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META-ANALYSIS OF THE PREVALENCE OF OVERLAP BETWEEN BRONCHIAL ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) AMONG PATIENTS WITH BRONCHOPULMONARY PATHOLOGY

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Abstract
Asthma and chronic obstructive pulmonary disease (COPD) are a major public health problem and represent a leading cause of morbidity and mortality worldwide [1,2]. Asthma and COPD are the most common chronic respiratory diseases worldwide, each with a specific pathophysiology [1]. Asthma is typically characterized by chronic airway inflammation with reversible symptoms, whereas COPD is characterized by persistent respiratory changes in the bronchopulmonary system [3,4However, patients may sometimes have clinical features of both diseases, a condition called asthma-COPD overlap (ACO), recommended by the joint GINA (Global Strategy for Asthma Management and Prevention) and GOLD (Global Initiative for Chronic Obstructive Lung Disease) guidelines. According to these guidelines, ACO is characterized by "persistent airflow limitation with some features of asthma and COPD."

Introduction

Most previous studies have shown that patients with ACO have more severe respiratory symptoms, frequent exacerbations, poor quality of life, high mortality, increased healthcare resource utilization, and a higher prevalence of comorbidities than patients with asthma alone or COPD alone [5].

Numerous population-based studies have been conducted to estimate the prevalence of PBAC worldwide, particularly in the United States and Europe. However, the studies vary widely. The prevalence of ACO in these studies varied widely, from 0.3 to 5.0% in the general population, from 3.2 to 51.4% in patients with asthma, and from 12.6 to 55.7% in patients with COPD. Although the number

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of population-based studies in this context is currently limited, it has been increasing in recent years.

The global prevalence of ACO is not fully understood, and meta-analyses of population-based studies have been limited. However, due to significant heterogeneity in data on the prevalence of ACO and its significant impact on population health, an accurate estimate of ACO prevalence is crucial for strategic planning and public health policy. Therefore, we conducted a meta-analysis of the published literature to explore this parameter. We examined the prevalence of ACO among patients with asthma and/or COPD to better understand the absolute burden of this condition.

Purpose of the study: Based on the analysis of the incidence of COPD and bronchial asthma according to data from foreign authors, conduct a meta-analysis of the prevalence of the overlap of bronchial asthma and COPD in this sample of patients.

Materials and methods of study: To conduct a meta-analysis, we used data from international authors studying the incidence of bronchial asthma overlap in patients with bronchial asthma/COPD in various populations. Data were compared between patients with ACO and those with bronchial asthma/COPD—the main group; the control group included the populations where the sample was drawn. The inclusion criteria for this study were diagnoses of ACO, bronchial asthma, and COPD, which were established based on the GOLD/GINA index. The exclusion criterion for the meta-analysis was the lack of comparative data on the epidemiology of ACO among patients with bronchial asthma/COPD and in the general population..The meta-analysis included studies in the general population conducted between 1996 and 2019. Patient ages in these studies ranged from 4 to 84 years. Statistical processing of the meta-analysis data was performed using Microsoft Excel 2016, RevMan 5.3 (Cochrane Collaboration 2014) statistical analysis software. The meta-analysis was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

To describe our own research results, 150 patients with diagnoses of asthma, COPD and ACO aged 18–82 years were included..Patients were selected from among those receiving inpatient treatment in the pulmonology and allergology department of the Bukhara regional multidisciplinary clinic and in the internal medicine department of the city hospital No. 3 of the Mirabad district of Tashkent.

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Research results and discussions:The search for epidemiological studies on the incidence of ACO in patients with bronchial asthma/COPD was carried out in the following databases: PubMed, Cochrane Library, ReSearchGate (search criteria - ("Asthma-chronic obstructive pulmonary disease overlap syndrome") OR ("Asthma and chronic obstructive pulmonary disease overlap syndrome") OR ("asthma-COPD overlap syndrome") OR ("asthma-COPD overlap") OR ("asthma-COPD") OR ("ACOS") OR ("mixed asthma-COPD phenotype") OR ("Asthma combined with COPD") OR ("coexistence of asthma and COPD") OR ("COPD with asthmatic features") OR ("overlap of asthma-COPD"), in accordance with the PRISMA guidelines for writing review articles and meta-analyses of data. The meta-analysis was performed using the random effects model and the Mantel-Haenszel test. The results of the meta-analysis were presented as odds ratios (OR) and 95% confidence interval (CI). The search yielded 4,726 publications, of which 4,560 were removed after title and abstract review, and duplicates were also removed due to non-compliance with the inclusion criteria. An additional 166 articles were reviewed, of which only 24 were selected and met the search criteria. The meta-analysis included 21 studies on the epidemiology of asthma, COPD, and ACO. After excluding publications that did not have comparison (control) groups, 18 studies were included in the meta-analysis on the incidence of ACO among patients with asthma, 21 studies on the incidence of ACO among patients with COPD, and 18 studies comparing the prevalence of PBAC among asthma and COPD.

Among the 18 publications selected for meta-analysis between 1996 and 2019, 421,470 patients aged 39.5±5.5 years were covered, of which 30,916 were patients with bronchial asthma, including 7,707 patients with ACO, which amounted to 24.93%. Data on the population sample amounted to 421,470, of which the overlap of bronchial asthma and COPD was detected in 1.83%. The studies indicate a higher frequency of overlap of bronchial asthma and COPD among patients with bronchial asthma compared to the population (OR = 0.25; 95% CI 0.17-0.33), which is statistically significant (Fig. 1).

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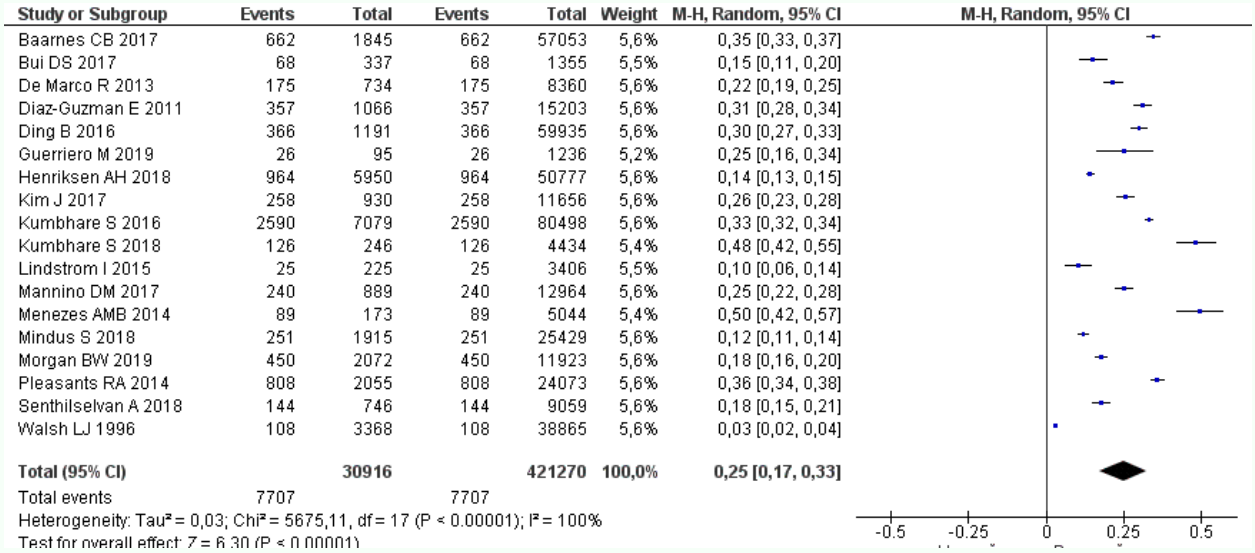

Fig. 1. Meta-analysis of bronchial asthma

We further analyzed studies on the overlap of bronchial asthma and COPD among patients with COPD, which covered 2,454,851 patients with a mean age of 40.5±5.5 years and found that out of 82,147 patients with COPD, bronchial asthma overlap was present in 28,534 patients, which amounted to 34.73%. In a sample from a population of 2,454,851, ACO was detected in 1.16%. Overall, the results of the meta-analysis suggest a statistically significant (OR = 0.28; 95% CI 0.20-0.37) (p <0.00001) increase in the frequency of PBAC among patients with COPD compared to patients with ACO in the population (Fig. 2).

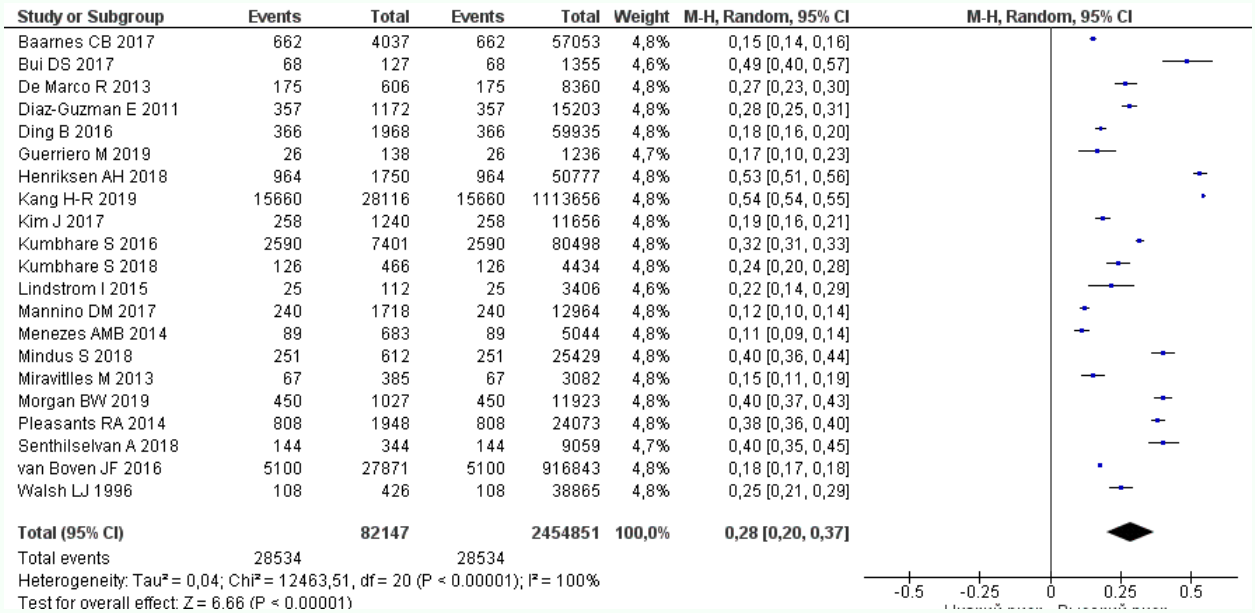

Fig. 2. Meta-analysis of chronic obstructive pulmonary disease

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To compare the incidence of ACO among bronchial asthma/COPD patients, we conducted a meta-analysis of 18 studies from 1996 to 2019, covering more than 56,691 patients with an average age of 37.5 ± 5.5 years. It showed that among 30,916 bronchial asthma patients, 24.93% had ACO, while among 25,775 COPD patients, ACO was found in 29.9%. Of the 18 studies included in the analysis, all reported a higher incidence of ACO among COPD patients compared to bronchial asthma patients in the population. Overall, the results of the meta-analysis (OR = 0.80; 95% CI 0.50-1.28) suggest a statistically significant (p <0.00001) increase in the frequency of ACO among patients with COPD compared to patients with bronchial asthma in the population (Fig. 3).

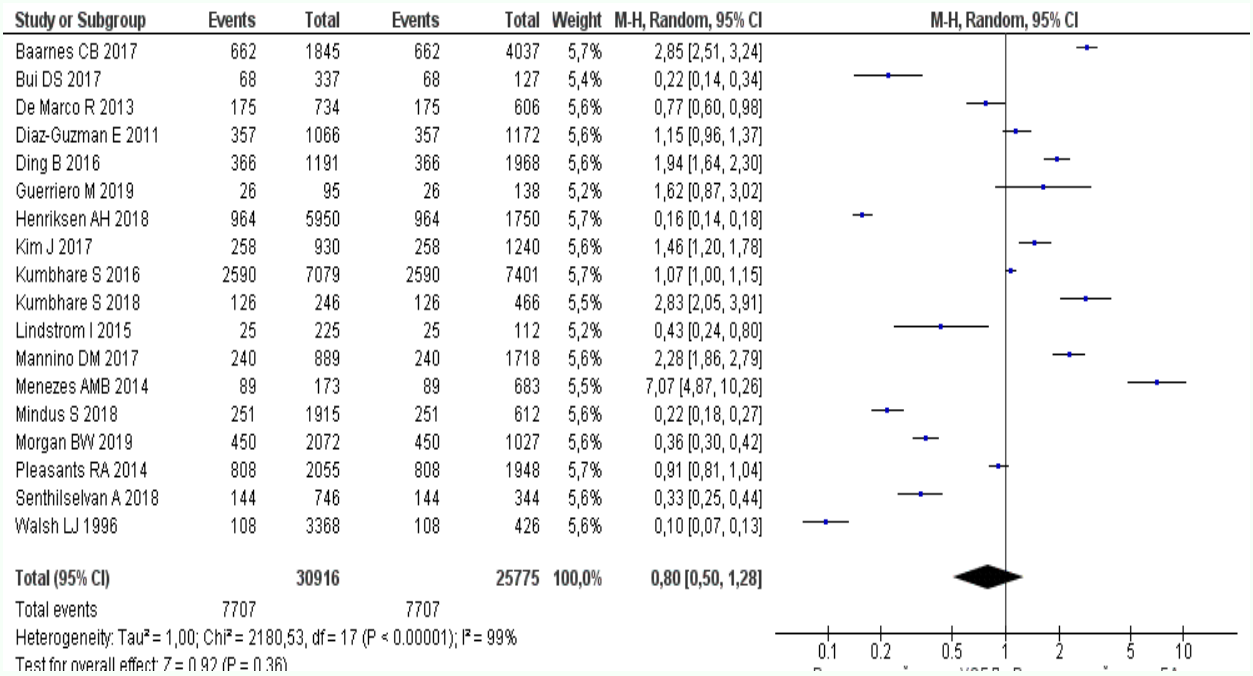

Fig. 3. Meta-analysis of asthma COPD overlab

Based on our own observations of 150 patients, the incidence of ACO was studied. It was 25.3% and 23.86% in patients with asthma and COPD, respectively.

Conclusions: Thus, despite its high incidence, only a few population-based studies have examined the prevalence of ACO, and as a result, the epidemiology of this condition remains poorly defined. A meta-analysis showed that ACO is more common in patients with asthma/COPD than in papules. When comparing the presence of ACO among patients with asthma and COPD, the highest percentage

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was found among patients with COPD (29.9%) than among patients with asthma (24.93%) (OR = 0.80; 95% CI 0.50-1.28) ($p < 0.00001$).

REFERENCES

1. Andersen H, Lampela P, Nevanlinna A, Säinäjakangas O, Keistinen T. High hospital workload in partial syndrome asthma and COPD. Clin Respir J. 2013; 7(4):342–346. doi: 10.1111/crj.12013.
2. Baarnes CB, Andersen ZJ, Tjønneland A, Ulrik CS. Incidence and long-term outcomes of severe asthma and COPD overlap compared with asthma and COPD alone: a 35-year prospective study of 57,053 middle-aged adults. Int J Chron Obstruct Pulmon Dis. 2017; 12: 571–579. doi: 10.2147/COPD.S123167.
3. Bui DS, Burgess DA, Lowe AJ, Perrett DL, Lodge SJ, Bui M, Morrison S, Thompson BR, Thomas PS, Giles GG. Childhood lung function predicts adult chronic obstructive pulmonary disease and asthma-chronic obstructive pulmonary disease overlap syndrome. Am J Respir Crit Care Med. 2017; 196(1):39–46. doi: 10.1164/rccm.201606-1272OC.
4. De Marco R, Pesce G, Marcon A, Accordini S, Antonicelli L, Buggiani M, Casali L, Ferrari M, Nicolini G, Panico MG. Coexistence of asthma and chronic obstructive pulmonary disease (COPD): prevalence and risk factors in young, middle-aged, and elderly individuals from the general population. PLoS One. 2013; 8(5):e62985. doi: 10.1371/journal.pone.0062985.
5. Diaz-Guzman E, Khosravi M, Mannino DM. Asthma, chronic obstructive pulmonary disease, and mortality in the US population. COPD. 2011; 8(6):400–407. DOI: 10.3109/15412555.2011.611200.
6. Ding B, DiBonaventura M, Carlsson N, Ling H: Asthma-chronic obstructive pulmonary disease overlap syndrome in an urban Chinese population: prevalence and disease burden using the China National Health and Welfare Surveys 2010, 2012, and 2013. Int J Chron Obstruct Pulmon Dis 2016, 11: 1139–1150.
7. Ehteshami-Afshar S, Fitzgerald J, Doyle-Waters M, Sadatsafavi M. The global economic burden of asthma and chronic obstructive pulmonary disease. Int J Tuberc Lung Dis. 2016; 20(1):11–23. doi: 10.5588/ijtld.15.0472.
8. Global Initiative for Asthma (GINA). Global strategy for asthma care and prevention, 2017 update. Available at: www.ginasthma.org. 2017.

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6972

9. Guerriero M, Caminati M, Viegi G, Senna G, Pomari C. Prevalence and characteristics of asthma and chronic obstructive pulmonary disease coincide in the general population of northern Italy. J Asthma. 2019; 56(1):27–33. doi: 10.1080/02770903.2018.1424190.
10. Henriksen AH, Langhammer A, Steinshamn S, Mai H-M, Brampton BM. Prevalence and symptom profiles of asthma and COPD overlap: the HUNT study. COPD. 2018; 15(1):27–35. doi: 10.1080/15412555.2017.1408580.
11. James SL, Abate D, Abate KH, Abay SM, Abbafati S, Abbasi N, Abbastabar H, Abdallah F, Abdela J, Abdelalim A. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: a systematic analysis of the Global Burden of Disease Study 2017. Lancet. 2018; 392(10159): 1789–1858. doi: 10.1016/S0140-6736(18)32279-7.
12. Kang HR, Hong SH, Ha S-I, Kim T-Bi, Lee I-K. Differences in mood disorder risk in patients with asthma and COPD partially overlap with those in patients with COPD alone: a nationwide population-based retrospective cohort study in Korea. Respir Res. 2019; 20(1): 80. doi: 10.1186/s12931-019-1039-5.
13. Kim J, Kim YS, Kim K, Oh Y-M, Yu KH, Rhee KK, Lee JH. Socioeconomic impact of asthma, chronic obstructive pulmonary disease, and asthma-COPD overlap syndrome. J Thorac Dis. 2017; 9(6):1547. doi: 10.21037/jtd.2017.05.07.
14. Kumbhare S, Pleasants R, Ohar JA, Strange S. Asthma/chronic obstructive pulmonary disease characteristics and prevalence are consistent in the United States. Ann Am Thorac Soc. 2016; 13(6):803–810. doi: 10.1513/AnnalsATS.201508-554OC.
15. Kumbhare S, Strange C. Mortality in asthma and chronic obstructive pulmonary disease overlap in the United States. South Med J. 2018; 111(5):293–298. doi: 10.14423/SMJ.0000000000000807.
16. Lindström I, Luukkonen R, Vasankari T, Kanervisto M, Helijovaara M, Kainu A, Pallasajo P. Asthma, COPD, and the risk of receiving a disability pension - an 11-year register-based follow-up. Eur Respir J. 2015; 46: PA356.
17. Mannino DM, Gan WC, Wurst K, Davis KJ. Asthma and chronic obstructive pulmonary disease overlap: impact of definitions on burden metrics. Chronic Obstr Pulm Dis. 2017; 4(2):87–96.

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6972

18. Menezes AMB, de Oca MM, Pérez-Padilla R, Nadeau G, Wehrmeister FC, López-Varela MV, Munho A, Jardim JRB, Valdivia G, Talamo S. Increased risk of exacerbation and hospitalization in subjects with an overlapping phenotype: COPD-asthma. Chest. 2014. 145(2):297–304. doi: 10.1378/chest.13-0622.
19. Mindus S, Malinowski A, Eckerljung L, Forsberg B, Gislason T, Jõgi R, Franklin KA, Holm M, Johannesen A, Middelveld R. Asthma–COPD overlap (ACO) is associated with a high burden of sleep disturbance and respiratory diseases. Symptoms: results from the RHINE and Swedish GA2LEN studies. PLoS One. 2018; 13(4):e0195055. doi: 10.1371/journal.pone.0195055.
20. Miravitles M, Soriano JB, Ancochea J, Muñoz L, Durán-Tauleria E, Sánchez J, Sobradillo V, García-Río F. Characterization of the overlapping COPD-asthma phenotype. Focus on physical activity and health status. Respir Med. 2013. 107 (7): 1053–1060. doi: 10.1016/j.rmed.2013.03.007. [PubMed] [CrossRef] [Google Scholar]
21. Morgan BW, Grigsby MR, Siddharthan T, Chowdhury M, Rubinstein A, Gutierrez L, Irazola V, Miranda JJ, Bernabe-Ortiz A, Alam D. Epidemiology and risk factors for asthma and chronic obstructive pulmonary disease overlap in low- and middle-income countries. J Allergy Clin Immunol. 2019; 143(4):1598–1606. doi: 10.1016/j.jaci.2018.06.052.
22. Pleasants RA, Ohar JA, Croft JB, Liu Y, Kraft M, Mannino DM, Donoghue JF, Herrick HL. Chronic obstructive pulmonary disease and asthma - patient characteristics and health outcomes. COPD. 2014. 11 (3): 256–266.
23. Salomova, F. I., Mavlonov, A., & Abdukadirova, L. K. (2024). Talabalar o'rtasida gastritning tarqalishi va to'g'ri ovqatlanishning ahamiyati.
24. Senthilselvan A, Beach J. Characteristics of asthma and COPD overlap syndrome (ACOS) in a Canadian population. J Asthma. 2018: 1–9.
25. van Boven JF, Roman-Rodriguez M, Palmer JF, Toledo-Pons N, Cosio BG, Soriano JB. Comorbidity, structure, and impact of asthma-COPD overlap syndrome in real life. Chest. 2016;149(4):1011–1020. doi: 10.1016/j.chest.2015.12.002.
26. Vogelmeier KF, Kreiner GJ, Martinez FJ, Anzueto A, Barnes PJ, Burbo J, Celli BR, Chen R, Decramer M, Fabbri LM. Global strategy for the diagnosis, treatment, and prevention of chronic obstructive pulmonary disease. 2017 report. GOLD summary. Am J Respir Crit Care Med. 2017; 195(5):557–582.

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 12, December 2025
brightmindpublishing.com
ISSN (E): 3061-6972

27. Walsh L, Wong S, SS, Guhan A, Pringle M, Tattersfield A: Prevalence of diagnosed asthma and COPD in the population in Nottinghamshire Thorax 1996, 51: A26.