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ASSESSMENT OF QUALITY OF LIFE IN ASTHMA PATIENTS DEPENDING ON THE DEGREE OF DISEASE CONTROL, BODY MASS INDEX AND SMOKING

Ocena jakości życia u chorych na astmę zależna od stopnia kontroli choroby, wskaźnika masy ciała oraz palenia papierosów

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A – Koncepcja i projekt badania, B – Gromadzenie i/lub zestawianie danych, C – Analiza i interpretacja danych, D – Napisanie artykułu, E – Krytyczne zrecenzowanie artykułu, F – Zatwierdzenie ostatecznej wersji artykułu

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Abstract (in Polish):
Cel pracy
Astma jest przewlekłą chorobą zapalną układu oddechowego przebiegającą ze zmniejszeniem przepływu powietrza wydychanego przez drogi oddechowe, której towarzyszy grupa charakterystycznych objawów klinicznych: kaszel, duszność, ucisk w klatce piersiowej i świszczący oddech. Astma ze względu na przebieg oraz proces leczenia, może modyfikować jakość życia. Cel pracy to ocena jakości życia chorych na astmę z uwzględnieniem stopnia kontroli choroby, wskaźnika masy ciała BMI i palenia papierosów.

Materiał i metody

Badania przeprowadzono wśród 124 chorych na astmę. Dane zebrano z użyciem elektronicznego sondażu diagnostycznego złożonego z autorskiego kwestionariusza ankiety, Testu Kontroli Astmy (ACT) oraz Kwestionariusza Szpitala Świętego Jerzego (SGRQ). Wyniki opracowano w programie R. W analizie statystycznej wykorzystano współczynnik korelacji rang Spearmana (rho), test Andersona-Darlinga (AD Test), Mann-Whitney Test oraz test Kruskala-Wallisa. Za istotność statystyczną przyjęto p≤0,05.

Wyniki

W badaniu wykazano obniżenie jakości życia astmatyków. Osoby z lepszą kontrolą choroby miały istotnie wyższą jakość życia. Chorzy z wyższym wskaźnikiem BMI miały istotnie mniejszy komfort życia (domena „Objawy", „Wpływ na życie", wynik globalny). Palenie papierosów nie modyfikowało jakości życia.

Wnioski

Determinantami gorszej jakości życia chorych na astmę są: zła kontrola choroby i wysoki wskaźnik BMI.

Abstract (in English):

Aim

Asthma is a chronic inflammatory disease of the respiratory system that results in a reduced airflow exhaled by respiratory tract, accompanied by a group of characteristic clinical symptoms: cough, dyspnoea, chest tightness and wheezing. Asthma, due to the course and treatment process, may modify the quality of life (QoL). Assessment of the quality of life in patients with asthma, including the degree of disease control, Body Mass Index (BMI) and ciggaret smoking.

Material and methods

The research was carried out among 124 patients with asthma. Data were collected by Internet using a diagnostic survey method consisting of the author's questionnaire, the Asthma Control Test (ACT) and Saint George's Hospital Questionnaire (SGRQ). The results were processed in the R program. In statistical analysis Spearman's rho, Anderson-Darling test (Test AD), Mann-Whitney U test and the Kruskal-Wallis test were used. Statistical significance was accepted for $p \leq 0.05$

Results

Research results showed a deterioration in the quality of life of asthmatics. People with better disease control had a significantly higher quality of life. Patients with a higher BMI had a significantly lower quality of life ("Symptoms", "Impact on life" domain, global score). Smoking cigarettes did not influence the quality of life.

Conclusions

Determinants of worse quality of life in asthma patients are primarily: poor control of the disease and a high BMI.

Short title
Ocena jakość życia chorych na astmę

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Introduction

Asthma is a significant health problem that affects different populations around the world. The Global Initiative for Asthma (GINA) report shows that the incidence of asthma has been increasing for years. It is estimated that this disease affects 5% of the general population, which is over 300 million people. In Europe, the number of patients is estimated at 30 million [1,2]. According to the report GINA, asthma is a heterogeneous, chronic inflammatory disease of the respiratory system in which the flow of air exhaled through the airways is reduced. The disease is characterized by a group of clinical symptoms, such as cough, shortness of breath, tightness in the chest and wheezing. These symptoms, depending on the level of severity and frequency of occurrence, to varying degrees reduce the patency of the bronchial tree, impairing the respiratory functions of the body [3].

Asthma is a disease that is associated with chronic bronchitis and the coexistence of respiratory symptoms. The variable characteristics of these symptoms correlate with reduced airflow in the airways and may resolve spontaneously or as a result of the treatment [1]. On the surface, the presence of the characteristic symptoms of asthma, however, may indicate the occurrence of diseases other than asthma.

The diagnosis of asthma is based on a positive family history an individual's physical examination, and examination results of allergy tests [4]. A properly conducted interview should include information on atopy in the family, the specificity of the disease, the frequency and circumstances of the onset of symptoms, response to treatment and the factors exacerbating symptoms related to the disease [5]. The prevalence of asthma, especially in children, varies depending on latitude. This may be affected by the variety of diagnostic criteria in different countries [6].

The aim of a properly conducted therapeutic procedure in the treatment of asthma is to obtain and maintain control of symptoms and maintaining normal physical activity. Further goals are reduction of the risk of exacerbation of the disease or consolidation of obstruction in the future, while controlling the risk of adverse drug reactions [7].

Treatment of asthma is a continuous process and should be constantly checked for the severity of symptoms, the relevance of a customized treatment and its efficacy. Usually, if asthma is properly diagnosed, it is not difficult to control the symptoms of the disease with low doses of inhaled corticosteroids. When

the disease does not respond to standard treatment and the use of higher doses of the drug does not bring the expected results, we enter the area of "problematic and severe asthma" [8].

Patients with asthma regularly take medicines that control the course of the disease, which should be used daily, but temporarily they can also take the so-called symptomatic medications [1]. Controlling medications are designed to reduce inflammation and asthma symptoms, as well as the risk of possible acute attacks and a decline in FEV1 [1,2,9-11]. Symptomatic drugs are taken during exacerbations to immediately eliminate symptoms caused by bronchoconstriction [1,2]. Effective treatment plan, in addition to pharmacological methods also includes all kinds of non-pharmacological methods, among which proper patient education, medical counseling and various forms of physiotherapy should be distinguished [12,13]. The implementation of a comprehensive physiotherapeutic procedure has a positive effect on the patient's activity, not only in terms of daily activities, but also professional and social sphere, increases the effectiveness of treatment and significantly improves impaired respiratory functions. In addition, the combination of appropriate pharmacological treatment with a properly matched physical exercise program alleviates symptoms of asthma, its course, reduces inflammation and the process of bronchial remodeling, as well as improves lung performance. It should be remembered that excessive physical effort is not recommended, and comprehensive physiotherapeutic measures are only a supplement to pharmacological treatment, not its alternative [13,14,15]. Asthma treatment requires development of effective national strategies that could result in a reduction in the high asthma burden for patients but also for society as a whole [16].

Quality of life related to health

The World Health Organization (WHO) defines quality of life (QoL) as "an individual's perception of their position in life in the context of culture, the value system in which they live in relation to their own goals, expectations, standards and interests". Although the definition created by WHO applies to all aspects of human life, members of medical specialties mainly use the term Health Related Quality of Life (HRQoL) [17].

In the fields of medical research, quality of life is used, among others, to assess: the state of health of the patient, the effectiveness of the treatment, the effectiveness of innovative pharmaceuticals, the degree of organization of health services, the demand for social services and to prepare the patient for self-care, as well as the planning and implementation of nursing care [18].

In medicine, the quality of life is assessed through a number of general and specific questionnaires. General questionnaires can be used for all patients, regardless of disease entity. Specific questionnaires take into account the specific nature of a particular course of the disease, which is why they are used for a strictly defined group of patients [18].

Considering the course of asthma, its chronic nature, many factors that can intensify symptoms and methods of its treatment, it can be said that it has a significant impact on the daily functioning of patients, and thus may lead to a decrease in their quality of life.

The aim of the research project was to assess the quality of life of patients asthma including the degree of disease control, BMI and cigatette smoking.

Material and methods

The research project was carried out in the period from December 2018 to March 2019. The study involved 124 patients with asthma: 110 women and 14 men, aged from 18 to over 60. Most of the respon-

dents (37%) were in the 18-24 age group. Respondents' weight ranged from 42 kg to 145 kg, their hight was from 1.48 m to 1.93 m. The BMI ranged from 16 kg/m2 to more than 50 kg/m2. The majority of respondents (52%) declared that they lived in a city with over 100 thousand residents. Others were residents of smaller cities (26%) and villages (22%). Most asthmatics in the study had a secondary (50%) and higher (42%) education. Almost half of the surveyed represented workers (49%), a smaller group were students (32%) and the unemployed (11%). The majority of survey participants rated their financial situation as good (56%) or moderately sufficient (31%). A substantial minority of respondents declared their socio-economic situation as very good (7%) or extremely bad (6%). Most people (41%) had been diagnosed with asthma 4 years before the inception of the study or more than 10 years ago (44%). The remaining part constituted of persons suffering from asthma for 5-10 years (15%). Over half of the respondents (64%) declared that they did not smoke, the rest were smokers (36%). The frequency of exercising in the study group was relatively low. Regular sporting activity was declared by a substantial minority of respondents: 11% exercised 2-3 times a week, 5% 4-5 times a week, and only 3% of respondents exercised every day. Most of the respondents (49%) exercised once a week, and 32% of study participants reported no physical activity in their daily life. More than half of the surveyed (56%) did not have any comorbidities. Additional medical conditions reported by the remainder of the subjects (44%) were mainly: allergy, hyperthyroidism and hypothyroidism, hypertension and obstructive sleep apnea. Detailed characteristics of the study group are shown in Table 1.

The study was conducted in accordance with the Helsinki Declaration. Data were collected using electronic diagnostic survey method consisting of the author's questionnaire, the Asthma Control Test (ACT) and Saint George's Respiratory Questionnaire (SGRQ). The study group was divided according to the degree of disease control. Based on the analysis of the Asthma Control Test (ACT) responses, respondents were allocated to one of three subgroup: fully controlled disease (n = 119), partially controlled disease (n = 5), and uncontrolled disease (n = 0). The results were statistically analyzed in the R. program and presented in tabular form. To assess the quality of life a Polish version of Saint George's Respiratory Questionnaire was used. This questionnaire is a standardized method of evaluating the quality of life, dedicated to people with respiratory diseases, with a particular focus on patients with asthma and Chronic Obstructive Pumlonary Disease (COPD). The Polish version of the questionnaire was a validation process, which confirmed its high efficiency, repeatability and reliability [19]. The questionnaire consisted of 50 questions collected in three domains: "Symptoms", "Activity" and "Impact on life" [17]. The domain "Symptoms" analyzed the symptoms of asthma such as coughing and shortness of breath, secretions, episodes of wheezing. Domain "Activity" was related to physical activity that caused or was limited by the shortness of breath. Domain "The impact on life" included questions about the impact of asthma on the daily functioning of the patient in society, including professional life, and pharmacotherapy [20,21].

The number of points obtained in the various domains were summed up and divided by the maximum possible score on the appropriate subscale. The total result was calculated by dividing the sum of the points from the questionnaire by the maximum number of points available. The total score obtained in the questionnaire and the results for individual domains were expressed as a percentage of the overall loss of quality of life and ranged from 0 (highest QoL) to 100 (lowest QoL) [17].

In statistical analysis Spearman's rho, Anderson-Darling test (Test AD), Mann-Whitney test and the Kruskal-Wallis test were used. Statistical significance was accepted at $p \leq 0.05$.

Table 1. Characteristics of the study group

Variable		Number of people (%)
Sex	female	110 (89)
	male	14 (11)
The age range [years]	18-24	46 (37)
	25-29	20 (16)
	30-39	28 (23)
	40-49	19 (15)
	50-60	7 (6)
	> 60	4 (3)
Place of residence	city <100 thousand. residents	32 (26)
	city >100 thousand. residents	64 (52)
	village	28 (22)
Education	basic	3 (2)
	professional	8 (6)
	average	61 (50)
	higher	52 (42)
The duration of the disease [years]	1-4	50 (41)
	5-10	19 (15)
	> 10	55 (44)
Socio-professional status	student	39 (32)
	working	61 (49)
	unemployed	14 (11)
	pensioner	6 (5)
	retired	4 (3)
Smoking	smokers	45 (36)
	non-smokers	79 (64)
Socio-economic situation	bad	7 (6)
	on average, sufficient	39 (31)
	good	69 (56)
	very good	9 (7)
Frequency of use of exercise	at all	39 (32)
	once a week	61 (49)
	2-3 times a week	14 (11)
	4-5 times a week	6 (5)
	daily	4 (3)
The presence of comorbidities	yes	55 (44)
	no	69 (56)

Results

Asthma patients in the study group assessed their quality of life at a medium level (Me = 37). Women's quality of life global assessment (Me=39) was significantly worse than men's (Me=26). Women also rated worse their QoL in the category: "Symptoms" and "Impact on life". Both women and men assessed the lowest their QoL in the domain of "Activity" (Table 2).

Table 2. Quality of life of patients with asthma. The average values obtained in the Saint George's Respiratory Questionnaire (SGRQ)

SGRQ	Female (n=110)				Male (n=14)				F+M			
	min--max	$\overline{x}$ ±SD	Me	Q1-Q3	min--max	$\overline{x}$ ±SD	Me	Q1-Q3	min--max	$\overline{x}$ ±SD	Me	Q1-Q3
Domain „Activity"	35-72	55.7 ±20.55	57	42-61	20-63	47.4 ±20.00	50	28-55	20-72	41,09 ±26.48	43	27-61
Domain „Symptoms"	29-61	43.9 ±25.72	47	35-52	12-36	18.7 ±22.01***	20	17-33	12-61	54,78 ±20.58	47	25-51
Domain „The impact on life"	17-58	33.7 ±23.11	34	24-46	14-48	20.9 ±20.10 *	23	18-40	14-58	32.27 ±23.07	34	24-44
Global results	15-54	33.7 ±23.11	39	26-49	12-45	23.9 ±18.54 **	26	17-38	12-54	38.66 ±21.36	37	23-45

* p≤0,05; ** p≤0,01; *** p≤0,001

After analyzing the answers given in the Asthma Control Test (ACT), the respondents were assigned to one of three groups which determined the degree of asthma control:

- Patients who not controlled asthma – ACT score of below 20,
- Patients who was partly controlled – ACT score in the range of 20-24,
- Patients who fully controlled asthma – ACT score of 25 equaled.

The answers of the respondents indicated that the vast majority of asthmatics (96%) did not control the symptoms accompanying asthma. Only a small percentage of patients (4%) had partial control of the disease. There was not a single person in the study group who had full control of their asthma (Table 3).

Table 3. Structure of the study group including the degree of asthma control (ACT)

Asthma Control Test (ACT)	Number of people (%)
Asthma is not controlled	**119 (96)**
Partially controlled asthma	**5 (4)**
Asthma fully controlled	**0 (0)**

The analysis of the collected data shows that the age of the respondents significantly influenced the quality of life of asthmatics in the "Symptoms" domain (p = 0.015).The youngest people (18-24 years old), received the lowest average score of the analyzed variable (Me=35) and scored best against the background of the entire group. The quality of life of older people was clearly reduced. In addition, it has been shown that asthmatics aged 50-60 years were characterized by the worst quality of life in all analyzed areas (Table 4).

Disease duration had no significant impact on the quality of life of patients. Despite this, the average results included in Table 4 show that quality of life was assessed as worse by people with a long course of the disease (> 10 years) compared to those diagnosed in the last four years.

There were no significant difference in quality of life between non smokers and cigarette smokers. The average result achieved by both groups remained almost at the same level in relation to all analyzed questionnaire SGRQ domains. Moreover, higher average values in each SGRQ domains, and thus slightly better quality of life, was achieved in the group of smokers (Table 4).

Analysis of the relationship between the degree of asthma control and quality of life of patients showed significant positive correlations in each of the SGRQ domains. Better asthma control was associated with a higher quality-of-life rating. It was also shown that subjects with a higher BMI rated their quality of life as worse in the "Symptoms" and "Impact on life" domains, while interestingly, a higher BMI did not significantly correlate with their assessment of the quality of life in terms of "Activity". There was no correlation between the number of cigarettes smoked per day and the subjective assessment of the quality of life of people in the study group (Table. 5).

Table 4. Quality of life (SGRQ), depending on age, disease duration and smoking cigarettes

Variable		N	Activity				Symptoms				Effects on life				Global score			
			$\bar{x}\pm SD$	Me	Q₁-Q₃	min-max	$\bar{x}\pm SD$	Me	Q₁-Q₃	min-max	$\bar{x}\pm SD$	Me	Q₁-Q₃	min-max	$\bar{x}\pm SD$	Me	Q₁-Q₃	min-max
Age [years]	18-24	46	51.3 ±16.33	55	48-57	40-62	34.2 ±23.05	35	23-39	12-51	26.2 ±17.15	28	23-34	18-42	33.8 ±17.18	36	28-40	22-48
	25-29	20	50.6 ±19.54	56	38-58	31-65	36.0 ±27.82	40	25-42	15-54	31.9 ±27.10	37	26-43	14-52	35.4 ±24.19	35	26-39	15-56
	30-39	28	56.5 ±19.50	60	49-62	42-73	47.3 ±23.11	50	36-52	28-69	35.9 ±23,14	36	28-40	16-49	42.8 ±19.28	45	36-47	27-59
	40-49	19	56.3 ±28.57	58	45-60	38-74	40.2 ±29.59	41	31-49	23-68	32.8 ±23.24	39	25-44	19-58	38.0 ±23.71	40	33-45	21-56
	50-60	7	77.4 ±11.18	75	65-79	63-87	66.3 ±31.35	68	63-72	59-92	54.1 ±30.68	58	32-60	27-86	60.1 ±25.87	65	54-67	42-78
	> 60	4	56.3 ±28.89	69	54-69	51-73	63.2 ±21.31	63	61-69	58-74	37.5 ±31.53	35	28-42	16-65	47.5 ±27.26	54	45-56	36-68
	p		0.068				0.015 *				0.191				0.060			
The duration of asthma [years]	1-4	50	53.17 ±19.20	55	42-58	39-67	38.3 ±25.16	40	32-43	20-56	29.5 ±19.63	31	26-35	19-42	36.3 ±18.40	39	32-39	22-49
	5-10	19	55.66 ±21.37	58	47-62	32-74	42.9 ±21.96	43	38-49	31-53	29.0 ±23.91	34	24-36	17-49	38.2 ±20.39	45	27-48	19-63
	> 10	55	55.94 ±21.76	62	48-64	35-72	43.1 ±29.15	46	39-55	29-62	35.9 ±25.45	38	30-49	20-61	41.0 ±24.15	43	36-59	21-71
	p		0.761				0.606				0.404				0.772			
Smoking cigarettes	Non-smokers	79	54.1 ±21.41	60	47-62	32-74	41.0 ±27.08	45	34-48	26-66	32.1 ±22.83	33	28-46	18-59	38.6 ±21.59	40	28-46	21-68
	Smokers	45	55.9 ±19.21	63	52-61	47-68	41.3 ±25.72	47	36-58	20-63	32.5 ±23.76	36	30-44	28-57	38.7 ±21.19	41	30-43	25-65
	p		0.559				0.992				0.994				1.000			

Note: DOMAIN SGRQ

Table 5. Correlations between the quality of life (SGRQ), and BMI, the degree of disease control (ACT) and the number of cigarettes smoked per day

Variable	N	DOMAIN SGRQ							
		Activity		Symptoms		Effects on life		Global score	
		rho	p	rho	p	rho	p	rho	p
ACT	124	0.247	0.005 **	0.205	0.022 *	0.244	0.006 **	0.257	0.003 **
BMI [kg / m2]	124	0.163	0.071	0.339	0.0001 ***	0.245	0.006 **	0.292	0.001 **
Number of cigarettes smoked per day	45	0.097	0.525	0.142	0.353	0.065	0.669	0.108	0.479

Discussion

In the era of an ageing society, an increase in the incidence of chronic diseases is observed, which, according to global statistical reports, contributed to 35 million deaths in 2005. The occurrence of the disease disrupts the interactions and processes in the patient's organism and its immediate surroundings. The differentiation of symptoms, the specific nature and course of the disease significantly affect the patient's life, impairing their quality of life [22,23].

In order to identify disorders and deficits in various spheres of life related to the functioning of chronically ill people, a holistic approach to patients and research on their QoL is extremely important [23].

This research showed no significant reduction in the quality of life of patients with asthma. It was observed that the declared QoL was at an average level, and the greatest impairment of the QoL was found in the area associated with symptoms accompanying the disease. Additionally, our study showed quite high values of standard deviation (SD), indicating significant differences between the assessment of the QoL by individual respondents. This meant that not all asthmatics experienced a similar reduction in life satisfaction due to the presence of the disease. Hassan et al. [24] arrived at similar conclusions. These researchers observed a deterioration in the QoL associated with the disease in all patients, particularly in terms of activity and overall life satisfaction. Ramírez Narváez et al., who conducted experiments in children with asthma, have found that subjects were characterized by a good QoL particularly in the emotional sphere. The greatest impairment of the QoL was observed in terms of reduced physical activity caused by the presence of symptoms associated with the disease [25]. Praena Crespo et al. [26] demonstrated a slight reduction in the QoL of asthmatics in their studies. The good QoL of asthmatics was also noted by Sundh et al. [27]. Moreover, the mentioned studies have shown adverse effects of poor control of the disease on the QoL, which is consistent with our results. A similar relationship was presented by Boussoffara et al. [28]. They noted a significant reduction in life satisfaction in patients with uncontrolled asthma, which was particularly pronounced in areas relating to the physical activity and their perception of their health and in areas relating to mental health and

mental limitations resulting from emotional state. Chełmińska et al. also showed that asthmatics with uncontrolled disease had significantly worse results in all assessed domains compared to people with good asthma control. The biggest differences in the assessment of the QoL of patients with good and poor control of the disease have been observed in the category of "Symptoms". The smallest differences were found consistent across all groups in the domain of the impact of asthma on patient functioning in everyday life (domain "Impact on life") [29]. Correlation between the QoL and the degree of control of the disease was confirmed also by Szynkiewicz [30] and Torchyan et al. [31]. The authors observed that with the lowering of the level of control of asthma, both subjective and objective QoL decreased. The QoL was assessed by the respondents as average. The respondents rated QoL the lowest in the area of physical activity and independence in everyday life [30, 31].

Over the past years, asthma and obesity have become the biggest health problems of contmporary populations and have become known as lifestyle diseases. Numerous studies are currently being conducted to verify the validity of the posed hypotheses on the relationship between obesity and asthma. In clinical practice, obesity is determined using the Body Mass Index (BMI), which is the ratio of body weight in kilograms to height in meters squared (kg / m2). This study has shown that BMI would affect the perceived QoL for people with asthma. It has been shown that the increase in BMI was associated with decreased QoL of asthmatics. That correlation was observed in the overall assessment of the QoL, as well as in the domain of evaluating the symptoms of the disease (domain "Symptoms") and in the domain "Impact on Life". The relationship between the QoL of asthmatics and BMI values have also been shown by Singh et al. [32], Baltieri et al. [33], and Sundh et al. [27].

Smoking is one of the reasons leading to ill health and premature death. Smoking seriously threatens the health of smokers and those who are exposed to secondhand smoke. Increasing awareness of the harm resulting from the addiction has contributed in many countries to reducing smoking, but it is still common all over the world and is considered one of the priority health problems in contemporary populations [18,34].

Kuźmicka et al. reviewed the scientific research, conducted around the world, on the impact of cigarette smoking on the assessment of QoL. That meta-analysis did not reveal a clear relationship between smoking and the QoL. In the majority of studies, smokers assessed their QoL worse compared to non-addicts. In addition, people who stopped smoking had higher life satisfaction than the active smokers, but not all studies have reported such a relationship. This study showed no relationship between smoking and the poorer QoL asthmatics. Moreover, a group of smokers achieved slightly better results in each of the domains studied, these were not, however, significant differences. It was therefore concluded that asthmatics smoking cigarettes do not feel the lower QoL associated with the disease, and also the presence of addiction does not affect the course of asthma [18]. Przybylski et al. [35] and Torchyan et al. [31] drew different conclusions from their research. They showed that asthmatics who smoked had a lower assessment of their QoL than those who were free from addiction, especially when asthma symptoms were not adequately controlled by the patient. The authors concluded that full control of the disease and tobacco smoking cessation leads to an improvement in the perceived level of QoL [31]. In studies conducted by Tan et al. [36] a statistically significant deterioration in the QoL due to cigarette smoking (in terms of symptoms and emotional life) was observed. Kalyva et al. [37] conducted one of the first studies examining the effect of passive smoking on the QoL in asthma. Based on the results it was concluded that smoking by at least one parent contributed to a reduction in the quality of life of all the family.

Conclusions

1. In patients with asthma, the better control of the disease and the lower BMI, the better the quality of life
2. Smoking cigarettes does not influnce the declared quality of life of asthmatic patients.

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