



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 5(A), pp. 26512-26514, May, 2018

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Review Article

IMPACT OF ASTHMA ON ORAL HEALTH: A REVIEW

Supriya Sharma¹, Priyanka Gaur², Shalini Gupta¹ and Surya Kant^{3*}

¹Department of Oral Pathology and Microbiology, King George's Medical University, UP, Lucknow

²Department of Physiology, King George's Medical University, UP, Lucknow

³Department of Pulmonary Medicine, King George's Medical University, UP, Lucknow

DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0905.2073>

ARTICLE INFO

Article History:

Received 17th February, 2018

Received in revised form 12th
March, 2018

Accepted 7th April, 2018

Published online 28th May, 2018

Key Words:

Asthma, beta-2 agonist, dental caries, dental erosion, inhaled corticosteroids, oral candidiasis.

ABSTRACT

Asthma is a chronic inflammatory condition that stimulates the airway constriction and produces excess mucus, making breathing difficult. It is distinguished by the obstruction of airflow which is inconsistent over a short period of time. This is a reversible condition, either spontaneously or can be controlled with the help of various drugs. Asthma medication includes bronchodilators, anti-inflammatory, corticosteroids and anticholinergic drugs. Most of these drugs are inhaled using different forms of nebulizers or inhalers. The impact of these drugs on oral health is the topic of debate among dental practitioners or Dentist. Patients taking medicine for asthma may be at risk of dental caries, dental erosion, periodontal diseases and oral candidiasis. Hence, patients undergoing treatment of asthma should receive special prophylactic attention. This review evaluates the consortium between asthma and oral health and indicates diverse measures to counter possible oral health status affiliated with asthma.

Copyright © Supriya Sharma et al, 2018, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Asthma is a developing public health issue affecting over 300 million people worldwide. It is considered that a supplementary 100 million may be diagnosed with asthma by 2025 (Thomas MS, 2010). Asthma is heterogeneous disease characterized by chronic airway inflammation. It is a lung disease that excites and narrows the airway resulting diverse respiratory symptoms such as chest tightness, wheeze, shortness of breath, and cough that range over time and in severity, simultaneously with variable expiratory airflow restriction. (Agnihotri S, Kant S, 2015)

Asthma treatment has two main parameters: to control, as well as to decrease the airway inflammation, and reestablish the airways. Drugs that attain the first objective are known as anti-inflammatory agents and those that attain the second are known as bronchodilators. The medicines of Asthma falls into two categories: (1) quick-relief medication (2) long-term control medication. Quick-relief medication consists of short-acting bronchodilators, anticholinergic drugs, systemic corticosteroids. Long-term control medication comprises anti-inflammatory agents, leukotriene modifiers and long-acting bronchodilators (Spielmann N, 2011)

Medication of asthma is inhaled using various forms of inhalers or nebulizers. Patients should be deliberately trained in the use of various inhalers for these to be productive. Patients should also be trained to use inhalers usually as prescribed. Inhalers which carry this therapeutic may be used up to four times a day over a long duration. As the predominance of asthma is on the rise, the dilemma caused by asthma medication could result in a remarkable worldwide dental health problem. Therefore, it is compulsory to scrutinize the impact of asthma and their medication on the oral health of an individual (Gupta P, 2013)

Role of Saliva in Preservation of Oral Cavity

Saliva is a versatile seromucous complex mixture of biofluids that surrounds the oral tissues, and it produces from major and minor salivary glands and non-glandular sources like gingival crevicular fluids, host cells, and oral microorganisms. Saliva plays an active role in the protection of teeth, owing to its cleaning actions as well as acid neutralization, anti solubility, and antimicrobial properties. During decrease flow of saliva, which can be found in correlation to irradiation in the head and neck area, medication or surgery, or in advanced age groups with poor health, an increased prevalence of caries and various diseases are often found (Gupta P, 2013; Ryberg M, 1987)

*Corresponding author: **Surya Kant**

Department of Pulmonary Medicine, King George's Medical University, UP, Lucknow

Dental Caries in Asthma

The flow rates of whole and parotid saliva reduces by 26% and 36%, respectively, in asthmatics when compared to the non-asthmatic control group and permanent teeth have more tooth decay in asthmatic children (McDerra EJ, 1998) Although the asthmatic children have a high onset of caries and this enhances with the extremity of bronchial asthma (Reddy DK, 2013). Asthma, through its disease level and its medications, includes some risk factors such as hyposalivation and decrease salivary pH for development of caries (Ersin NK, 2006). They also reviewed that time period of medication and illness has a significant effect on the risk of developing caries in asthmatics (Shashikiran ND, 2007). Shashikiran and co-workers; Observed that asthmatic patients, chiefly those using salbutamol inhalers, have more caries rate than the control group (Kargul B, 1998). It was also reported that a significant reduction in the pH of saliva and plaque, below the critical value of 5.5 in asthmatic children, 30 minutes after medication with beta-2 agonist inhalers (Kenny DJ, 1989). The high prevalence rate of caries in asthmatics can also be attributed to the presence of fermentable carbohydrate in medications of asthma. Some dry powder inhalers consist of sugar (lactose monohydrate) so that the patient can consume the taste of the drug when it is delivered. Frequent oral inhalation of these sugar-containing drugs, combined with hyposalivation may promote to an increased risk of caries. The prevalence rate of caries is higher in long-term use of sugar-containing liquid oral medications (Johansson I, 1987; O'Sullivan EA, 1998).

Dental Erosion in Asthma

Saliva is believed to be one of the principal neutralizing factors in the pathogenesis of dental erosion. The demolition of dietary acid is related to the flow rate and buffering capacity of saliva in the oral cavity. As discussed earlier, studies have shown a reduced salivary flow rate in asthmatic patients treated with beta-2 adrenoceptor agonists when compared to non-asthmatic groups (Tootla R, 2001; Harding SM, 2004).

The chief asthmatic drugs in current use, principally the powdered drugs, have a pH less than the critical level of 5.5 compulsory for hydroxyapatite dissolution (Hyypya T, 1984). This was also observed that the none of the inhalers revealed a clinically significant acidogenic response, a drop in salivary pH and plaque pH was examined with a lactose-based dry powder inhaler. When using frequently in a day, these drugs may subsidize to the dissolution of teeth and revealed that GOR symptoms are more predominant in asthmatic patients (approximately 75%) when compared to the nonasthmatic control group. The esophagus and the lungs communicate through a variety of mechanisms. Oesophageal acid-induced bronchoconstriction can be stimulated by a vagally mediated reflex and microaspiration. Hypothetical mechanisms whereby asthma may repercussion to the improvement of gastro-oesophageal reflux (GOR) comprise autonomic dysregulation, an elevation in the pressure gradient differential between abdomen thorax, a high predominance of a hiatal hernia, and alters in crural diaphragm function (Hanania NA, 1995; Han ER, 2009)

Since documentation is strong that Gastro-Oesophageal reflux plays an active role in asthmatic patients, conjectural diagnosis

by the Dentist should lead to appropriate referral for advanced investigation.

Periodontal Disease in Asthma

A commendatory association between asthma and periodontal disease may involve either pathological activation of the inflammatory and immune system, the adverse reaction of the asthma medications, or the interaction between the two. Intercommunication between the Pathogenic bacteria and immunologic factors play an active role in periodontal diseases. Since most drugs of asthma modify secretion of saliva in a significant percentage of patients, the periodontal health of these patients may be influenced in a negative manner. It was also reported that gingival inflammation or gingivitis in asthmatic children could be introduced by an altered immune response and the dehydration of alveolar mucosa due to the habit of mouth breathing. The level of IgE in gingival tissue is found to be increased in patients with asthma, which can also result in the destruction of periodontal tissue (Kurt E, 2009)

The asthmatic children have more calculus than normal control group children. The high occurrence of calculus in asthmatic children is supposed to be due to an increase in the levels of calcium and phosphorous in parotid and submaxillary saliva. This can also subsidize an increase periodontal problems in asthmatics patients. The frequent use of conventional doses of ICS by asthmatics patients can suppress the function of adrenal and reduce bone density in a dose-related fashion. Systemic bone loss produced by these drugs, mostly when high doses are used for a duration, may have an impact on the appearance and progression of periodontal disease. The tooth loss in asthmatics undergoing long-term medications with topically potent ICS shown to be associated with a decrease in bone mineral density, commonly in the mandible (Fukushima C, 2005).

Prevalence of Oral Candidiasis In Asthma

Oral candidiasis is an opportunistic fungal infection of the mouth and especially associated with the use of nebulized corticosteroids. The occurrence of oral candidiasis can vary from 1 to 77% with ICS treatment, possibly because of the variation in methods used to detect it. This local side effect is mostly seen among patients who consume high doses of ICS regularly. Reported that ICS can reduce salivary IgA. This host factor can relate to the development of oral candidiasis⁽¹⁹⁾ Knight and Fletcher *et al* Observed that patients who are explored with corticosteroids pose a higher level of salivary glucose than the nonasthmatics control group. Also, many of the dry powder inhalers enclose lactose monohydrate as the transport vehicle in a fraction of 10–25 mg per dose. This higher concentration of glucose promotes in attachment, proliferation and development of the Oral candidiasis. As it has been mentioned before asthmatics who are dealing with beta-2 agonist manifest reduced salivary flow rate. This hyposalivation can be related with higher colony counts of oral Candida. The Treatment used to enhance the salivary flow rate include sialogogue medications, as well as sugar-free chewing gums. Other technique used to the development of Candida include the practice of antimicrobial mouthrinses. Controlled management of topical antifungal, such as nystatin, is also effective to inhibit the growth and bacterial colony count of oral candidiasis in the oral cavity (Knight L. 1971; Harding SM, 2004)

CONCLUSIONS

In conclusion, asthmatic patients are at the higher risk of advancing various dental diseases. Dental practitioners or dentist should be apprised of correlation between asthma and oral health. They should train and counsel their patients to follow preventive measures to intercept adverse effects on hard and soft tissues of the oral cavity.

References

1. Thomas MS, Parolia A, Kundabala M, Vikram M., (2010). Asthma and oral health: a review. *Aust Dent Journal*, 55(2): 128-133.
2. Agnihotri S, Kant S, Mishra SK, Tripathi PM.,(2015) Prevalence of Asthma Prevalence of Asthma and its Treatments:A Resource. Dynamics of Human Health,2(1):http://journalofhealth.co.nz/?page_id=772
3. Spielmann N, Wong DT.,(2011). Saliva: diagnostics and therapeutic perspectives.*Oral Dis*,17(4):345-354
4. Gupta P, Gupta N, Pawar AP, Birajdar SS, Natt AS, Singh HP., (2013).Role of sugar and sugar substitutes in dental caries:A review. *ISRN Dent* ,2013: 1-5
5. Ryberg M, Moller C, Ericson T.,(1987). Effect of beta 2-adrenoceptor agonists on saliva proteins and dental caries in asthmatic children. *JDentRes*, 66:1404-1406.
6. McDerra EJ, Pollard MA, Curzon ME.,(1998). The dental status of asthmatic British school children. *Pediatr Dent*,20(4):281-287.
7. Reddy DK, Hegde AM, Munshi AK.,(2003). Dental caries status of children with bronchial asthma. *J Clin Pediatr Dent*, 27:293-295.
8. Ersin NK, Gulen F, Eronat N, Cogulu D, Demir E, Tanaç R, Aydemir S.,(2006). Oral and dental manifestations of young asthmatics related to medication, severity and duration of condition. *Pediatr Int*, 48(6):549-554
9. Shashikiran ND, Reddy VV, Raju PK.,(2007).Effect of antiasthmatic medication on dental disease: dental caries and periodontal disease. *J Indian Soc Pedod Prev Dent*, 25:65-68.
10. Kargul B, Tanboga I, Ergeneli S, Karakoc F, Dagli E.,(1998). Inhaler medicament effects on saliva and plaque pH in asthmatic children. *J Clin Pediatr Dent*, 22:137-140
11. Kenny DJ, Somaya P.,(1989).Sugar load of oral liquid medications on chronically ill children. *J Can Dent Assoc*, 55:43-46.
12. Johansson I, Ericson T.,(1987). Saliva composition and caries development during protein deficiency and beta-receptor stimulation or inhibition. *J Oral Pathol*,16:145-149.
13. O'Sullivan EA, Curzon ME.,(1998).Drug treatments for asthma may cause erosive tooth damage. *BMJ*, 317:820.
14. Tootla R, Toumba KJ, Duggal MS.,(2004).An evaluation of the acidogenic potential of asthma inhalers. *Arch Oral Biol*, 49:275-283.
15. Harding SM.,(2001).Gastroesophageal reflux, asthma, and mechanisms of interaction. *Am J Med*,111(8):8-12.
16. Hyyppa T.,(1984).Gingival IgE and histamine concentrations in patients with asthma and in patients with periodontitis. *J Clin Periodontol*,11:132-137.
17. Hanania NA, Chapman KR, Sturtridge WC, Szalai JP, Kesten S.,(1995).Dose-related decrease in bone density among asthmatic patients treated with inhaled corticosteroids. *J Allergy Clin Immunol*,96:571-579
18. Han ER, Choi IS, Kim HK, Kang YW, Park JG, Lim JR, Seo JH, Choi JH.,(2009). Inhaled corticosteroid-related tooth problems in asthmatics. *J Asthma*,46(2):160-164.
19. Kurt E, Yildirim H, Kiraz N.,(2008).Oropharyngeal candidiasis with dry-powdered fluticasone propionate: 500 microg / day versus 200 microg / day. *Allergol Immunopathol*,36:17-20.
20. Fukushima C, Matsuse H, Saeki S, Kawano T, Machida I, Kondo Y, Kohno S.,(2005).Salivary IgA and oral candidiasis in asthmatic patients treated with inhaled corticosteroid. *J Asthma*, 42(7):601-604.
21. Knight L, Fletcher J.,(1971).Growth of *Candida albicans* in saliva: stimulation by glucose associated with antibiotics, corticosteroids, and diabetes mellitus.*J Infect Dis*,123(4):371-377.

How to cite this article:

Supriya Sharma et al.2018, Impact of Asthma on Oral Health: A Review. *Int J Recent Sci Res*. 9(5), pp. 26512-26514.
DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0905.2073>
