



Assessment of disease-related knowledge among patients with chronic obstructive pulmonary disease: a cross-sectional study

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Abstract

Introduction. The main task of this study was to study the level of knowledge of the Ukrainian patient about chronic obstructive pulmonary disease (COPD), and the factors that cause and affect this indicator, with the help of a validated instrument. **Methods.** 41 patients were involved in the study. Socio-demographic data, information on the duration, course of the disease and cooperation with a physical therapist were collected. Anthropometric measurements, spirometry, pulse oximetry, tonometry were performed. Patients were surveyed with Modified Medical Research Council Dyspnea Scale, Hospital Anxiety and Depression Scale, Clinical COPD Questionnaire score, and Bristol COPD Knowledge Questionnaire (BCKQ). Bristol COPD Knowledge Questionnaire was translated, cross-culturally adapted and validated. Regression analysis was performed to determine relationships between the level of knowledge about the disease, socio-demographic data, indicators of respiratory system functional status, and survey data. **Results.** The average total score for BCKQ was 24.71±9.62 points. Patients gave the least number of correct answers to the question related to medical treatment. The level of knowledge depends on the factors such as age ($\beta=-0.557$; 95% CI: -1.041–0.086, $p=0.086$), duration of the disease ($\beta=-0.114$; 95% CI: -0.077–0.055, $p=0.048$), respiratory ratings, functional limitations, and own psychosocial dysfunction according to the CCQ scale ($\beta=-0.506$; 95% CI: -0.007–0.752, $p=0.053$), and the HADS depression score ($\beta=-0.655$; 95% CI: -4.257– -0.085, $p=0.043$). **Conclusion.** The level of knowledge of Ukrainian patients about COPD is low. More experience of the disease did not affect the increase in the level of knowledge. Older patients had a lower level of knowledge about their disease. Impact of body mass index, spirometry results, level of severity of shortness of breath, and symptoms of the disease on the level of knowledge was not revealed.

Keywords: COPD, BCKQ, knowledge, educational component, pulmonary rehabilitation.

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) remains a major cause of death in many countries of the world. Encouragingly, the definition of COPD in the latest review of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) indicates that the disease is preventable and treatable. The danger of the COPD is increased by the high cost of treatment and loss of the patient's ability to work due to the progression of the disease. Today there is an ever-increasing demand for improvement of medical therapy and rehabilitation of the patient. However, the complexity of the treatment and control of the COPD exacerbations constantly arise, pathological changes occurring in the body have a systemic character, and the development of concomitant pathologies is also typical. Disease control requires active involvement of the patient, raising the level of awareness of the patient about his/ her own disease, developing the educational component of the rehabilitation program in such a way as to fill the knowledge gaps.

The relationship of the patient's knowledge of his/ her disease to the results of treatment and rehabilitation has been studied for many chronic diseases [1]. Education for patients with chronic diseases has been proven to be an extremely important component of treatment and rehabilitation [2], and a high level of literacy about the disease reduces anxiety and depression [3-5], improves quality of life and increases self-efficacy [6]. At the same time, low treatment adherence and motivation to follow recommended treatment regimen is often the result of the patient's low awareness of the disease, prognosis in the absence of treatment, the mechanisms of action of prescribed medications and differences between basic and on-demand treatment, lack of understanding of the need for long-term (lifelong) therapy, fear of the development of adverse effects of therapy and dependence on medications, high cost of treatment and the patient's unwillingness to change their lifestyle (e.g. stop smoking) [7].

Education of a Ukrainian patient with COPD should be an integral component of pulmonary rehabilitation, which corresponds to international approaches and standards [8]. Thus, when the patient is poorly informed about his or her condition, the educational component in rehabilitation becomes mandatory and should contain information on self-control, prevention and treatment of exacerbations. Self-management strategies in the education of patients with COPD help to improve self-efficacy (i.e. confidence in successful management of their health) by increasing the necessary knowledge and skills of patients [9]. Assessment of the patient's level of knowledge, literacy about the disease is an important step in working with individuals with COPD; these steps are carried out before the pulmonary rehabilitation programme and after its completion [10]. Today, the international practice of pulmonary rehabilitation is based on Bristol COPD Knowledge Questionnaire (BCKQ) [11], which provides high reliability and sensitivity, and allows to track changes in patient literacy. This tool, as well as its analogues [12], which have proven effectiveness and are used in different countries around the world, is inaccessible to Ukrainian patients, significantly limits some stages of rehabilitation of the patients, does not allow to understand the state of the problem with the level of literacy, to track progress in rehabilitation or to compare the effectiveness of rehabilitation programs in other countries of the world. Accordingly, the main task of this study was to study the level of knowledge of the Ukrainian patient about chronic obstructive pulmonary disease, and the factors that cause and affect this indicator, with the help of a validated instruments.

MATERIAL AND METHODS

Participants

Participants were recruited in Ukrainian hospital (Pulmonology Department of the Municipal non-profit enterprise "5th city clinical hospital in the city of Lviv"). Future participants were invited by telephone to conduct study-related procedures. During the first visit, socio-demographic data (age, educational level, bad habits, marital status, job availability), information on the duration and course of the disease and cooperation with a physical therapist were collected. Anthropometric measurements (height, body weight) as well as spirometry, pulse oximetry, tonometry were performed. Subjects meeting the following inclusion criteria: (1) willing to participate, (2) patients

with a confirmed COPD diagnosis (3) stable COPD or patients who had exacerbations at least during last 2 weeks, (4) were registered with the Pulmonology Department of the hospital. COPD diagnosis was made according to GOLD standard [13]. Withdrawal criteria: (1) mental illness or cognitive impairment, (2) COPD exacerbation period, (3) first stage of COPD, (4) non-cooperation. In the study were involved 41 patients.

Data collection instrument

The following tools were used: Modified Medical Research Council Dyspnea Scale (mMRC), Hospital Anxiety and Depression Scale (HADS), Clinical COPD Questionnaire score (CCQ), BORG scale, and Bristol COPD Knowledge Questionnaire (BCKQ).

The mMRC scale is accepted as a classification criterion for the assessment of symptoms in the GOLD ABCD system [14], it consists of 5 questions about recent symptoms of shortness of breath in "Yes" or "No" format of answers. The patient determines the possible level of physical activity that causes shortness of breath. The level of shortness of breath is rated from 0 to 4 points; a higher score corresponds to more severe shortness of breath [15].

HADS is a self-assessment scale designed to assess the severity of symptoms of anxiety and depression in general medical practice. It consists of 14 questions, among which seven questions allow to assess the level of anxiety, and other seven – the level of depression. Four options of answer correspond to each statement that reflect the gradation of the severity of the sign and the severity of the symptom (from 0 points – no symptom, to 3 points – the symptom is as pronounced as possible). Indicators were calculated separately for each subscale. The results were interpreted according to the following scale: 0–7 points – normal (no significant symptoms of anxiety and depression), 8–10 points – subclinically expressed anxiety/ depression; ≥ 11 points – clinically expressed anxiety/ depression.

The CCQ questionnaire is a short, simple, and reliable tool containing 10 questions, and focuses on clinical respiratory status, functional limitations, and psychosocial dysfunction. Answer options (from 0 to 6 points) are added together to get the final score [16].

BORG scale is a self-administered unidimensional assessment tool that analyzes breathlessness [17]. It starts at number 0 where patient's breathing is causing that there is no difficulty at all and progresses through to number 10 where breathing difficulty is maximal.

The level of knowledge about COPD was determined with the help of the BCKQ. This tool is valid and reliable questionnaire, that was developed by White et al. [18]. Questionnaire includes 13 subscales (1) epidemiology, (2) etiology, (3) symptoms, (4) breathlessness, (5) phlegm, (6) infections, (7) exercise, (8) smoking, (9) vaccination, (10) inhaled bronchodilators, (11) antibiotics, (12) oral steroids, (13) inhaled steroids. Each subscale contains five items, and for each item there are three possible answers "True," "False," and "Don't know." A correct answer scores one point, incorrect/ "Don't know" – zero point. The total score of each subscale range from 0 to 5 points, total score sums up the scores of all subscales and ranges from 0 to 65.

The permission to use the English version of BCKQ was obtained from the copyright owner Dr. Roger White before translation procedure and cross-cultural validation.

Validation of Bristol COPD Knowledge Questionnaire

In order to provide self-reported measures that can be compared to international studies, we performed the validation of BCKQ. Translation and cross-culture validation was conducted to provide applicable, meaningful, and equivalent tool for the Ukrainian population. Internal consistency reliability and test-retest reliability were studied in order to assess how well the tool delivers reliable scores.

We followed the novel recommendation of guidelines during translation and cross-cultural adaptation [18–20]. Four-step translation was performed – forward translation (1), backward translation (2), cognitive interviews (3), and proofreading (4) (Table 1).

The main priority of those steps was to produce Ukrainian version of BCKQ that is conceptually equivalent to the English version, use the language that is colloquial and easy for understanding. A local coordinator (native language is Ukraine, advanced level of English according to the Global Scale of English, the area of expertise – physical culture, physical rehabilitation) was involved in all steps of linguistic validation. The results of linguistic validation is presented in Annex.

Table 1. The process of linguistic validation of the BCKQ

Steps	Participants	Procedure	Result	Duration
Forward translation (translation of BSKQ into Ukrainian)	2 professional translators	Independent translation, discussion with local coordinator, consensus to create a single version	First Ukrainian version (V1UA)	1 week
Backward translation (translation of V1UA into English)	2 local professional translators, native speakers of the English language, bilingual in the Ukrainian language	Independent translation, comparing with original instrument, with local coordinator, consensus to create a single version	Second Ukrainian version (V2UA)	2 weeks
Testing of V2UA	n=8	individual interviews, discussing difficulties in understanding, interpretation of all items	Third Ukrainian version (V3UA)	3 weeks
Proofreading of V3UA (for avoiding any typing, spelling, or grammatical mistakes)	Editor of scientific literature (physical education, physical rehabilitation, health) whose native language is Ukrainian	Proofreading, discussing with local coordinator	Final Ukrainian version (V4UA)	1 week

Internal consistency was measured using Cronbach's alpha. The questionnaire had a high degree of internal consistency (Cronbach's alpha – 0.887). The final Ukrainian version of BCKQ was tested on a group of 20 participants, the length of test-retest interval was three weeks. During that time, they had not to receive any further information about COPD. According to results, Spearman's rho was 0.84 ($p < 0.05$) that demonstrates good test-retest reliability.

Ethical approval

The participants received a brief explanation, informed consent was obtained from those who agreed to take part in study. Ethical consent for the study was obtained from the Bioethical Committee of Lviv State University of Physical Culture.

Statistical analysis

Descriptive statistics were presented in terms of mean (M), standard deviation (SD), median (Me) for continuous variables, distribution, range of scores, floor and ceiling effects. Mean and SD for subscales and total score were presented for comparison with international literature about COPD knowledge level of patients. Regression analysis (linear regression) was performed to determine relationships between the level of knowledge about the disease, socio-demographic data, indicators of respiratory system functional status, and survey results. Data analyses were completed by Origin Pro 8.6 and SPSS Statistics 23.

RESULTS

The patient's level of knowledge of COPD

The percentage of correct and incorrect answers to each question of BCKQ are included in Table 2. There were more correct answers in the subscale "Symptoms" (56.10%), in particular to the question concerning the presence of whistle-type noise in the lungs during COPD. On average, half of the respondents correctly answered the questions of the subscale "Phlegm" (54.63% of persons), "Etiology" (53.17% of persons) and "Smoking" (51.35% of persons).

Table 2. Percentage of participants (N=41) giving a correct response for all 65 items and 13 subscales

No.	Subscale/ respondents' answers	Question					average % of correct answers (ordinal number***)
		a n (%)	b n (%)	c n (%)	d n (%)	e n (%)	
1	Epidemiology correct answer incorrect answer	7 (17.07) 34 (82.93)	25 (60.98) 16 (39.02)	24 (58.54) 17 (41.46)	2 (4.88) 39 (95.12)	7 (17.7) 34 (82.93)	31.83 (9)
2	Etiology correct answer incorrect answer	24 (58.54) 17 (41.46)	28 (68.29) 13 (31.71)	22 (53.66) 19 (46.34)	19 (46.34) 28 (68.29)	16 (39.02) 25 (60.98)	53.17 (3)
3	Symptoms correct answer incorrect answer	19 (46.34) 28 (68.29)	32 (78.05) 9 (21.95)	34 (82.93) 7 (17.7)	16 (39.02) 25 (60.98)	14 (34.15) 27 (65.85)	56.10 (1)
4	Breathlessness correct answer incorrect answer	9 (21.95) 32 (78.05)	18 (43.9) 23 (56.1)	2 (4.88)** 39 (95.12)	32 (78.05) 9 (21.95)	28 (68.29) 13 (31.71)	43.41 (5)
5	Phlegm correct answer incorrect answer	23 (56.1) 18 (43.9)	16 (39.02) 25 (60.98)	32 (78.05) 9 (21.95)	11 (26.83) 30 (73.17)	30 (73.13) 11 (26.83)	54.63 (2)
6	Infections correct answer incorrect answer	14 (34.15) 27 (65.85)	26 (63.42) 15 (36.59)	20 (48.78) 21 (51.22)	16 (39.02) 25 (60.98)	7 (17.7) 34 (82.93)	40.61 (7)
7	Exercises correct answer incorrect answer	12 (29.27) 29 (70.73)	18 (43.9) 23 (56.1)	16 (39.02) 25 (60.98)	29 (70.73) 12 (29.27)	3 (7.32)** 38 (92.68)	38.05 (8)
8	Smoking correct answer incorrect answer	35 (85.37)* 6 (14.63)	37 (90.24)* 4 (9.76)	25 (60.98) 16 (39.02)	1 (2.44)** 40 (97.56)	7 (17.7) 34 (82.93)	51.35 (4)
9	Vaccination correct answer incorrect answer	18 (43.9) 23 (56.1)	12 (29.27) 29 (70.73)	16 (39.02) 25 (60.98)	11 (26.83) 30 (73.17)	3 (7.32) 38 (92.68)	29.27 (10)
10	Inhaled bronchodilators correct answer incorrect answer	3 (7.32)** 38 (92.68)	16 (39.02) 25 (60.98)	3 (7.32)** 38 (92.68)	11 (26.83) 30 (73.17)	12 (29.27) 29 (70.73)	21.95 (11)
11	Antibiotics correct answer incorrect answer	9 (21.95) 32 (78.05)	29 (70.73) 12 (29.27)	9 (21.95) 32 (78.05)	4 (9.76)** 37 (90.24)	33 (80.49) 8 (19.51)	40.98 (6)
12	Oral steroids correct answer incorrect answer	9 (21.95) 32 (78.05)	6 (14.63) 35 (85.37)	7 (17.7) 34 (82.93)	13 (31.71) 28 (68.29)	10 (24.39) 31 (75.61)	22.08 (12)
13	Inhaled steroids correct answer incorrect answer	7 (17.7) 34 (82.93)	4 (9.76)** 37 (90.24)	8 (19.51) 33 (80.49)	4 (9.76)** 37 (90.24)	0 (0)** 41 (100)	11.35 (13)

* - questions which were answered correctly by 80% and more respondents; ** - questions which were answered correctly by 10% and less of respondents; ** - ranking of scales in order from the one with the most correct answers (first position) to the less correct answers (thirteenth position).

Less than 10% of respondents answered 9 of 65 questions correctly. Among patients 95.12% consider shortness of breath as a sign of oxygen level decrease; only 7.32% of persons understand that shortness of breath is not a reason not to do bodily exercises. The smallest number of correct answers were given to the questions "Stopping smoking usually results in improved lung function" (1 person) and "Inhaled steroids improve lung function in COPD" (no correct answer).

Patients gave the least number of correct answers to the question related to medical treatment. In the three questions of the subscale "Inhaled steroids", the percentage of correct answers was below 10%. Thematic subdivisions "Oral steroids" and "Inhaled bronchodilators" also had a low percentage of correct answers (on average 22.08% and 21.95% respectively).

Table 3. The patient's level of knowledge of COPD about their disease

No.	Subscale of BCKQ	Result M±SD [points]	Me	Range [points]
1	Epidemiology	1.58±0.17	2	0.00–4.00
2	Etiology	2.60±0.23	3	0.00–5.00
3	Symptoms	2.78±0.19	3	0.00–5.00
4	Breathlessness	2.18±0.16	2	0.00–4.00
5	Phlegm	2.73±0.21	3	0.00–5.00
6	Infections	2.00±0.2	2	0.00–5.00
7	Exercises	1.90±0.21	2	0.00–4.00
8	Smoking	2.55±0.16	3	0.00–4.00
9	Vaccination	1.43±0.2	1	0.00–4.00
10	Inhaled bronchodilators	1.13±0.2	1	0.00–4.00
11	Antibiotics	2.00±0.19	2	0.00–4.00
12	Oral steroids	1.13±0.19	1	0.00–4.00
13	Inhaled steroids	0.58±0.15	0	0.00–4.00
Total score for BCKQ		24.71±9.62	25.00	0.00–45.00

BCKQ - Bristol COPD Knowledge Questionnaire; M – mean; SD – standard deviation

Based on the results of the assessment of responses for each individual subscale (Table 3), it was found that a low level of knowledge in patients (1 point out of 5 possible) was in the thematic subsections “Inhaled steroids,” “Inhaled bronchodilators,” and “Oral steroids.” The highest level of knowledge was found in the thematic units “Symptoms,” “Phlegm,” “Etiology,” and “Smoking,” although one of them had an average score not exceeding 3. The average total score for BCKQ was 24.71±9.62 points.

Socio-demographic data of participants, physiological and psychological status of patients and their relationship to the level of literacy related to COPD

The average age of the participants was 9.05±13.09 years old, with 53.66% of women (Table 4). The level of education of 65.85% of participants was higher than secondary. More than half of the patients (58.54%) have never had the experience of working with a physical therapist. Almost all patients (85.37%) consider themselves physically active in life and everyday life; 63.42% of participants have been ill for 5 years or more; more than half of them (58.54%) have COPD exacerbations every six months or more. Of the bad habits, the respondents only reported smoking. In particular, 26.83% of respondents reported that they were active smokers at the time of the study.

The body weight of almost half of the respondents was within the normal range (18.5–24.9 kg/m²), body mass index in 31.71% of the respondents was higher than normal (>25 kg/m²) (Table 5). The spirometry data met the diagnosis criteria. Forced respiratory volume for the first second (FEV₁) averaged 64.52% of the required amount, while forced volume vital capacity (FVC) was 69.67±17.26% of the required amount. The SpO₂ indicator was within the normal range. The average rate of shortness of breath according to the mMRC questionnaire was within acceptable limits (up to 2 points). According to the BORG scale, the patients rated their shortness of breath from “somewhat strong” to “strong” (4.44±2.42 points).

Average values for anxiety and depression indicate that there are no credibly expressed symptoms of depression and anxiety. Anxiety index was 6.83±3.82 points, and depression index – 6.58±3.06 points. Table 4 and 5 include the mean and SD of BCKQ overall score and the regression coefficients explaining the effects of the sociodemographic and clinical characteristics on BCKQ overall scores. The level of knowledge depends on the factors such as age (95% CI: -1.041 to 0.086, p=0.086), duration of the disease (95% CI: -0.077 to 0.055, p=0.048), respiratory ratings, functional limitations, and own psychosocial dysfunction according to the CCQ scale (95% CI: -0.007 to 0.752, p=0.053), and the HADS depression score (95% CI: -4.257 to -0.085, p=0.043).

Table 4. Socio-demographic factors associated with BCKQ overall score

Factor	Number of persons n (%)	BCKQ overall score			
		M±SD [points]	r	95 % CI	p
Age	41 (100)	24.71±9.62	-0.557	-1.041; 0.086	0.086
Gender			-0.286	-18.082; 7.281	0.355
male	18 (43.90)	23.21±11.39			
female	22 (53.66)	26.0±7.83			
Education:			0.074	-3.654; 5.359	0.674
higher	15 (36.59)	26.53±11.92			
vocational secondary	12 (29.27)	23.75±6.05			
secondary	14 (34.15)	23.57±9.73			
Professional employment:			-0.363	-16.538; 2.939	0.146
employed	20 (48.78)	25.10±10.93			
not employed	21 (51.22)	24.33±8.44			
Marital status:			-0.316	-26.084; 11.678	0.405
married	31 (75.61)	25.71±9.14			
single	10 (24.39)	21.60±10.90			
Children:			0.204	-10.233; 23.491	0.391
with children	36 (87.80)	25.64±9.07			
no children	5 (12.20)	18.00±11.90			
Physical activity			-0.174	-14.817; 5.776	0.341
I consider myself a physically active person	35 (85.37)	24.54±8.76			
I don't consider myself a physically active person	6 (14.63)	25.66±14.71			
Bad habits:			0.021	-5.722; 6.214	0.927
No	28 (68.29)	25.78±9.70			
ex-smoker	2 (4.88)	23.86±9.65			
smoker	11 (26.83)	23.00±10.03			
other	0 (0)	-			
Duration of the disease, M±SD [years]:			-0.114	-0.077; 0.055	0.048
≤1 year	10.05±1.4				
1–5 years	6 (14.63)	13.83±8.75			
5–10 years	9 (21.95)	23.89±8.92			
≥10 years	10 (24.39)	25.00±12.94			
≥16 years	16 (39.02)	30.06±15.02			
Experience of cooperation with a physical therapist/rehabilitation specialist:			0.198	-4.957; 9.580	0.484
with experience of cooperation	8 (19.51)	25.88±9.48			
no experience of cooperation	24 (58.54)	24.71±8.42			
massage	7 (17.07)	24.38±8.20			
underwent sanatorium-resort care	2 (4.88)	24.68±6.20			
Number of exacerbations:			0.169	-2.216; 4.467	0.460
less than once a year	2 (4.88)	28.33±8.14			
once a year	14 (34.15)	20.36±12.06			
every six months	10 (24.39)	28.30±9.66			
3 times a year	7 (17.07)	23.43±2.76			
every six months	2 (4.88)	31.00±7.50			
>4 times a year	6 (14.63)	27.50±7.23			

M – mean; SD – standard deviation; r – correlation coefficient ; p - statistical significance

Table 5. Physiological and psychological factors associated with BCKQ overall score

Factor		BCKQ overall score				
List of factors	M±SD	M±SD [points]	r	95% CI	p	
BMI [kg/m ²]	23.19±0.79	21.33±9.64 25.00±10.16 27.86±8.32 25.00±11.25	-0.078	-1.102; 0.804	0.728	
body weight deficit, n [%]	9 (21.95)					
body weight within normal limits, n [%]	19 (46.34)					
overweight, n [%]	8 (19.51)					
obesity, n [%]	5 (12.20)					
FVC [%]	69.67±17.26	24.71±9.62	0.192	-0.729; 0.932	0.786	
FEV1 [%]	64.52±21.94		-0.287	-1.119; 0.872	0.782	
SpO ₂ [%]	95.76±2.67		-0.432	-3.655; 0.616	0.140	
RF [movements/minute]	20.71±4.96		-0.001	-0.890; 0.887	0.997	
Heart rate [bpm]	76.31±1.88		0.344	-0.188; 0.732	0.210	
mMRC [points]	1.98±1.15		-0.195	-9.613; 6.020	0.611	
BORG shortness of breath scale [points]	4.44±2.42		0.477	-1.273; 4.981	0.209	
CCQ [points]	24.85±12.96		0.506	-0.007; 0.752	0.053	
HADS:						
anxiety [points]	6.83±3.82		0.190	-1.180; 2.156	0.519	
depression [points]	6.58±3.06	-0.655	-4.257; -0.085	0.043		

BMI – body mass index; FVC – forced volume vital capacity; FEV1 – forced respiratory volume for the first second; mMRC – modified scale of assessment of shortness of breath of the British Medical Research Council; RF – respiratory frequency; HR – heart rate; HADS – hospital scale of anxiety and depression; CCQ – clinical questionnaire for chronic obstructive pulmonary disease (COPD); M – mean, SD – standard deviation, r – correlation coefficient, p – statistical significance

DISCUSSION

This is the first study using the validated and adapted Ukrainian version of BCKQ for Ukrainian population. This tool is used by researchers from around the world [11,22], it is a standard in assessing the effectiveness of rehabilitation programs, educational components of rehabilitation interventions in different countries [7]. According to the results of this study, its application becomes possible in Ukrainian rehabilitation practice. The study was designed to investigate the impact of clinical and socio-demographic characteristics on the level of knowledge of Ukrainian patients about chronic obstructive pulmonary disease.

Patients with COPD showed a low level of knowledge about their disease – the overall score was only 24.55±1.53 points, which is 37.77% of the maximum BCKQ score. Prolonged duration of the disease (more than 5 years in 63.42% of respondents) did not affect the improvement of knowledge about COPD. Moreover, the subscale assessments the questions of which were better answered by patients (“Etiology,” “Symptoms,” “Phlegm,” “Smoking”), were on average or below average level. This can only indicate the lack of adequate access to information materials in such patients, low level of interest of this category of patients in increasing literacy about their own disease, and insufficient implementation of the training component of treatment and rehabilitation programmes for patients with COPD. Low level of medical literacy of patients with COPD can be considered as a phenomenon that is typical for different countries of the world. In particular, study of the level of knowledge of patients with COPD without special training showed that BCKQ scores ranged from 46–49% of the maximum possible score in Canada [23], 46–61.27% in China [24], 48% in Italy [25], which still is higher than in surveyed group of Ukrainian patients.

The most problematic for Ukrainian patients should be considered to be literacy on the issues of medication treatment of COPD, namely, bronchodilators for inhalations, oral steroids, inhalation of steroids and the like.

Knowledge of some of the issues covered in the questionnaire is directly related to understanding actions that improve health, quality of life, and are related to the best treatment outcomes. For example, 73.17% of patients incorrectly answered the question about the advantage and greater efficiency of walking compared to breathing exercises; 60.98% of patients did not know

that physical exercise can help reduce osteoporosis and maintain bone density; 73.17% of patients believe that shortness of breath during exercise in patients with COPD is dangerous, and exercise should be stopped. Ignorance or misperceptions about the aforementioned issues can lead to further deterioration in health. The answers to questions about vaccination and medication can be considered critical, however, most of the patients (50%) chose the answer "I don't know". This further confirms the data on a low vaccination culture among the adult Ukrainian population.

The lowest level of knowledge in the sub-section "Steroid inhalation" may be explained by the lower use of spacer devices for the treatment of patients with COPD in the studied sample. In our opinion, it was quite predictable that older people had lower knowledge of the disease. Dependence on the duration of the disease can be explained by the fact that younger patients have shorter duration of the disease, but the level of their knowledge about COPD is higher. On the example of various populations, different conclusions can be drawn about the factors that influence the level of knowledge. In the Italian patient sample, the total BCKQ was not correlated with patient age, gender, education, years of disease, or disease severity [25]. Analysis of potential factors related to knowledge levels in medicine nurses from China demonstrated that overall BCKQ score was connected with the availability of postgraduate degrees, persons who had a bachelor or lower degrees had lower overall BCKQ score [26]. The situation was the opposite in the case of Chinese adults [24]. The BCKQ overall scores progressively declined with an increase in education level. The investigators assumed the presence of a "tortoise-rabbit scenario" in which persons who had higher education levels pay less attention to education materials. It can be assumed that educational level influences the level of knowledge ambiguously, but the profession may have a significant influence on it.

No relations were found between overall BCKQ score and factors related to a healthy lifestyle – physical activity level, smoking status, drinking status. Besides, the cross-sectional study in China showed that non-drinkers were observed to have a significantly higher BCKQ overall score, these results were presented in the discussion as questionable [24].

Impact of symptoms of assessed CCQ on the level of knowledge about COPD is explained by the fact that the number of correct answers to questions of the BCKQ subscale "Symptoms" was the highest. The presence of a high level of COPD symptoms in patients allowed them to answer questions correctly by their own experience. The more vivid and diverse the manifestations of the disease and the higher the CCQ score, the greater the number of correct answers regarding the manifestation of the disease. It was found that the level of knowledge of patients about the disease is an important risk factor for depression in patients with COPD, which is confirmed in other studies [3].

Given that the number of patients with COPD is constant and there is an urgent need to ensure effective disease management, a modern, valid assessment tool is an important requirement for a healthcare professional. Availability of validated and adapted for Ukrainian population BCKQ is an important step in improving the quality of rehabilitation services for respiratory diseases. The use of BCKQ will not only help to delineate gaps in the patient's knowledge, it will also allow for a reasonable selection of thematic content for the educational component of pulmonary rehabilitation programs. It has been proved that the level of knowledge about the disease of caregivers and relatives of patients with COPD, physical therapists, medical workers correlates with the effectiveness of the educational component of pulmonary rehabilitation of patients [27].

Limitations

There are some limitations to this study. First, a relatively small number of patients participated in the study. Second, the study did not determine the sensitivity of the tool for tracking changes in the level of knowledge of patients. Therefore, it is worthwhile to plan the study of changes in the level of literacy of patients with respect to their own disease after passing special educational programs in future studies.

CONCLUSIONS

Cross-cultural and linguistic validation of the BCKQ was conducted for the Ukrainian population. The tool has a high degree of internal consistency and is understandable for the Ukrainian patient. The level of knowledge of Ukrainian patients about chronic obstructive pulmonary disease is

low. More experience of the disease did not affect the increase in the level of knowledge. Along with this, older patients had a lower level of knowledge about their disease. Impact of such clinical indicators as body mass index, spirometry results, level of severity of shortness of breath, and symptoms of the disease on the level of knowledge was not revealed. The results obtained are important for understanding the list of educational issues that should be adequately covered during the implementation of the educational component in pulmonary rehabilitation programs for patients with COPD and during their information during treatment and rehabilitation. The top-priority issues are the impact of shortness of breath on the life of a patient with COPD, the ability to perform and the effect of exercise, the impact of smoking on the progression of the disease, issues of medication treatment of patients. Knowledge in these areas will help manage the disease more effectively, understand the importance of self-management, and use strategies to maintain and improve own health.

CONFLICT OF INTEREST

The authors report that there is no conflict of interest.

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ANNEX

BRISTOL COPD KNOWLEDGE QUESTIONNAIRE (BCKQ)©

Брістольський опитувальник для оцінювання рівня знань про ХОЗЛ©

Цей опитувальник розроблено для того, щоб зрозуміти, що Ви знаєте про проблеми з Вашими легенями. Заповніть опитувальник самостійно, без сторонньої допомоги. Зазвичай це займає 10–20 хв. Відповіді допоможуть нам зрозуміти, яку інформацію слід надати про стан Ваших легень і чого навчити для керування диханням. Відзначте, яка, на Вашу думку, відповідь є правильною.

	Правильно	Неправильно	Не знаю
1. Діагноз ХОЗЛ:			
а. У діагнозі ХОЗЛ слово «хронічний» означає важкий	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. ХОЗЛ може бути підтверджено лише тестами функції дихання	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. ХОЗЛ зазвичай поступово погіршується з часом	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. У разі ХОЗЛ рівень кисню в крові завжди низький	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. ХОЗЛ не характерне для людей молодших, ніж 40 років	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. ХОЗЛ:			
а. Понад 80 % випадків ХОЗЛ виникає через куріння сигарет	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. ХОЗЛ може виникати внаслідок пилу на виробництві	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Тривала захворюваність на астму може розвинути у ХОЗЛ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. ХОЗЛ зазвичай не є спадковим захворюванням	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Жінки менш вразливі до впливу куріння сигарет, ніж чоловіки	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. ХАРАКТЕРНІ для ХОЗЛ симптоми:			
а. набряк суглобів	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Втрата сил (втома)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Свисти в легенях	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Сильний біль у грудній клітці	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Швидка втрата ваги	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Задишка у разі ХОЗЛ:			
а. Сильна задишка унеможливує подорожі літаком	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Задишка може погіршуватися після переїдання	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Задишка означає, що Ваш рівень кисню знижений	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Задишка є нормальною відповіддю на фізичне навантаження	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Задишка насамперед виникає через звуження бронхів	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Мокротиння:			
а. Кашель з мокротинням є звичним симптомом у разі ХОЗЛ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Відкашлювати мокроту важче, якщо Ви зневоднені	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Інгаляції з бронхорозширювальними препаратами полегшують відходження мокроти	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Мокротиння завдає шкоди у разі його проковтування	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Очищення від мокротиння можна поліпшити за допомогою дихальних вправ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Правильно	Неправильно	Не знаю
6. Інфекція/ загострення:			
а. Респіраторна інфекція часто спричиняє кровохаркання	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. При респіраторній інфекції мокротиння може набувати певного кольору (зеленого чи жовтого)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Загострення (епізоди погіршення) може відбуватися за відсутності респіраторної інфекції	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Респіраторна інфекція завжди супроводжується високою температурою	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Стероїдні (гормональні) таблетки слід вживати щоразу в разі загострення	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Вправи у разі ХОЗЛ:			
а. Ходьба є кращою активністю, ніж дихальні вправи, для поліпшення фізичного стану	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Вправ слід уникати, оскільки вони спричиняють напруження легень	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Вправи можуть допомогти зберегти щільність кісткової тканини	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Вправи допомагають полегшити депресію	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Вправу слід зупинити, якщо вона спричиняє задишку	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Куріння:			
а. Припинення куріння зменшує ризик серцевих захворювань	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Припинення куріння уповільнить подальше пошкодження легень	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Припиняти курити безглуздо, оскільки легені вже пошкоджені	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Припинення куріння зазвичай сприяє поліпшенню функції легень	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Нікотинозамісна терапія доступна тільки за рецептом	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Вакцинація:			
а. Вакцинацію від грипу рекомендують застосовувати щорічно	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Можна захворіти на грип після вакцинації від грипу	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Ви можете зробити вакцинацію від грипу у разі, якщо Вам 65 років і більше	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Вакцина від пневмонії захищає від усіх форм пневмонії	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Ви можете зробити вакцинацію від пневмонії і грипу за один день	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Інгалювання бронходилататорів:			
а. Усі бронходилататори діють швидко (у межах 10 хв)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Бронходилататори короткої і довгої дії можна вживати впродовж дня	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Спейсери (наприклад, волюматик, небухалер) потрібно сушити рушником після миття	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Використання спейсерного пристрою збільшить кількість препарату, доставленого в легені	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Тремор може бути побічним ефектом використання бронходилататорів	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Правильно	Неправильно	Не знаю
11. Лікування антибіотиками у разі ХОЗЛ:			
а. Для ефективності курс повинен тривати не менше ніж 10 днів	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Надмірне застосування антибіотиків може спричинити бактеріальну (мікробну) резистентність	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Антибіотик знищить усю інфекцію в легенях	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Антибіотикотерапія необхідна при загостренні (погіршенні), однак вона повинна бути м'якою	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Потрібно звернутися за порадою, якщо антибіотики викликають важку діарею	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Стероїдні таблетки, які призначають у разі ХОЗЛ (наприклад, преднізолон):			
а. Стероїдні таблетки допомагають зміцнити м'язи	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Стероїдних таблеток слід уникати, якщо є інфекція в легенях	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Ризик довгострокових побічних ефектів від стероїдних препаратів є меншим при вживанні їх короткими курсами, порівняно з безперервним лікуванням	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Розлади шлунка є поширеним побічним ефектом застосування стероїдних таблеток	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Стероїдні таблетки можуть підвищити Ваш апетит	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Інгалювання стероїдних препаратів (коричневі, червоні або оранжеві):			
а. Інгаляції стероїдних препаратів слід припинити, якщо Вам призначили стероїдні таблетки	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
б. Стероїдні інгалятори можна використовувати, щоб швидко полегшити задишку	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
в. Спейсерні прилади зменшують ризик виникнення кандидозу (молочниці) у ротовій порожнині	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
г. Інгаляції зі стероїдами слід використовувати перед бронходилататорами	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
д. Інгаляційні стероїди поліпшують функцію легень у разі ХОЗЛ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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