

Quality of life (SGRQ)	Bronchial obturation severity									
	Mild		Moderate		Severe		Very severe		Significance level	
	M	SD	M	SD	M	SD	M	SD	H	p
Symptoms (S)	74.78	10.63	77.00	8.23	75.38	9.92	74.89	9.65	1.976	0.577
Activity (A)	39.53	10.51	45.07	11.92	51.31	13.24	61.51	10.74	29.504	<0.001
Impact on life (I)	34.75	4.67	29.83	10.95	34.38	10.84	41.47	13.57	20.863	<0.001
Total score (T)	43.49	6.57	43.28	8.62	47.27	8.76	54.02	10.69	22.823	<0.001

Further studies were carried out to analyze the frequency of symptoms reported by patients as being the most burdensome. The most frequently reported symptoms included dyspnoea (n=192, 60.4%), cough,

(n=136; 42.7%) and difficulties with coughing up phlegm (n=114; 35.9%). More than one half of the subjects (n=164; 51.4%) reported disease exacerbations with severe COPD symptoms lasting for at least 2 days within one month preceding the study; a slightly smaller group (n=99; 31.1%) consisted of patients who had experienced severe exacerbations of symptoms which lasted for three or more days. Exacerbations of COPD symptoms exclude patients from normal activities and contribute to significant disability, job resignations (n=71; 22.3%) or job changes (n=152; 47.5%) as the result of severe respiratory problems. The activity of patients was very limited. Nearly all subjects within the study group (n=294; 92.2%) declared that they did not participate in activities involving moderate physical exercise. Walking was a problem for 83% (n=265) of the subjects and a vast majority (n=248; 77.6%) perceived staircases in their residential buildings as significant barriers. When analyzing the responses of and the quality of life results reported for the Impact subscale, it should be noted that despite experiencing painful symptoms, patients tend to adapt their lives to their capabilities of functioning with chronic disease. The COPD Assessment Test was used to assess the severity of COPD symptoms. Descriptive statistics are provided in Table 4.

Table 4. CAT results

Disease symptoms CAT	M	SD
Cough	3.00	0.78
Bronchial phlegm (mucus)	2.64	0.75
Chest tightness	2.21	0.92
Breathlessness when walking uphill or climbing up a flight of stairs	3.41	0.81
Difficulty with any type of household activities	2.72	0.79
Confidence when leaving home	2.38	0.74
Sleep	2.40	0.82
Energy	2.49	0.76
Total	21.26	3.98

The next stage of the study consisted in the analysis of the impact of symptom severity on the quality of life of COPD patients. It was observed that the higher the severity of each of the CAT-measured disease symptoms, the lower the overall quality of life. The results of statistical analysis are presented in Table 5.

Table 5. Correlation between the disease symptoms (CAT) and the quality of life (SGRQ).

Disease symptoms CAT	Quality of life (Total score)	
	Rho	p
Cough	0.211	<0.001
Bronchial phlegm (mucus)	0.248	<0.001
Chest tightness	0.273	<0.001
Breathlessness when walking uphill or climbing up a flight of stairs	0.337	<0.001
Difficulty with any type of household activities	0.163	<0.004

Confidence when leaving home	0.268	<0.001
Sleep	0.287	<0.001
Energy	0.320	<0.001

Discussion

The knowledge of the disease symptoms and the determination of the quality of life of patients contribute to better diagnosis and treatment of COPD [23–29]. Fishwick et al. [24] carried out a study in a group of 623 English subjects, including 148 patients diagnosed with COPD. The researchers noted that the quality of life of COPD patients was significantly lower than that with other occupational exposure-related conditions. The authors also noted that the effect of the quality of life being reduced in these patients persisted after their retirement. Most patients (80%) reported mobility problems. These were followed by difficulties with everyday activities (74%) [24]. Comparable results were obtained in our study, where 24% of subjects had resigned from their jobs due to COPD despite the fact that their quality of life remained at an average level. A similar observation was presented by Kessler et al. [25] who had carried out an analysis of 2441 patients with established severe COPD. Nearly all patients (92.5%) had experienced COPD symptoms within seven days preceding the interview. Most patients (72.5%) reported breathlessness, particularly as experienced in the mornings, to be the greatest problem. For a vast majority of the population (62.7%), everyday morning-time activities such as washing and dressing were also problematic. In addition, it was noted that most reported problems with climbing stairs (82.4%), doing household chores (56.9%) and doing shopping (41.3%). A small percentage of patients (13.1%) reported that they were unable to function alone whereas more than one half of this group (66.5%) admitted that their disability was a burden for other family members. With reference to the analysis by Kessler et al. [25], one can conclude that COPD disturbs the daily and social life of patients, preventing them from performing their everyday routines. Reduced physical activity of COPD patients leads to a loss of muscle mass which is a determining factor for disability. Such a relationship was observed by Shrikrishna et al. [28] who reported reduced strength of quadriceps femoris muscle in patients with reduced exercise capacity. The study showed that the atrophy of the quadriceps femoris muscle was related to the reduction in physical effort undertaken by COPD patients due to their disease symptoms. The quality of life is important not only from the standpoint of patient's functioning but from the standpoint of therapeutic further management as well. In their study carried out in 1443 patients, Chrystyn et al. [29] observed that patient's satisfaction with the prescribed inhaler largely affected systematic use of medications while reducing exacerbation rates and improving the quality of life. Health education is an important factor with positive impact on the quality of life of COPD patients. Wang et al. [30] carried out a meta-analysis of 24 studies which had confirmed that health education of COPD patients provided tangible benefits in terms of the quality of life of the subjects while contributing to reduced rates of hospitalizations due to disease exacerbations and even to reduced mortality rates. On the other hand, a long-term study on the impact of patient education and smoking cessation programs on disease exacerbations and hospital admissions in the group of 20,666 COPD patients revealed that the HRQoL in the group of subjects who had not participated in educational programs was worse than in those who had taken part in health education [31]. Educational intervention can inhibit disease deterioration, improve patients' abilities to cope with the disease and increase the quality of their lives. Other interventions related to the treatment of the disease in patients affected by COPD may include physical exercise, self-management of exacerbations, exacerbation action plans and educational programs for which the improvement in the quality of life and exercise tolerance had been demonstrated in a systematic review [32-34].

Conclusions

1. Patients with COPD require health education to address tobacco control, as well as tertiary prevention of the primary disease, cardiovascular diseases, and diabetes.
2. The quality of life of the study patients is determined mainly by the clinical condition associated with the severity of the symptoms and the degree of lung function impairment.

Recommendations for nursing practice

1. The assessment of the quality of life in COPD patients can be indicative of patients' functional capabilities associated with increase in clinical symptoms and the degree of lung function impairment.
2. Elimination of tobacco smoking is an essential element of health education at all phases of COPD prevention, as well as the prevention of its comorbidities.
3. Preventive and therapeutic tasks play the key role in the outpatient nursing care to COPD patients.

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Conflicts of interest

The authors report no conflicts of interest.

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