World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(REVIEW ARTICLE)

Check for updates

Relationship between Asthma and Periodontitis: A Literature Review

Indeswati Diyatri [1,*], Khansa Salsabila [2] and Margaretha Elaine Keisha Ghazya [2]

[1] *Department of Oral Biology, Faculty of Dental Medicine, Airlangga University, Surabaya.*
[2] *Faculty of Dental Medicine, Airlangga University, Surabaya.*

World Journal of Advanced Research and Reviews, 2025, 27(03), 1646-1651

Publication history: Received on 10 August 2025; revised on 19 September 2025; accepted on 22 September 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.27.3.3258

Abstract

Background: Asthma is a chronic respiratory disease characterized by reversible airway obstruction. This disease usually results from allergic reaction or hypersensitivity. Periodontitis is a chronic inflammatory disease of the oral cavity characterized by the loss of periodontal tissue support. This disease is multifactorial and largely attributed to inflammatory development from bacterial biofilm host-microbe interactions. The association between respiratory diseases and periodontitis has been investigated in the past decades. The results on their correlation have been conflicting throughout the years.

Objective: To analyze the association between asthma and periodontitis.

Methods: The method used in this paper is literature review, which identifies, analyzes, compares and evaluates previously published scientific works.

Conclusion: The main findings in this review validated an association between asthma and periodontitis.

Keywords: Asthma; Periodontitis; Respiratory disease; Periodontal disease

1. Introduction

Asthma is a chronic respiratory disease characterized by reversible obstruction of the airway. Generally, asthma is triggered by allergic reactions or hypersensitivity. In 2019, asthma incidence reached 37 million cases, marking a 13% increase since 2010. Patients with asthma tend to have more comorbidities than those without asthma, and the prevalence of this respiratory disease is notably higher among asthmatic patients compared to controls [1].

Periodontitis is a chronic inflammatory disease of the oral cavity, which is typically characterized by the loss of supporting periodontal tissues [1]. The onset and progression of periodontitis are multifactorial, largely driven by inflammatory responses resulting from the interaction between host and bacterial biofilm microorganisms [2]. Periodontitis is reported to affect 45-50% of the adult population worldwide, with its most severe form recognized as the sixth most common human disease, impacting 11,2% of the global adult population. This condition is not confined to the oral cavity alone but can extend to the vascular system, which contributes to increasing systemic inflammation. As a result, periodontitis carries significant implications for other systemic diseases [3].

The relationship between periodontitis and various respiratory diseases has been investigated over the past decades. Given that both asthma and periodontitis are highly prevalent conditions, exploring their association may provide valuable insights for healthcare professionals in managing asthmatic patients. The use of inhaled corticosteroids can reduce severe asthma and help control symptoms in both adults and adolescents. However, the usage of corticosteroids

* Corresponding author: Indeswati Diyatri

may also suppress the local immune system, which can increase patients' susceptibility to infections caused by pathogenic microorganisms [1]. Therefore, this article aims to compare and analyze previous studies regarding the association between asthma and periodontitis.

2. Material and methods

2.1 Research Strategy

Literature and data were retrieved from journals and articles using specific keywords combined with Boolean Operators (AND, OR, AND NOT). This method is carried out by identifying, analyzing, comparing, and evaluating previously published scientific works. The search was restricted to publications from the last five years (2019-2025). The keywords applied in this systematic review are "Asthma and Periodontitis" which aims to specify the search to make it easier to determine the literature used.

2.2 Inclusion and Exclusion Criteria

In this study, the inclusion criteria are literature available in full text and open access in English, uses and original research design, and has been published within the last 5 years. The exclusion criteria is literature that uses languages other than English, literature unavailable in full-text, literature that is not open access, and literatures published more than 5 years ago.

2.3 Synthetic Data

The literature is collected through full-text understanding and data extraction, including research title, author, year of publication, research objectives, research results, and conclusions. The data is analyzed to get a conclusion that can answer research questions and objectives. The literatures were selected through keyword searches and filtered based on title and abstract. The full text was screened to determine the relevance to the criteria established in this study.

Results and discussion

A study done by Park et al. in 2023 found an association between periodontitis and asthma in Korean adults. A positive connection was found. There are a few factors that are connected to asthma and connected to periodontitis, one of them is salivary rate, which is crucial for the oral and teeth health. The salivary rate can be affected by medications used for treating asthma, diet, and asthmatic patients' lifestyle. Inhaled corticosteroids and antihistamine could reduce the salivary secretion and change the salivary composition. Reduced salivary rate could cause a good environment for periodontitis-causing bacteria to reproduce. Pathogens linked to periodontitis could also be involved in asthma progression. Study showed that interaction between oral cavity microorganisms and hosts have a relationship with respiratory disease, like asthma [1]. Another study by Brasil-Oliveira et al. in 2020 supported this result. An association between asthma and periodontitis could be found, in which periodontitis and reduced salivary rate was found in asthmatic patients. Patients with severe asthma showed a higher amount of tooth-loss and tend to have periodontitis with reduced salivary rate. A few studies also showed a strong positive association between periodontitis and the severity of asthma, but there is still no evidence of a causal relationship [4]. Tattar et al. also did a study that showed a potential association between periodontitis and asthma. Dental plaque in patients with periodontal disease can serve as a reservoir for respiratory pathogens, while enzymes released from inflamed periodontal tissues may alter mucosal surfaces, facilitating bacterial colonization in the airways. These findings should be interpreted with caution due to potential confounding factors, particularly smoking history and status [12].

Another study done by Ibraheem et al. in 2024 showed that there is a bigger periodontal destruction in patients with asthma compared to patients without. The amount of tooth loss, bone loss, and attachment loss is also higher in patients with asthma. This is because asthmatic patients have an increased level of Immunoglobulin E (IgE) in the gingival tissue. Severe periodontitis is also found in patients with anti-asthma medications and patients with uncontrolled asthma [7]. Kouanda et al. also found an association between periodontal disease and respiratory disease [8]. A study by Lopes et al. in 2020 found that there is an association between severe asthma in adults and periodontitis. These two diseases are interconnected because of dysbiosis or imbalance in oral cavity microorganisms. One of them is Prevotella intermedia, which is a bacteria found in subgingival biofilm [9].

Gani et al. did a study in 2020 that showed periodontitis might be related with asthma through the usage of asthma medications. However, the danger of periodontal disease progression is increasing in patients with a severe form of asthma [5]. A population-based cohort study done in asthmatic patients in Finland done by Lemmetyinen et al. in 2021 found that adults with asthma have high risk of having oral disease or disease with oral manifestations. There is no significant association between asthma and periodontitis, but an association between asthma medications and

periodontitis could be found. It is widely known that asthma medications, especially corticosteroids, have immunosuppressive effects that can cause candidiasis, teeth decay, and periodontitis [3]. Beuker et al. did a study to find the prevalence of comorbidities in patients with periodontitis and revealed that periodontitis occurs often in patients with asthma. This is likely due to the asthma medications used by patients, which increase the risk of periodontitis. However, further study is needed to be done to fully understand the association [11]. Another study revealed that individuals with asthma present with a higher prevalence and severity of periodontitis. The potential link between the two conditions may be explained by multiple biological mechanisms. Asthma is characterized by chronic airway inflammation mediated by a Th2-driven immune response and cytokines such as IL-4, IL-5, and IL-13, which may also affect periodontal tissues and increase their susceptibility to destruction. Moreover, the use of inhalation therapy, particularly corticosteroids, often leads to xerostomia, changes in salivary pH, and greater plaque accumulation, thereby facilitating the development of periodontitis [14].

A study by Gomes-Filho et al. in 2020 also found that there is an association between periodontitis and asthma, pneumonia, and chronic obstructive pulmonary disease (COPD). The research result showed a moderate to high association between periodontitis and respiratory disease [6]. In other study done by Saleh et al. in 2025, a positive association between periodontitis and asthma was found, but the result was influenced by smoking habit and usage of asthma medications. These two things were said to increase the prevalence of periodontitis in patients with asthma [2]. That being said, another study done by Molina et al. in 2023 could not find a significant association between periodontitis and asthma, but an association between periodontitis and COPD, sleep apnea, and COVID-19 complications could be found. The researcher could not confirm a significant relationship of periodontitis and asthma. Other than that, in an intervention research, a mortality decline in asthmatic patients receiving periodontal therapy could be found. It was known that asthma and periodontitis have the same risk factors, like smoking and obesity. Moreover, asthma is usually diagnosed in younger age. Thus, long-term research in bigger population is needed to be done to evaluate the prevalence of periodontitis and its effect on asthma-related complications [10]. Herrera et al. also said that the research results for these two diseases are inconsistent. However, patients with asthma have to pay attention to their oral health due to their inhalers' impact on the periodontal [13]. A study done by AlQassab also showed no significant difference in gingival and periodontal health in asthmatic and healthy children. Conflicting results across these studies might be attributed to differences in study design, population characteristics, exposure to asthma medications, oral habits, and the wide age range of participants [15].

Table 1 Summary of study results

No.	Author Name, Year	Journal Name	Title	Research Result
1	Park et al.	Diagnostics Vol. 13 No. 24, 2023.	Association between Asthma and Periodontitis	Based on the research, it can be concluded that there's an association between asthma and periodontitis in adults in Korea.
2	Gomes-Filho et al.	Oral diseases Vol. 26 No. 2, 2020.	Periodontitis and Respiratory Diseases: A systematic review with meta-analysis	Based on the research, it can be concluded that there is an association between periodontitis and asthma, pneumonia, and chronic obstructive pulmonary disease (COPD).
3	Saleh et al.	Journal of Periodontal Research, 2025.	Association between asthma and periodontitis: A case-control analysis of risk factors, related medications, and allergic responses.	Based on the research, it can be concluded that there's an association between asthma and periodontitis, but this association is modified by smoking habits and the usage of asthma medications.
4	Molina et al.	Journal of Clinical Periodontology Vol. 50, No. 6, 2023.	The association between respiratory diseases and periodontitis: A systematic review and meta-analysis	Based on the research, it can be concluded that there is no significant association between periodontitis and asthma, but associations between periodontitis and COPD, sleep apnea, and COVID-19 complications could be found.

5	Gani et al.	Clinical and Molecular Allergy, Vol. 18, 2020.	Oral health in asthmatic patients: a review: Asthma and its therapy may impact on oral health	Based on the research, it can be concluded that there is an association between the medications used for asthma and periodontitis.
6	Lopes et al.	Journal of Periodontology, Vol. 91 No. 1, 2020.	Prevotella intermedia and periodontitis are associated with severe asthma	Based on the research, it can be concluded that there is an association between severe asthma in adults with periodontitis that is connected because of dysbiosis in oral cavity microbiota.
7	Brasil-Oliveira et al.	Jornal brasileiro de pneumologia, 2020.	Oral health-related quality of life in individuals with severe asthma	Based on the research, it can be concluded that periodontitis and reduction of salivary rate is often found on asthmatic patients.
8	Lemmetyinen et al.	BMJ open, Vol. 11 No. 12, 2021.	Diseases with oral manifestations among adult asthmatic in Finland: a population-based matched cohort study	Based on the research, it can be concluded that adults with asthma have higher risk of getting oral diseases or diseases with oral manifestations. There is no significant association between asthma and periodontitis, but there is an association between the medications used for asthma and periodontitis.
9	Ibraheem et al.	Bioinformation, Vol. 20, No. 1, 2024.	Association between asthma and periodontitis	Based on the research, there is an association between asthma and periodontitis in a group with anti-asthmatic medication and a group with uncontrolled asthma.
10	Kouanda et al.	Pulmonary Medicine, 2021.	Periodontal Diseases: Major Exacerbators of Pulmonary Diseases	Based on the research, it can be concluded that there is an association between periodontal disease and respiratory disease.
11	Beukers et al.	Journal of Clinical Medicine, Vol. 13 Tahun 2024	The Prevalence of Comorbidities in Individuals with Periodontitis in a Private Periodontal Referral Practice	Based on the research, it can be concluded that individuals with asthma may have periodontitis because of certain asthma medications, which increase the risk of periodontitis. However, further studies needed to be done to fully understand the connection.
12	Tattar et al.	British Dental Journal, 2025.	The interrelationship between periodontal disease and systemic health	Based on the research, it can be concluded that periodontitis and asthma have a potential association. Dental plaque in patients with periodontal disease can serve as a reservoir for respiratory pathogens, while enzymes released from inflamed periodontal tissues may alter mucosal surfaces, facilitating bacterial colonization in the airways. These findings should be interpreted with caution due to potential confounding factors, particularly smoking history and status.
13	Herrera et al.	European Journal of General	Periodontal diseases and cardiovascular diseases, diabetes, and respiratory	Based on the research, it can be concluded that the research results for the connection between periodontitis

		Practice, Vol. 30 No. 1, 2024.	diseases: Summary of the consensus report by the European Federation of Periodontology and WONCA Europe	and asthma are inconsistent, but patients with asthma have to pay attention to the impact of their medications (corticosteroid inhalers) to the periodontal health.
14	Alizadeh Bahmani et al.	Biomedicine, Vol. 13 No. 1, 2025.	Association of Corticosteroid Inhaler Type with Saliva Microbiome in Moderate-to-Severe Pediatric Asthma	Based on the research, it can be concluded that individuals with asthma present with a higher prevalence and severity of periodontitis. The potential link between the two conditions may be explained by multiple biological mechanisms. Asthma is characterized by chronic airway inflammation mediated by a Th2-driven immune response and cytokines such as IL-4, IL-5, and IL-13, which may also affect periodontal tissues and increase their susceptibility to destruction. Moreover, the use of inhalation therapy, particularly corticosteroids, often leads to xerostomia, changes in salivary pH, and greater plaque accumulation, thereby facilitating the development of periodontitis.
15	ALQassab et al.	Alexandria Dental Journal, 2025.	Oral Health Status of A Group Asthmatic Children in Alexandria, Egypt (Cross-sectional Study)	Based on the research, it can be concluded that gingival and periodontal health status have reported no statistically significant difference between asthmatic and healthy children.

3. Conclusion

It can be concluded that there might be a positive relationship between asthma and periodontitis, which is caused by the microbial imbalance in the oral cavity, a reduction in the salivary flow rate, increasing IgE levels, and side effects of asthma medications. However, due to inconsistencies of research results, a long-term study in a wider population needs to be done to truly know the relationship between asthma and periodontitis.

Compliance with ethical standards

Disclosure of conflict of interest

There is no conflict of interest declared by authors in this study.

Statement of informed consent

Informed consent was obtained from all individual participants included in this study.

References

[1] Park SJ, Jung HJ, Park MW, Choi HG, Kim H, Wee JH. Association between Asthma and Periodontitis. Diagnostics. 2023 Dec 10;13(24):3637.

[2] Saleh MH, Decker AM, Kalani K, Hoang K, Mandil O, Gathalia P, Ray B, Lugogo N, Wang HL. Association between asthma and periodontitis: A case–control analysis of risk factors, related medications, and allergic responses. Journal of Periodontal Research. 2025 Jan;60(1):44-54.

[3] Lemmetyinen R, Karjalainen J, But A, Renkonen R, Pekkanen J, Haukka J, Toppila-Salmi S. Diseases with oral manifestations among adult asthmatics in Finland: a population-based matched cohort study. BMJ open. 2021 Dec 1;11(12):e053133.

[4] Brasil-Oliveira R, Cruz ÁA, Souza-Machado A, Pinheiro GP, Inácio DD, Sarmento VA, Lins-Kusterer L. Oral health-related quality of life in individuals with severe asthma. Jornal brasileiro de pneumologia. 2020 Nov 6;47(01):e20200117.

[5] Gani F, Caminati M, Bellavia F, Baroso A, Faccioni P, Pancera P, Batani V, Senna G. Oral health in asthmatic patients: a review: Asthma and its therapy may impact on oral health. Clinical and Molecular Allergy. 2020 Nov 7;18(1):22.

[6] Gomes-Filho IS, Cruz SS, Trindade SC, Passos-Soares JD, Carvalho-Filho PC, Figueiredo AC, Lyrio AO, Hintz AM, Pereira MG, Scannapieco F. Periodontitis and respiratory diseases: A systematic review with meta-analysis. Oral diseases. 2020 Mar;26(2):439-46.

[7] Ibraheem WI, Bhati AK, Ageeli FM, Sufyani RA, Darraj MA, Ageeli EO, Mobarki KM, Alhazmi MY, Beshir SE. Association between asthma and periodontitis. Bioinformation. 2024 Jan 31;20(1):59.

[8] Kouanda B, Sattar Z, Geraghty P. Periodontal diseases: major exacerbators of pulmonary diseases. Pulmonary Medicine. 2021;2021(1):4712406.

[9] Lopes, M. P., Cruz, Á. A., Xavier, M. T., Stöcker, A., Carvalho-Filho, P., Miranda, P. M., ... & Trindade, S. C. (2020). Prevotella intermedia and periodontitis are associated with severe asthma. Journal of Periodontology, 91(1), 46-54.

[10] Molina A, Huck O, Herrera D, Montero E. The association between respiratory diseases and periodontitis: A systematic review and meta-analysis. Journal of Clinical Periodontology. 2023 Jun;50(6):842-87.

[11] Beukers NG, Loos BG, van der Heijden GJ, Stamatelou E, Angelakis A, Su N. The Prevalence of Comorbidities in Individuals with Periodontitis in a Private Periodontal Referral Practice. Journal of Clinical Medicine. 2024 Dec 5;13(23):7410.

[12] Tattar R, da Costa BD, Neves VC. The interrelationship between periodontal disease and systemic health: The interrelationship between periodontal disease and systemic health. British Dental Journal. 2025 Jul 25;239(2):103-8.

[13] Herrera D, Sanz M, Shapira L, Brotons C, Chapple I, Frese T, Graziani F, Hobbs FR, Huck O, Hummers E, Jepsen S. Periodontal diseases and cardiovascular diseases, diabetes, and respiratory diseases: Summary of the consensus report by the European Federation of Periodontology and WONCA Europe. European Journal of General Practice. 2024 Dec 31;30(1):2320120.

[14] Alizadeh Bahmani AH, Abdel-Aziz MI, Hashimoto S, Bang C, Brandstetter S, Corcuera-Elosegui P, Franke A, Gorenjak M, Harner S, Kheiroddin P, López-Fernández L. Association of Corticosteroid Inhaler Type with Saliva Microbiome in Moderate-to-Severe Pediatric Asthma. Biomedicines. 2025 Jan 2;13(1):89.

[15] ALQassab Z, Dowidar KM, Soliman RS. ORAL HEALTH STATUS OF A GROUP OF ASTHMATIC CHILDREN IN ALEXANDRIA, EGYPT (CROSS-SECTIONAL STUDY). Alexandria Dental Journal. 2025 Apr 11.