# MODERN APPROACHES TO REHABILITATION IN PATIENTS WITH BRONCHIAL ASTHMA AND OBESITY: NON-PHARMACOLOGICAL METHODS AND SANATORIUM TECHNOLOGIES

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**Abstract:** The prevalence of bronchial asthma (BA) combined with obesity poses significant challenges for rehabilitation medicine. This study evaluates the effectiveness of staged rehabilitation, including dry carbon dioxide baths, alimentary alkyl-glycerols, and thermal balneotherapy, in the comprehensive treatment of patients with mild BA and obesity. A total of 120 patients, aged 35-60 years, were treated at the Andijan Branch of the Republican Scientific Center for Emergency Medical Care. Our results show that combining these therapies significantly improves respiratory function, body mass index (BMI), and quality of life indicators ($p < 0.05$). These findings support the integration of innovative non-pharmacological methods in standard BA rehabilitation protocols.

**Keywords***: bronchial asthma, obesity, rehabilitation, thermal balneotherapy, dry carbon dioxide baths, respiratory function, BMI, quality of life*

**Introduction:** Bronchial asthma (BA) and obesity are chronic conditions with a high prevalence globally, often coexisting and exacerbating each other [1]. This phenotype presents unique challenges, including reduced treatment effectiveness, increased inflammatory markers, and impaired respiratory mechanics [2]. Non-pharmacological interventions, such as balneotherapy and physical rehabilitation, offer potential benefits in addressing these issues. Recent studies highlight the need for a comprehensive evaluation of these methods to optimize patient outcomes [3],[4]. This study investigates the effectiveness of staged rehabilitation incorporating innovative therapies in BA patients with obesity.

**Literature Review:** The association between BA and obesity is well-documented, with obesity increasing the risk of severe asthma exacerbations by 1.5 times [2]. Research by Kryzhanovsky et al. (2017) emphasizes the role of staged rehabilitation in managing this phenotype [1]. Yubitskaya and Antonyuk (2019) explored non-pharmacological treatments, highlighting thermal balneotherapy's benefits in reducing systemic inflammation and improving pulmonary function [2]. Additionally, Alexandrov et al. (2021) demonstrated the superiority of dry carbon dioxide baths over traditional therapies in enhancing metabolic and respiratory outcomes [3].

**Materials and Methods:** This study included 120 patients with mild BA and obesity who were treated in the Department of Therapy at the Andijan Branch of the Republican Scientific Center for Emergency Medical Care. Patients were divided into three groups:

Group A (n=40): Received standard pharmacological treatment.

Group B (n=40): Underwent standard treatment plus dry carbon dioxide baths and alimentary alkyl-glycerols.

Group C (n=40): Received comprehensive staged rehabilitation, including thermal balneotherapy, in addition to Group B's therapies.

Baseline evaluations included spirometry, BMI measurements, and quality of life assessments using the Asthma Quality of Life Questionnaire (AQLQ). Interventions lasted 12 weeks, with follow-ups at 3 and 6 months.

**Results:** Table 1 summarizes the improvements across all groups:

| **Parameter** | **Group A** | **Group B** | **Group C** |
|---|---|---|---|
| FEV1 (% predicted) | +8.2% | +15.4% | +22.8% |
| BMI reduction (kg/m²) | -1.2 | -2.6 | -3.8 |
| AQLQ score improvement | +12.5% | +22.3% | +35.6% |

Group C demonstrated significantly better outcomes in respiratory function (FEV1: $p=0.01$), BMI reduction ($p=0.02$), and quality of life ($p<0.001$) compared to Groups A and B.

**Discussion:** The integration of dry carbon dioxide baths and thermal balneotherapy within a staged rehabilitation program yielded superior outcomes compared to standard care. These therapies likely enhance vascular and metabolic functions, reduce systemic inflammation, and improve respiratory mechanics, as suggested by Alexandrov et al. [3]. Moreover, alimentary alkyl-glycerols may synergize with these modalities to optimize energy metabolism and immune responses. Limitations include the short follow-up duration and the single-center design. Future studies should explore long-term effects and expand on multicenter collaborations.

**Conclusion:** Staged rehabilitation, incorporating non-pharmacological methods, significantly enhances treatment outcomes for BA patients with obesity. These findings advocate for broader implementation of these therapies in clinical practice to improve patient quality of life and reduce the burden of chronic diseases.

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