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STRESS MANAGEMENT STYLE AND THE QUALITY OF LIFE OF PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease (COPD) is characterised by progressive limitation of airflow through the airways. It greatly affects the quality of life of patients and their way of coping with stress. The chronic nature of the disorder causes limitations in physical fitness, often forces the patients to change their job, and reduces their social contact, which results in lowering of their quality of life.

Aim of the study: To get to know the relationship between the ways of coping with stress and the quality of life in patients with COPD.

Material and methods: The study included a total of 100 patients with diagnosed COPD. The method used in the study was a diagnostic survey. In order to collect the data, the authors' survey questionnaire was used as well as standardised tools, i.e. Mini-COPE and WHOQOL-BREF.

Results: Among patients with COPD the dominating strategies were seeking emotional and instrumental support as well as strategies included in the active ways of coping with stress, i.e. active coping and positive revaluation. Most patients with COPD assessed the overall quality of their lives at an average level.

Conclusions: Patients with COPD most often presented with positive strategies of stress management. The surveyed persons assessed the quality of their lives at a low level. Those who did better with the disease and chose strategies of active coping with stress assessed the quality of their lives at a higher level. The patients with advanced disease assessed the quality of their lives at a lower level and chose avoidance strategies more often.

Key words: quality of life, chronic obstructive pulmonary disease, stress management style.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is one of the most important health problems of the modern world. According to estimated data, it is the fourth cause of death in the world [1, 2]. In Poland, it is the third most common chronic disease and its risk increases with age. The data from recent years indicate that every tenth person over 40 years of age suffers from COPD [3], the number of patients in Poland is around 2 million [4], and it more often concerns men [5].

The risk factors for COPD are connected with both the environment and individual characteristics, the most important of which is smoking, both active and passive. The disease develops as a result of the interaction of factors [4, 6], leading to irreversible bronchoconstriction, which impairs the flow of air through the bronchi. Harmful substances in the inhaled air cause chronic inflammation in all parts of the respiratory system.

Typical symptoms of the disease include cough, dyspnoea, abnormal breathing, feeling of constant fatigue, drowsiness, and intolerance of effort. A particular burden for the patients is dyspnoea initially occurring during effort, which then intensifies in exacerbation, as the disease progresses and as a result of infection of the respiratory system. Dyspnoea lowers life activity, worsens the quality of life, leads to disability, and is the cause of anxiety and depression. In the advanced stage of the disease, patients may suffer headaches caused by hypercapnia, symptoms of right-sided heart failure, and central cyanosis [3, 4, 6-8].

The diagnosis of COPD is based on anamnesis, physical examination, spirometry, and X-ray of the chest [5]. The treatment of patients with COPD aims to relieve the symptoms of the disease, improve

bronchial patency, reduce the number and severity of exacerbations, improve the quality of life, and slow down the progression of the disease. The treatment depends on the severity of the disease assessed in accordance with the guidelines of GOLD 2011 (updated in 2019). The medicines used in long-term and chronic treatment of COPD include: bronchodilators, inhaled glucocorticoids in some forms, phosphodiesterase type 4 inhibitors, and mucolytics [7, 9-11].

Chronic respiratory diseases such as asthma or COPD are a source of stress for the patient. In turn, the stress of everyday life and that connected with the disease make the control of these diseases more difficult. Additionally, stress may contribute to the exacerbation of the disease symptoms, and thus it may impair daily functioning [12, 13]. Although stress is not recognised as a cause of respiratory diseases, it is connected with them because long-term chronic stress results in decreased immunity. Thus, there is a greater risk of viral and bacterial activity, and this, in turn, is connected with more frequent infections and disease exacerbations.

Accumulating stress is also the cause of occurring sleep problems in the form of difficulties in falling asleep, light sleep, and frequent awakenings at night. As a result, long-term stress may contribute to chronic body fatigue [12, 13]. Consequently, modifying a stressor that is a chronic disease is greatly impaired. If a patient has a sense of control over the course of the disease, follows the doctors' recommendations, notices the effects of treatment, and has a sense of effectiveness of their own actions, then modifying the stressor is possible, logical, reasonable, and effective. If, however, the disease has changeable, unpredictable dynamics, its causes are not completely clear, the treatment does not give positive results, and the patient does not have a sense of control over the disease or their own life, then adapting to the stressor is impaired and requires a lot of effort from the patient and social support [14]. One's abilities of coping with stressful situations depend on a number of factors; among others: intelligence, knowledge, traits of personality and temperament, life experiences, or one's current physical and mental condition [15].

The assessment of the quality of life has particular importance in chronic diseases, and the latter include COPD. The term 'quality of life' is most often understood as a general level of satisfaction with life and a sense of wellbeing. It concerns a number of dimensions, including the following: physical, mental, social, cultural, spiritual, medical, and economic. In recent years, the issue of the quality of life, integrating spheres of many sciences, has enabled its complementary formulation with a broadened interdisciplinary perspective [16, 17]. Studies on the quality of life in medicine are highly valuable and make it possible to show the patient's point of view, they are a source of additional information, which can play an important role in making therapeutic decisions, especially in cases in which two different therapeutic methods can be used, and they point to the patients' needs in terms of out-of-hospital care.

The data from the studies on the quality of life of chronically ill patients indicate that changes which are minor from the perspective of health care workers are very often significant for the patients and their families. In turn, the changes which are perceived by health care workers as priorities are of little importance to the patient, sometimes even imperceptible [18, 19].

AIM OF THE STUDY

The aim of the work was to get to know the relationship between the ways of coping with stress and the quality of life in patients with COPD.

MATERIAL AND METHODS

In the study, the following methods were used: diagnostic survey method, survey technique, as well as the Mini-COPE Inventory for Measuring Stress Management and WHOQOL-BREF Quality of Life Assessment Questionnaire. The study was conducted between May and November 2017 among 100 patients with COPD hospitalised in the District Hospital in Limanowa, with the consent of the management. The study was conducted according to the principles of the Declaration of Helsinki.

The statistical analysis was carried out using the PQStat package version 1.6.4.122. Test probability at $p < 0.05$ was assumed significant, and test probability at $p < 0.01$ was assumed highly significant. In the analysis of the results of the WHOQOL-BREF and MINI-COPE scales, Spearman's monotonic correlation (age, education) and the Mann-Whitney *U* test (gender) were used, as well as the Kruskal-Wallis test and the post-hoc Dunn's test (marital status, residence). The relationships between the scales of the WHOQOL-BREF and MINI-COPE questionnaire were analysed estimating Spearman's monotonic correlation coefficients.

The study involved 60 women (60%) and 40 men (40%) between the ages of 36 and 78 years. As many as 35% of the surveyed were in the age group between 50 and 59 years. Quite a numerous group was made of people aged 40-49 (30%) and 60-69 years (22%). Six per cent of the surveyed were under 40 years old, and a similar percentage of the surveyed (7%) were over 70 years old. In the studied group the majority of the surveyed had higher education – 39%. Vocational education was declared by 29% of the surveyed, and secondary by 22%. Only 10% of respondents had elementary education. Most of the surveyed were married (69%). Almost one fifth of the surveyed (18%) were widowers/widows, and 13% were unmarried.

RESULTS

The participants of the study were asked about the duration of their disease. A period shorter than a year was indicated by 22% of the surveyed. The most numerous group (38%) were the surveyed who had suffered from chronic obstructive pulmonary disease for 1-5 years. A period between 6 and 10 years was indicated by 19% of the surveyed. Quite a numerous group was made of people suffering from COPD for more than 10 years (21%). The surveyed made a subjective assessment of their health. It was assessed as excellent by 7% of the surveyed and as very good by 8% of the surveyed. 33% of the surveyed assessed their health as good, and 30% as satisfactory. 22% of the surveyed assessed it as unsatisfactory or bad.

The surveyed people were asked to assess their exposure to risk factors of COPD. Frequent respiratory tract infections in childhood were reported by 40% of the surveyed.

In 36% of the surveyed the above-mentioned infections appeared rarely. Only 10% of the surveyed declared that they had not had them at all. 14% of the surveyed indicated that they did not remember how often they had had respiratory tract infections in childhood.

Only 35% of the surveyed declared that they had never smoked cigarettes. 29% of the surveyed smoked in the past, and 18% were passive smokers. Unfortunately, almost one fifth (18%) still used tobacco products.

The surveyed were also asked about the control of their health, including spirometry. As many as 28% of the surveyed had never undergone a test of this kind. 33% of the study participants had undergone a spirometry test obtaining a normal result, while 26% of the surveyed obtained results below the norm. A considerable percentage of the surveyed (13%) did not remember if they had undergone a test of this kind.

The surveyed were also asked about the periods of disease exacerbations. Only 13% of the surveyed reported having no symptoms of exacerbations during the last year. One or two exacerbations concerned almost half of the surveyed (47%). Nearly one third of the surveyed reported that they had 3-4 exacerbations during the year, and a small percentage (12%) experienced five or more disease exacerbations.

A group of 21% of the surveyed declared that they knew the factors causing the disease exacerbation and how to affect their reduction. Almost half of the surveyed (46%) could name the above-mentioned factors, but they did not know how to affect their reduction, while 33% of the surveyed did not know the factors causing the disease exacerbation at all.

One of the important elements of assessment of the disease exacerbation is the frequency and intensity of dyspnoea. The conducted study indicates that in 35% of the surveyed, dyspnoea exacerbation occurred only after effort. Nearly one third of the surveyed (28%) declared occurrence of dyspnoea several times a week. A smaller percentage of the surveyed (16%) reported that dyspnoea exacerbated more often than twice a day, and 12% of the surveyed – once a day.

During the preceding month dyspnoea always prevented 7% of the surveyed from doing ordinary activities at work or at home. Such situations very often occurred in 22% of the surveyed, and they sometimes happened in 38% of the surveyed. They rarely took place in 27% of the surveyed, and they never appeared in 6%.

Using bronchodilators permanently was declared by 81% of the surveyed, and glucocorticoids by 23%. Phosphodiesterase type 4 inhibitors were used by 6%, and mucolytics by 16% of the surveyed. The majority, i.e. 83% of the surveyed, declared that they regularly used medicines. As many as 17% of the surveyed admitted that they used medicines irregularly. The participants of the study indicated the necessity to increase medicine doses during exacerbations; short-acting inhaled medicines were used by 52% of the surveyed, while long-acting inhaled medicines were used by 20% of the surveyed. Using inhaled or oral glucocorticoids in the case of exacerbation of symptoms was declared by 23% of the surveyed and antibiotics by 55% of the surveyed.

The participants of the study noticed side effects of pharmacotherapy in themselves. The most frequent side effects were weight gain (92%), osteoporosis (59%), mycosis of mucous membranes of the oral cavity, and respiratory and digestive systems (49%), skin discolorations (43%), and hypertension (40%). The answers of the surveyed show that knowledge on steroid therapy complications was at a good level.

Chronic obstructive pulmonary disease also has social consequences. In the surveyed group the disease was the cause of a job loss in 11% of cases, and 9% had to change their job. Limiting working time was required in 48% of cases. Lack of influence of the disease on work was declared by 32% of the surveyed.

A significant problem in chronic diseases is the ability to control them by the patients themselves. Lack of control over the disease was indicated by 3% of the surveyed and weak control was declared by as many as 45%. Relatively controlled disease concerned 48%, and good control over the disease was indicated only by 4% of the surveyed. Among the ways helping to reduce the influence of the disease on everyday life the surveyed indicated the following (multiple choice question): regular use of medicines (76%), active lifestyle (55%), and regular check-ups and tests (47%).

Lack of knowledge on the factors causing the disease was declared by 53% of the surveyed, and lack

Table 1. Assessment of quality of life using the WHOQOL-BREF questionnaire in the surveyed group

	Assessment of quality of life	Assessment of satisfaction with one's health	Somatic domain	Psychological domain	Social domain	Environmental domain
Arithmetic mean	57.14	54.08	52.11	53.70	59.01	54.88
Median	50.00	50.00	53.57	58.33	66.67	59.37
SD	17.95	20.21	10.67	13.36	19.94	16.25
Minimum	0.00	0.00	14.29	16.67	0.00	9.37
Maximum	75.00	75.00	71.43	83.33	100.00	87.50
Lower quartile	50.00	50.00	46.43	45.83	50.00	47.66
Upper quartile	75.00	75.00	60.71	62.50	75.00	65.62

of knowledge on check-ups by 24% of the surveyed. Lack of knowledge on the factors causing exacerbation of the disease was indicated by 51% of the surveyed, and lack of knowledge on the ways of preventing exacerbations of the disease by as many as 58% of the surveyed.

The assessment of the quality of life of patients with COPD was made in the sphere of general quality of life, satisfaction with one's health, and the following four domains: somatic, psychological, social, and environmental. The general quality of life of patients with COPD in subjective assessment was 57.14 (SD = 17.95). This means that the majority of the surveyed assessed the quality of their lives at an average level.

Table 1 presents the results of the WHOQOL-BREF questionnaire in particular domains in the whole surveyed group.

The assessment of satisfaction with health was worse, the average result obtained in this scale was 54.08 (SD = 20.21), which indicates average satisfaction of the surveyed with their current state of health. The functioning of the surveyed in particular spheres of quality of life is shown in Figure 1.

Physical functioning was assessed at the lowest level by the patients (the average was 52.11, SD = 10.67), while social functioning was assessed at the highest level (the average was 59.01, SD = 19.94).

Detailed analysis of the relationship between the assessment of the quality of life and selected sociodemographic variables is presented below.

The results of the relationship between the assessment of the quality of life and the age of the surveyed are shown in Table 2.

Statistical analysis showed a negative correlation between the quality of life assessed by the surveyed in particular domains and age, which means that with increasing age the quality of life was assessed at a lower level. Only in the case of the somatic domain was no significant relationship found between age and the quality of life of the surveyed (p = 0.0763).

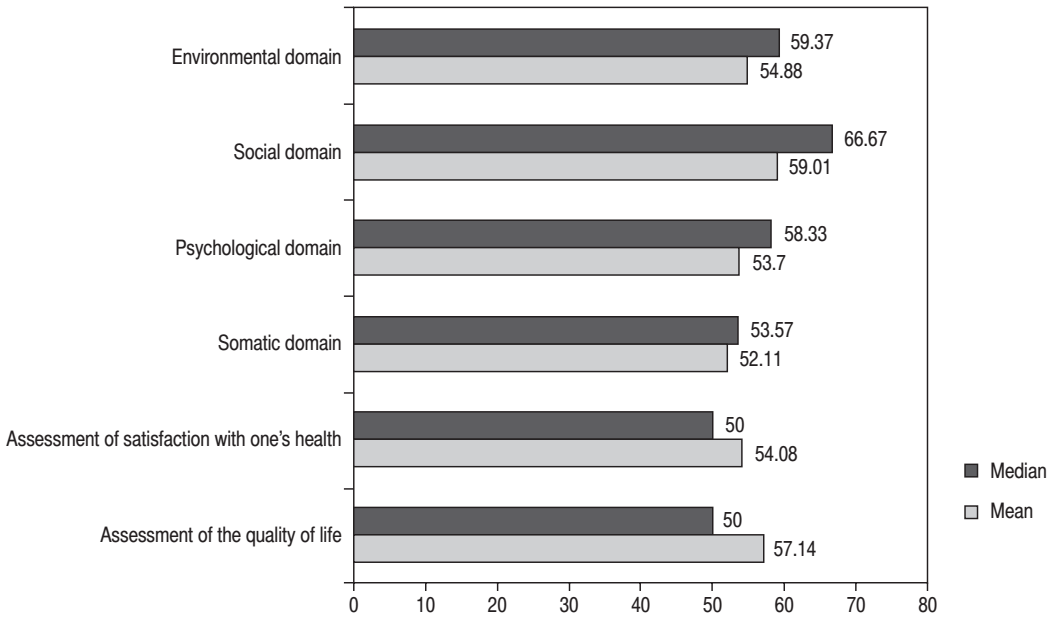

Figure 1. Assessment of the quality of life using WHOQOL-BREF questionnaire in the surveyed group

Table 2. Relationship between assessment of quality of life and the age of the surveyed

	Assessment of quality of life	Assessment of satisfaction with one's health	Somatic domain	Psychological domain	Social domain	Environmental domain
r	–0.3925	–0.2204	–0.1799	–0.3864	–0.3257	–0.2231
Error for *r*	0.0939	0.0996	0.1004	0.0941	0.0965	0.0995
–95% CI	–0.5524	–0.4062	–0.3704	–0.5474	–0.4968	–0.4086
+95% CI	–0.2048	–0.017	0.0252	–0.1979	–0.1302	–0.0198
t for *r*	–4.1814	–2.2134	–1.7917	–4.1051	–3.3755	–2.242
d*f*	96	96	96	96	96	96
p	0.0001	0.0292	0.0763	0.0001	0.0011	0.0273

Table 3. Relationship between assessment of quality of life and education

	Assessment of quality of life	Assessment of satisfaction with one's health	Somatic domain	Psychological domain	Social domain	Environmental domain
r	0.1885	0.2921	0.4568	0.2368	0.3146	0.3793
Error for *r*	0.1002	0.0976	0.0908	0.0992	0.0969	0.0944
–95% CI	–0.0162	0.0935	0.2787	0.0343	0.118	0.1898
+95% CI	0.3781	0.4683	0.6046	0.4206	0.4874	0.5415
t for *r*	1.881	2.9925	5.0316	2.3879	3.2472	4.0161
d*f*	96	96	96	96	96	96
p	0.0630	0.0035	< 0.0001	0.0189	0.0016	0.0001

The dependence of the assessment of the quality of life on the education of the participants of the study was also established (Table 3).

A positive correlation was found between the level of education and the WHOQOL-BREF scale results in all domains except for self-assessment of quality of life. The patients declaring a higher level of education assessed the quality of their lives as better than did the patients with lower education.

Statistical analysis showed that in particular domains quality of life was assessed at a higher level by women. A positive correlation was found between

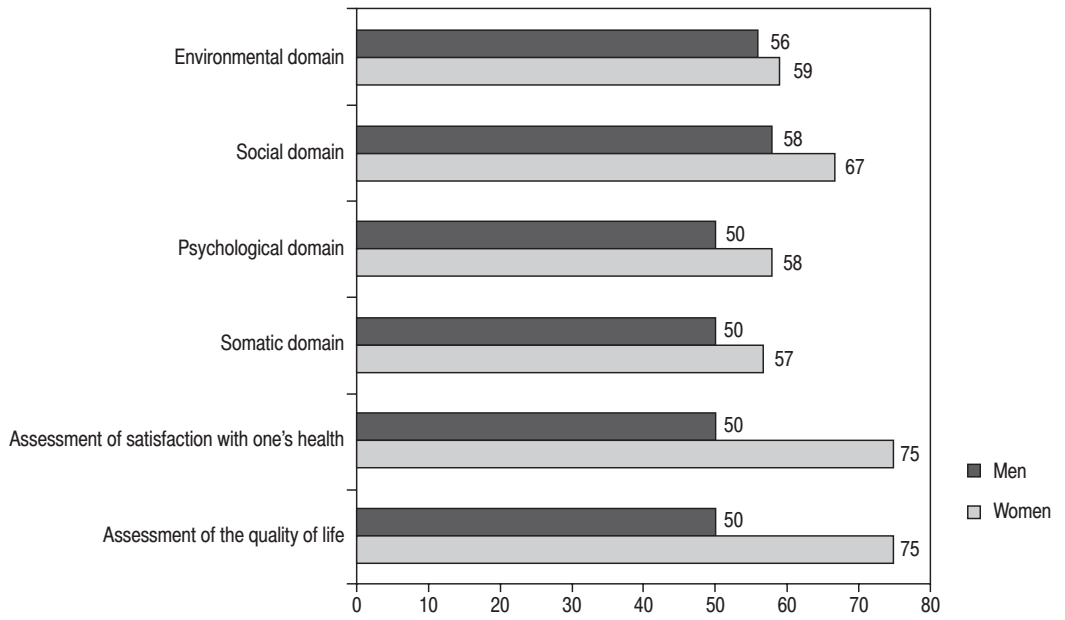

Figure 2. Relationship between the results of the WHOQOL-BREF questionnaire and gender

Table 4. Relationship between results of the WHOQOL-BREF questionnaire and the marital status of the surveyed

		Assessment of the quality of life			Assessment of satisfaction with one's health			Somatic domain			Psychological domain			Social domain			Environmental domain		
		M	U	W	M	U	W	M	U	W	M	U	W	M	U	W	M	U	W
Mean		60	69	38	55	65	41	54	53	45	54	59	49	61	67	44	56	62	46
Median		50	75	50	50	75	50	57	54	46	58	58	50	67	67	50	59	59	53
Deviation		15	11	20	19	13	25	10	9	13	13	14	15	17	17	26	14	14	21
Minimum		25	50	0	25	50	0	14	39	25	17	33	25	17	25	0	16	44	9
Maximum		75	75	50	75	75	75	71	68	61	83	83	71	100	92	83	81	88	69
Lower quartile		50	75	25	50	50	25	50	46	36	46	50	33	50	58	25	50	50	28
Upper quartile		75	75	50	75	75	50	61	57	57	63	63	58	75	75	67	66	72	63
Statistics H			23.1442			9.1854			6.6457			3.5271			9.3228			3.4066	
p			< 0.0001			0.0101			0.036			0.1714			0.0095			0.1821	
Post-hoc	M		0.11	< 0.01		0.25	0.10		1.00	0.03		0.94	0.50		1.00	0.02		1.00	0.41
	U	0.11		< 0.01	0.25		0.01	1.00		0.40	0.94		0.20	1.00		0.02	1.00		0.24
	W	< 0.01	< 0.01		0.10	0.01		0.03	0.40		0.50	0.20		0.02	0.02		0.41	0.24	

M – married, U – unmarried, W – widowed

gender and the assessment of the quality of life: in the somatic domain $p = 0.0136$, in the psychological domain $p = 0.0009$, and in the environmental domain $p = 0.0322$. The results of both sexes did not differ significantly only in the case of the social domain ($p = 0.1710$). The differences between the WHOQOL-BREF scale results in men and women are shown in Figure 2.

Correlations between the assessment of the quality of life and the marital status of the surveyed are presented in Table 4.

Statistical analysis showed that widowed people obtained lower results, which means that they assessed the quality of their lives in the WHOQOL-BREF questionnaire at a lower level. In the case of self-assessment of the quality of their lives, widowed people had highly significantly lower results ($p < 0.01$) than did unmarried and married people. In the case of satisfaction with their health, widowed people had significantly lower results ($p < 0.05$) than unmarried people. In the case of the somatic domain, widowed people obtained significantly lower results ($p < 0.05$) than did married people. In the social domain assessment, widowed people had significantly lower results ($p < 0.05$) than the other two groups. In the case of psychological and environmental domains, no correlation was found between the results of the WHOQOL-BREF questionnaire and marital status.

The correlation between the quality of life and the severity of the disease symptoms was also assessed (Table 5).

A highly significant correlation was confirmed between the results obtained by the surveyed in the WHOQOL-BREF scale in all domains and the severity of the disease symptoms. The patients with advanced COPD obtained significantly lower results in the WHOQOL-BREF scale, which means that they assessed the quality of their lives at a lower level (in the physical domain $p = 0.0029$, in the psychological, social, and environmental domains $p < 0.0001$).

In the study, the ways of coping with stress among the surveyed were assessed. Collective data are illustrated in Table 6.

Analysis of the results showed that among patients suffering from COPD the strategies of searching for support dominated, i.e. searching for emotional support (mean = 3.47, SD = 1.32) and searching for instrumental support (mean = 3.3, SD = 1.28). On the other hand, the least frequently used strategies included sense of humour (mean = 1.06, SD = 1.22), denial (mean = 1.32, SD = 1.26), and strategies expressing helplessness, i.e. using psychoactive

Table 5. The relationship between assessment of quality of life and severity of disease symptoms

	Assessment of quality of life	Assessment of satisfaction with one's health	Somatic domain	Psychological domain	Social domain	Environmental domain
r	0.349	0.4785	0.2982	0.5517	0.4747	0.4987
Error for *r*	0.0956	0.0896	0.0974	0.0851	0.0898	0.0885
–95% CI	0.156	0.304	0.1001	0.3917	0.2996	0.328
+95% CI	0.5164	0.6219	0.4735	0.6793	0.6189	0.6379
t for *r*	3.649	5.3388	3.0608	6.4815	5.2847	5.6376
d*f*	96	96	96	96	96	96
p	0.0004	< 0.0001	0.0029	< 0.0001	< 0.0001	< 0.0001

Table 6. Assessment of ways of coping with stress using the Mini-COPE questionnaire in the surveyed group

	1. Active coping	2. Planning	3. Positive revaluation	4. Acceptance	5. Sense of humour	6. Turning to religion	7. Searching for emotional support
Mean	3.27	3.09	3.22	3.3	1.06	2.45	3.47
Median	3.5	4	3	3	1	3	4
Deviation	1.24	1.43	1.28	1.31	1.22	2.05	1.32
Minimum	0	0	0	0	0	0	0
Maximum	6	6	6	6	4	6	6
Lower quartile	2	2	3	3	0	0	3
Upper quartile	4	4	4	4	2	4	4
	8. Searching for instrumental support	**9. Occupation with something else**	**10. Denial**	**11. Venting one's temper**	**12. Using psychoactive substances**	**13. Discontinuation of activities**	**14. Blaming oneself**
Mean	3.3	2.34	1.32	1.95	0.59	1.51	1.48
Median	3	2	1	2	0	2	1
Deviation	1.28	1.62	1.26	1.35	1.05	1.27	1.50
Minimum	0	0	0	0	0	0	0
Maximum	6	6	5	4	5	4	6
Lower quartile	2	1	0	1	0	0	0
Upper quartile	4	4	2	3	1	2	2

substances (mean = 0.59, SD = 1.05), discontinuation of activities (mean = 1.51, SD = 1.27), and blaming oneself (mean = 1.48, SD = 1.50).

The conducted statistical analysis showed a correlation between the marital status of the surveyed and several methods of stress management. In the case of the planning scale, a highly significant difference was found depending on the marital status of the surveyed – married people were definitely more likely to choose this strategy than the widowed ones ($p < 0.01$). In the case of the acceptance scale, a significant difference was found depending on the marital status of the surveyed – the lowest results (the least frequently used strategy for stress management) were found in the group of widowed people in comparison with the other two groups ($p = 0.03$, $p = 0.02$). In the case of the discontinuation of activities scale, a significant difference was found depending on the marital status of the surveyed – higher results (the most frequently chosen ways of stress management) were found in the group of widowed people than in the case of married and unmarried people ($p < 0.01$). In the remaining strategies of coping with stress, no correlation with the marital status was found. The collective results are presented in Figure 3.

The study established a relationship between strategies for coping with stress and the education of the surveyed (Table 7).

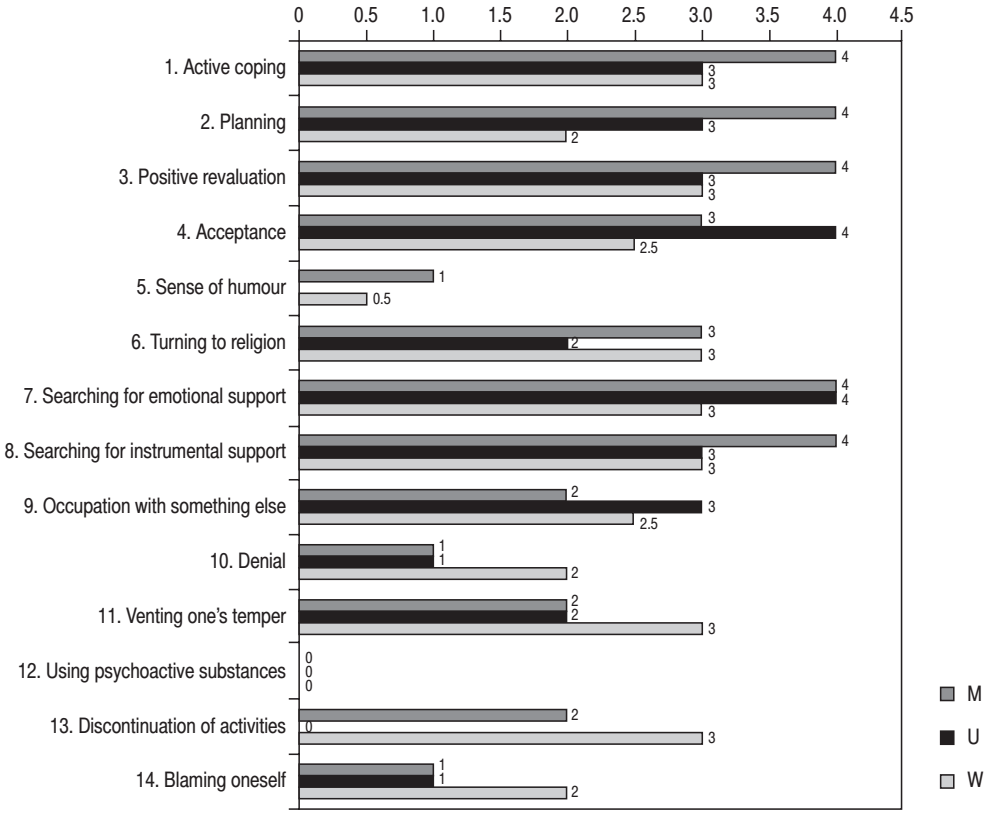

Figure 3. Relationship between the results of the Mini-COPE questionnaire and the marital status of the surveyed

Table 7. Relationship between assessment of quality of life and ways of coping with stress

	1. Active coping	2. Planning	3. Positive revaluation	4. Acceptance	5. Sense of humour	6. Turning to religion	7. Searching for emotional support
r	0.0932	0.0916	0.2060	0.0199	–0.1161	–0.2967	–0.0740
Error for *r*	0.1006	0.1006	0.0988	0.1010	0.1003	0.0965	0.1007
–95% CI	–0.1110	–0.1126	0.0041	–0.1829	–0.3109	–0.4705	–0.2720
+95% CI	0.2898	0.2883	0.3918	0.2211	0.0880	–0.1006	0.1301
t for *r*	0.9267	0.9102	2.0841	0.1970	–1.1574	–3.0753	–0.7342
d*f*	98	98	98	98	98	98	98
p	0.3564	0.3649	0.0398	0.8442	0.2499	0.0027	0.4646
	8. Searching for instrumental support	**9. Occupation with something else**	**10. Denial**	**11. Venting one's temper**	**12. Using psychoactive substances**	**13. Discontinuation of activities**	**14. Blaming oneself**
r	–0.1057	–0.1839	–0.2999	–0.1924	–0.2885	–0.1966	–0.2183
Error for *r*	0.1004	0.0993	0.0964	0.0991	0.0967	0.0990	0.0986
–95% CI	–0.3013	–0.3721	–0.4733	–0.3797	–0.4636	–0.3834	–0.4026
+95% CI	0.0985	0.0189	–0.1041	0.0101	–0.0918	0.0058	–0.0169
t for *r*	–1.0518	–1.8519	–3.1119	–1.9408	–2.9832	–1.9845	–2.2141
d*f*	98	98	98	98	98	98	98
p	0.2955	0.0671	0.0024	0.0552	0.0036	0.05	0.0291

Table 8. Relationship between assessment of quality of life and ways of coping with stress

	Assessment of quality of life	Assessment of satisfaction with one's health	Somatic domain	Psychological domain	Social domain	Environmental domain
r	0.2201	–0.016	0.0242	0.0915	0.2238	0.0735
Error for *r*	0.0996	0.102	0.102	0.1016	0.0995	0.1018
–95% CI	0.0167	–0.2194	–0.1808	–0.1148	0.0206	–0.1326
+95% CI	0.406	0.1888	0.2273	0.2902	0.4093	0.2736
t for *r*	2.2105	–0.1563	0.2375	0.9005	2.25	0.7225
d*f*	96	96	96	96	96	96
p	0.0294	0.8761	0.8128	0.3701	0.0267	0.4718

The conducted statistical analysis showed a positive correlation between the level of education and the positive revaluation strategy ($p = 0.0398$), which means that the patients with a higher level of education were definitely more likely to present this strategy. Additionally, a negative correlation was found between the level of education and the turning to religion strategy ($p = 0.0027$), denial strategy ($p = 0.0024$), using psychoactive substance strategy ($p = 0.0036$), and the blaming oneself strategy ($p = 0.0291$). The patients with a higher level of education were the least likely to choose these strategies as a way of coping with stress.

Looking for a relationship between the assessment of the quality of life and the methods of coping with stress, a correlation between individual variables was established (Table 8).

Statistical analysis showed a positive correlation between the assessment of the quality of life in general and in the social domain and the way of coping with the disease. The patients who coped with the disease assessed the quality of their lives as better in general and in the social domain at a significantly higher level.

DISCUSSION

Chronic obstructive pulmonary disease is characterised by poorly reversible and progressive airflow limitation. In the pathogenesis, the chronic inflammatory process connected with the harmful effects of tobacco smoke, dust, and gases is of great importance [5, 20]. Chronic obstructive pulmonary disease, due to its chronic and progressive character, greatly affects the quality of life of patients and their way of coping with stress. Lowered quality of life is caused by the chronic character of the symptoms, i.e. dyspnoea, cough, production of secretion in the airways. Moreover, the decrease in the efficiency of the respiratory system leads to the loss of physical fitness, often forces one to change one's lifestyle and give up one's job, and limits family and social contacts and causes helplessness and resignation. The disease in an advanced stage leads to respiratory failure, pulmonary heart disease, and emaciation of the body [21, 22].

In the presented work patients with COPD of all ages were examined in terms of the quality of their lives and ways of coping with stress, which a chronic disease involves.

On the basis of the conducted study it was confirmed that patients with COPD were most likely to use strategies of seeking support, i.e. searching for emotional support and searching for instrumental support, followed by active coping strategies, i.e. active coping, planning, and positive revaluation. The least frequently used strategies included strategies of helplessness, i.e. using psychoactive substances, discontinuation of activities, or blaming oneself. The study showed that the active strategies and the sense of humour strategy were less frequently used with age, while the strategies of searching for support and turning to religion were chosen more often. Also, the level of education had an influence on the strategies used in coping with stress. The patients with a higher level of education were definitely more likely to use active coping strategies, and the least likely to use the strategies of denial, using psychoactive substances, and turning to religion. The analyses additionally showed that villagers used strategies expressing helplessness, i.e. blaming oneself, venting one's temper, discontinuation of activities, more often than the inhabitants of small and large cities. Similar results were obtained by Zielazny in his studies [23].

The results of the conducted study showed low quality of life of patients with COPD, particularly in the domain of physical functioning and in the psychological domain. The quality of life of COPD patients worsens with progression of the disease, i.e. limiting the airflow in the bronchi, increased dyspnoea, and reducing exercise capacity. Similar observations in this respect were obtained by other authors [24].

The authors' own study confirmed the correlation between the quality of life of the surveyed with COPD and sociodemographic variables such as education,

age, and marital status. Worse quality of life was indicated by people with low level of education. Similar results were obtained in patients undergoing long-term dialysis [25] and patients with hypertension [26]. The study confirmed that with age, the quality of life of the patients worsens. This may be caused by the limitations resulting from the process of aging, the progress of the underlying disease, and a larger number of comorbidities. This is confirmed by the results of other authors [27, 28]. The study did not show a correlation between the quality of life and gender, which is consistent with the reports from other studies [29, 30].

The majority of the surveyed assessed their health as good (33%). A similar percentage found it satisfactory (30%). As many as 22% of the surveyed assessed their health as unsatisfactory. Despite regular use of medicines prescribed by a doctor, as many as 45% of the surveyed declared poor control over the disease. The answers of the surveyed show that they knew and applied the principles of proper use of inhaled steroid therapy, as well as the local and general side-effects of the medicines from this group. However, as many as 58% of the surveyed admitted that their knowledge about the way of preventing exacerbations of the disease was insufficient, and 51% of the surveyed confirmed that they were not familiar with the factors causing exacerbation of the disease. Summing up the results, attention should be paid to the need to conduct educational classes for COPD patients on the prevention of exacerbations and factors causing exacerbations.

The study confirmed that the severity of symptoms correlates with the ways of coping with stress and the assessment of quality of life. The statistical analysis showed a positive correlation between the degree of disease progression and the sense of humour strategy ($p = 0.0110$) as well as the occupation with something else strategy ($p = 0.0154$), which means that people with an advanced COPD are much more likely to choose these strategies. Additionally, a negative correlation was found between the severity of the disease and the turning to religion strategy ($p = 0.0213$) and the using psychoactive substances strategy ($p = 0.0327$), which means that patients with advanced COPD were the least likely to choose these strategies. The study showed that the severity of the symptoms correlated with the assessment of the quality of life – the patients with advanced COPD assessed the quality of their lives at a lower level (in the physical domain $p = 0.0029$, in the psychological, social, and environmental domains $p < 0.0001$). COPD is a disease impairing everyday functioning. This is confirmed by the authors' own study, in which the surveyed indicated that their dyspnoea increased several times a week (28%) or after physical effort (35%), which often prevents the patients from doing ordinary activities at work and at home. The diagnosis of the disease and its progress resulted in the loss of a job in 11% of the surveyed, reduced working time was required in 48% of the surveyed, and 9% had to change their job.

Unfortunately, despite the disease, as many as 18% of the surveyed were still tobacco smokers. A similar percentage (18%) were passive smokers who had contact with tobacco at home or at work. The data provided by the Central Revenue Office indicate that the percentage of smokers among adults is 31%, while in the BOLD study, the incidence of cigarette smoking was 28% [31]. Taking into consideration the number of smokers among COPD patients, smoking cessation programs should be conducted, not only for patients but also for healthy people, which in the future will reduce the number of COPD cases.

In summary, it is worth paying attention to the problems of COPD patients, such as frequent occurrence of exacerbations, deteriorating functional condition of the patients, and low level of knowledge on prevention of exacerbations and side effects of the medicines used.

It should be noted that the conducted studies concerned the population of patients with a predominance of women, a relatively small group of people from the youngest and oldest age group, and, in the vast majority, people living in rural areas and small towns. Taking into consideration these specific characteristics of the studied group, it seems necessary to conduct further studies. Considering COPD risk factors, it would be important to enlarge the group of the surveyed and conduct multi-centre studies as well as to compare the results obtained in highly specialised and general hospitals.

CONCLUSIONS

The conducted study shows that:

1. The surveyed with COPD most often presented strategies for coping with stress based on seeking support and so-called active coping with stress.
2. The participants of the study with COPD assessed the quality of their lives at a low level, particularly in the physical and psychological domains.
3. The surveyed who were better at coping with the disease and chose strategies for active coping with stress assessed the quality of their lives at a higher level.
4. The severity of the symptoms of the disease largely influenced the ways of coping with stress and the quality of life of the patients with COPD. The patients with advanced disease assessed the quality of their lives at a lower level and more often chose avoidance strategies.
5. A correlation was demonstrated between the ways of coping with stress and the level of educa-

tion and marital status. Widowed people preferred strategies for discontinuation of activities more often than married or unmarried surveyed. Higher education was conducive to the use of constructive strategies for coping with stress – positive revaluation.

Disclosure

The authors declare no conflict of interest.

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