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## ORIGINAL ARTICLE

# PECULIARITIES OF OBESITY EFFECTS ON THE QUALITY OF LIFE AND PSYCHOEMOTIONAL STATE OF PATIENTS WITH BRONCHIAL ASTHMA

DOI: 10.36740/WLek202210121

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## ABSTRACT

**The aim:** To study the effect of concomitant obesity in patients with bronchial asthma on quality of life and psychoemotional state depending on the phase of the disease.

**Materials and methods:** 176 patients with bronchial asthma in different phases of the disease with normal weight, pre-obesity and obesity were examined. The quality of life and psycho-emotional state of the patients was determined by the «Sent George Respiratory Question» and the Spielberger-Hanin and Beck tests

**Results:** All studied patients, showed significant violations of the psychoemotional sphere, a decrease in quality of life compared to healthy individuals ( $p < 0.05$ ). The remission phase revealed a deterioration in the quality of life of patients with overweight and obesity compared to patients with normal weight ( $p < 0.05$ ), in the exacerbation phase – with obesity and normal body weight ( $p < 0.05$ ). Exacerbation negatively affected the psycho-emotional sphere in patients with normal body weight and obesity ( $p < 0.05$ ).

**Conclusions:** The quality of life was reduced in all studied patients, regardless of body mass index ( $p < 0.05$ ), and the exacerbation of the disease worsened it ( $p < 0.05$ ), increased depressive tendencies in patients with normal body weight and obesity ( $p < 0.05$ ). In patients with obesity, the worst quality of life indicators were found in the remission phase ( $p < 0.05$ ) and more pronounced depressive tendencies in the exacerbation phase than in the pre-obesity group ( $p < 0.05$ ). The most important indicators determining the course of bronchial asthma are quality of life and body mass index.

**KEY WORDS:** bronchial asthma, obesity, quality of life

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## INTRODUCTION

Quality of life (QOL) is an integral indicator reflecting the degree of adaptation of a person to the disease and the possibility of performing his usual functions corresponding to his socio-economic situation [1]. The study of QOL using standardized methods makes it possible to assess the level of adaptive capabilities of the individual and to understand the nature of the disease more deeply [2]. Changes in QOL occur in all chronic diseases of internal organs, which include bronchial asthma (BA) [3]. The main manifestation of BA is suffocation attacks, which also affect the emotional and personal sphere of patients [4]. Meanwhile, manifestations of the psychoemotional state are not only the result of the main clinical syndrome. Attachment of Concomitant pathology can also provoke psychoemotional deviations. Obesity should also be considered among diseases with a significant spread and expressed impact on the psycho-emotional sphere of the patient [5, 6]. It is known that mental disorders increase the severity of somatic diseases, reducing the ability to work and quality of life often to a greater extent than diseases of internal organs [7].

## THE AIM

The aim of our work was to assess the effect of concomitant obesity on QOL and psychoemotional state in BA patients at different periods of the disease course.

## MATERIALS AND METHODS

176 patients with BA were examined, including 143 patients in the remission phase, 33 in the exacerbation phase, of which 54 were men and 122 were women. The average age of the patients was  $(45.19 \pm 0.89)$  years. 3 groups were formed: with normal weight (NW) – 57 patients with body mass index (BMI)  $(21,79 \pm 0,25)$  kg/m<sup>2</sup> (1st group), including 47 patients in remission (1-A) and 10 in exacerbation (1-B); with overweight – preobesity – (PO) – 60 with BMI  $(27,15 \pm 0,18)$  kg/m<sup>2</sup> (2nd group), including 45 in remission (2-A), 15 in exacerbation (2-B); with obesity (OB) – 59 with BMI  $(34,14 \pm 0,48)$  kg/m<sup>2</sup> (3rd group), including 51 in remission (3-A) and 8 in exacerbation (3-B). The control group consisted of 30 practically healthy persons with normal body weight, men – 11, women – 19, with an average age  $(42.4 \pm 2.0)$  years. Examination and treatment of BA patients was carried out in accordance with the current regulatory documents and recommendations of the GINA (Global Initiative for Asthma) 2022 [8]. Body mass index (BMI) was calculated using the formula: BMI = body weight (kg)/height (m<sup>2</sup>). According to WHO, overweight is a condition in which the BMI is equal to or greater than 25kg/m<sup>2</sup> and obesity is a BMI level equal to or greater than 30kg/m<sup>2</sup> [9]. To determine the QOL of patients, the Saint George Respiratory Questionnaire (SGRQ) [10] was used, which consisted of 76 questions divided into

**Table I.** Quality of life indicators in patients with bronchial asthma depending on body mass index

Period of disease	Groups	Quality of life parameters, %			
		Symptoms	Activity	Impact	Final assessment
Remission	1-A	51,43±3,73 <sup>*4</sup>	34,11±3,28 <sup>*4</sup>	31,04±2,84 <sup>*4</sup>	35,35±2,69 <sup>*4</sup>
	2-A	59,72±3,33 <sup>*</sup>	46,34±3,07 <sup>*2</sup>	35,15±2,67 <sup>*</sup>	42,58±2,45 <sup>*2</sup>
	3-A	58,05±3,39 <sup>*4</sup>	52,19±2,93 <sup>*2,4</sup>	44,25±2,95 <sup>*2,3</sup>	48,82±2,64 <sup>*2,4</sup>
	All studied patients	54,4±2,02 <sup>*4</sup>	44,41±1,88 <sup>*4</sup>	37,05±1,69 <sup>*4</sup>	42,43±1,57 <sup>*4</sup>
Exacerbation	1-B	72,58±2,29 <sup>*</sup>	62,38±5,99 <sup>*</sup>	58,13±3,73 <sup>*</sup>	61,79±3,89 <sup>*</sup>
	2-B	62,26±5,92 <sup>*</sup>	56,46±5,55 <sup>*</sup>	42,93±5,06 <sup>*2</sup>	49,91±4,54 <sup>*</sup>
	3-B	81,58±5,84 <sup>*3</sup>	71,29±7,2 <sup>*</sup>	60,84±8,01 <sup>*</sup>	67,39±6,61 <sup>*3</sup>
	All studied patients	70,07±3,34 <sup>*</sup>	61,85±3,61 <sup>*</sup>	51,88±3,44 <sup>*</sup>	57,75±3,07 <sup>*</sup>
Control group		9,54±4,39	12,38±3,58	3,13±1,27	7,26±2,16

**Notes:**

\* - differences are statistically significant relative to the control group ( $p < 0.05$ );

<sup>2</sup> - differences are statistically significant relative to the group with normal mass ( $p < 0.05$ );

<sup>3</sup> - differences are statistically significant relative to the overweight group ( $p < 0.05$ ).

<sup>4</sup> - differences are statistically significant relative to the group with asthma exacerbation ( $p < 0.05$ ).

3 parts. The first part “symptoms” measured the degree of anxiety caused by respiratory symptoms. The second part “activity” – measured the limitation of mobility and physical activity. The third part “influence” – studied the psychosocial impact of the disease. In addition, the final score of QOL was calculated. The sum of the scores when evaluating responses to this questionnaire ranged from 0 to 100%, with 0 being the best possible value. As BA patients are prone to anxiety and depressive tendencies [11], we additionally used Spielberg-Khanin tests for determining personal anxiety and tests to determine Beck's depression with the two subscales – cognitive-affective and somatic manifestations of depression. The survey was conducted at the permission of the Bioethics Commission of the Faculty of Medicine of the Uzhhorod National University (Minutes No. 4 dated February 26, 2019).

Statistical processing of the data was carried out using the programs Microsoft Office Excell 2016 and Statistica v 13.3.

## RESULTS

All patients suffering from BA showed significant changes in QOL parameters, and the state of the psychoemotional sphere compared to the control group. This refers to increased personal anxiety, the level of depressive trends and a decrease in QOL according to all scales – “symptoms,” “activity,” “impact,” “final assessment” ( $p < 0.05$ ). In patients of different weight categories, certain features were found in the indicators of QOL and in the psycho-emotional state.

In patients with normal body weight in the exacerbation phase, a higher level of manifestations of depression was found, mainly due to the second subscale ( $p < 0.05$ ), than in remission. The level of anxiety did not depend on the phase of the disease course, unlike to QOL, which was reduced during exacerbation ( $p < 0.05$ ).

In patients with PO, compared with normal weight, it was found that during remission, the level of depressive

tendencies was slightly higher, and QOL was lower due to the “activity” and “total” scales ( $p < 0.05$ ). An inverse pattern was observed during exacerbation – a lower level of depressive manifestations due to the subscale II ( $p < 0.05$ ) and better QOL indicators (“impact,”  $p < 0.05$ ) than in patients with normal weight. In the exacerbation phase of BA, individuals with PO had a tendency to decrease QOL compared to remission.

When comparing the QOL parameters of patients with OB with patients with normal weight, the following features were found: with OB in remission, all QOL indicators were reduced ( $p < 0.05$ ) with the same symptoms of the disease, in contrast to the exacerbation phase, where they did not differ statistically from each other. During exacerbation QOL in persons with OB, was more reduced due to the scales «symptoms», «activity» and «total» than during remission ( $p < 0.05$ ). When comparing QOL in patients with OB and PO, it was found that in the remission phase there were more pronounced changes in the «impact» scale ( $p < 0.05$ ), in the exacerbation – «symptoms» and «total» ( $p < 0.05$ ).

The level of depression in OB was differed depending on the phase of the course of the disease: during exacerbation, the indicators of depression were higher ( $p < 0.05$ ), due to the I subscale of cognitive-affective disorders ( $p < 0.05$ ) than during remission. In the exacerbation phase, the level of depression in patients with OB was higher than in patients with PO ( $p < 0.05$ ). In patients with OB, there was a tendency to increase anxiety compared to patients with normal weight.

When conducting a correlation analysis in patients with normal weight, links were established between the severity of the disease and depression ( $r = 0.39$ ), QOL scales ( $r = 0.36$ ); between anxiety and depression ( $r = 0.62$ ), QOL scales ( $r = 0.4$ ); between the level of depressive manifestations and QOL scales ( $r = 0.51$ ). In patients with PO, an average degree of correlation was found: between anxiety level and gender is negative ( $r = -0.35$ ), depressive

**Table II.** Indicators of psychoemotional state of patients with bronchial asthma depending on body mass index

Period of disease	Groups	Anxiety, scores	Depression, scores	Depression subscales, scores	
				I	II
Remission	1-A	47,81±1,35*	8,21±0,91 <sup>*,4</sup>	4,17±0,55*	4,68±0,69 <sup>*,4</sup>
	2-A	49,24±1,42*	10,78±1,23*	5,49±0,88*	5,29±0,52*
	3-A	50,37±1,34*	10,33±1,03 <sup>*,4</sup>	5,09±0,68 <sup>*,4</sup>	5,24±0,48*
	All studied patients	49,17±0,79*	9,78±0,62 <sup>*,4</sup>	4,92±0,41*	5,07±0,33 <sup>*,4</sup>
Exacerbation	1-B	46,9±3,26*	17,6±2,83*	7,8±2,18*	9,7±0,98*
	2-B	51,13±2,58*	9,93±1,63 <sup>*,2</sup>	5,2±1,04*	4,73±0,79 <sup>*,2</sup>
	3-B	55,5±2,95*	14,75±1,18 <sup>*,3</sup>	8,38±1,28*	6,38±0,68 <sup>*,2</sup>
	All studied patients	50,91±1,74*	13,42±1,28*	6,76±0,88*	6,64±0,61*
Control group		39,69±1,32	4,07±0,79	2,03±0,46	2,03±0,45

**Notes:**

\* - differences are statistically significant relative to the control group ( $p < 0.05$ );

<sup>2</sup> - differences are statistically significant relative to the group with normal mass ( $p < 0.05$ );

<sup>3</sup> - differences are statistically significant relative to the overweight group ( $p < 0.05$ ).

<sup>4</sup> - differences are statistically significant relative to the group with asthma exacerbation ( $p < 0.05$ ).

tendencies ( $r = 0.66$ ), QOL ( $r = 0.34$ ); between the level of depressive manifestations and QOL scales ( $r = 0.34$ ). In patients with OB, an average degree of correlation was established: between the severity of the disease and the level of anxiety ( $r = 0.46$ ), QOL scales ( $r = 0.46$ ); between the level of anxiety and depression ( $r = 0.62$ ), QOL scales ( $r = 0.39$ ); between the level of depressive tendencies and QOL scales ( $r = 0.4$ ).

Using the method of multivariate analysis, the factors that are the most typical for the studied groups: QOL ("final assessment") and body mass index have been identified.

**DISCUSSION**

Overweight and obesity are multifactorial conditions. They can be risk factors or a comorbid condition with somatic diseases. Overweight and obesity themselves can cause changes in the physical and psycho-emotional state of the patient and cause a decrease in QOL [5]. A comprehensive assessment of the condition of a patient with BA is the determination of QOL [2].

We made an attempt to establish the characteristics of the psycho-emotional state and QOL depending on BMI in patients with BA in the phase of remission and exacerbation.

In conducting our research, we found probable deterioration of all indicators of quality of life and psycho-emotional state during remission and exacerbation of BA compared to healthy individuals. The obtained results confirm the value of negative emotions from the disease in reducing QOL and controlling BA [11]. In our patients, exacerbation of BA had a negative effect on QOL. The total score increased in all studied groups, probably in patients with NW and OB, and in the group with PO – had a tendency. In patients with excessive BMI, there is a decrease in physical activity, which in turn contributes to an increase in body weight [9]. In the remission phase of the disease, the worst QOL indicators were observed in groups of patients with PO and OB. On

the "Activity" and "Final assessment" scale, these groups had a statistically significant difference compared to the with NW. It is interesting to note that the exacerbation of BA led to possible QOL violations in patients with NW and OB, but leveled the differences between the studied groups.

Our studies have confirmed that the chronic course of the disease, periodic exacerbations, the need for long-term treatment, fear of a suffocation attack form a state of chronic psycho-emotional overstrain, stress in a patient with BA and have a significant impact on the formation of anxiety and depression [3].

The «Anxiety» scores in all studied groups were probably worse than the group of healthy individuals and did not depend on the phase of BA and BMI. Indicators of «Depression» were also probably higher in all groups of studied patients during remission and exacerbation of BA compared to healthy individuals. Exacerbation of BA probably increased depression in the groups with NW and OB and practically did not affect patients with PO. Such changes led to the fact that during the period of exacerbation of BA in the PO group, the value of depression was statistically significantly less than the groups of patients with NW and OB.

**CONCLUSIONS**

The following changes in quality of life and psycho-emotional sphere were found in BA patients:

1. With bronchial asthma in all patients, regardless of body mass index, there was a decrease in quality of life indicators on the scales "symptoms", "activity", "impact", "final assessment", increased level of anxiety and depressive tendencies, compared with healthy individuals ( $p < 0.05$ ).
2. Exacerbation of BA significantly reduced QOL in all patients ( $p < 0.05$ ) and increased depressive tendencies in patients with normal weight and OB ( $p < 0.05$ ).
3. In patients with obesity, there was a decrease in QOL ( $p < 0.05$ ) and an increased tendency to anxiety than in



other patients with the same symptoms of the underlying disease.

4. The most significant factors associated with the course of BA were indicators of QOL and body mass index.

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## Conflict of interest:

The Authors declare no conflict of interest.

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