International Journal of Dental Research
www.dentaljournal.net
Online ISSN: 2664-9055, Print ISSN: 2664-9047
Received: 29-09-2021, Accepted: 15-10-2021, Published: 30-10-2021
Volume 3, Issue 2, 2021, Page No. 39-41

Comparision of oral manifestations and salivary characteristics of asthmatic patients with healthy adults

Kavya Shankar
Resident, Oral and Maxillofacial Radiology, UConn Health of Dental Medicine, Farmington, Connecticut, United States

Abstract
Background: Asthma is a chronic inflammatory condition that causes airways constriction with excess mucus production. The effects of asthma & its medication on oral health is a subject of concern. Hence, patients with bronchial asthma on medication should receive special prophylactic attention.
Objectives: To assess the incidence of caries, salivary flow rate, salivary pH & periodontal changes, xerostomia and taste alteration among the asthmatics who are on inhalers and to compare the oral and dental manifestation among asthmatic and non-asthmatics. Also, to study xerostomia, taste alteration and periodontal changes with duration of medication among asthmatics.
Materials & Methods: Study consisted of 100 asthmatic subjects and 100 age & gender matched controls. The subjective symptoms like xerostomia and taste alteration were recorded using questionnaire. Oral examination was carried out to record DMFT scores for caries and CPITN index for periodontal status. Salivary flow rate & pH were assessed by modified Schirmer's test & pH strip. Smear test followed by PAS staining were carried out to assess Candida.
Results: In asthmatics, the mean DMFT, CPITN score was 4.52±2.5, 2.34±0.97 while in healthy adults it was 2.2±1.81, 1.32±0.08, which were significantly higher. Salivary flow rate & pH in asthmatics was 23.89±3.99ml/3 mins and 6.48±0.43 which was lower than in controls (27.37±3.99ml/3min and 6.92±0.2). 54% asthmatics had xerostomia & 79% had taste alterations.
Conclusion: Asthmatics using ICS for longer duration had high dental caries, periodontal diseases, low salivary flow rate & pH than the controls. Measures such as promoting oral hygiene practices as well as regular periodic dental check-ups, dietary modification should be encouraged.

Keywords: asthma, oral health, dental caries, periodontal disease, xerostomia, candidiasis, salivary flow rate, salivary pH

Introduction

Oral health is essential to general health and well-being at every stage of life. A healthy mouth enables not only nutrition of the physical body, but also enhances social interaction and promotes self-esteem and influences how they grow, enjoy life, look, speak, chew, taste food and socialize, as well as their feelings of social well-being. Oral health also influences other chronic diseases [1].

Certain chronic diseases, as well as adverse effects of some drugs can condition appetite and cause poor diet that can easily affect oral health by depressing the immune system, resulting in oral diseases [2].

Asthma is described as a chronic inflammatory disorder involving many cell types, manifesting with episodes of chest tightness, coughing, labored breathing and wheezing and the symptoms can last for a few moments or for as long as days. The airway obstruction in asthma is initiated by inflammation and muscle spasm. It's generally believed that both genetic and environmental factors, as well as allergens, are important in the initiation and continuation of the airway inflammation [3, 4].

The medications of asthma depend on the symptoms and severity of the disease. It includes rapid-acting beta 2 agonists as needed for symptoms. If symptoms are more persistent and a short-acting beta 2 agonist alone does not provide relief, the next line of treatment should include inhaled corticosteroids [5]. Generally, the person with moderate asthma requires medication daily. Inhaled corticosteroids are used at a low dose of 400 to 800 µg/day. If the patient cannot tolerate inhaled corticosteroids, the conventional substitute for prophylactic therapy is either Cromolyn Sodium or Nedocromil Sodium. Leukotriene antagonists, Theophylline, Anticholinergics are also advised [6].

The use of nebulized corticosteroids can result in throat irritation, dysphonia and dryness of mouth, oropharyngeal candidiasis and, rarely, tongue enlargement. These side effects may be attributed to the topical effects of these medications on the oral mucosa, as only 10 percent to 20 percent of the dose from an inhaler reaches the lungs; the rest remains in the oropharynx [7].

The beta-2 receptors are present in parotid and other salivary glands. The prolonged use of beta-2 agonists is associated with decreased salivary production and secretion. In patients with asthma, the normal salivary action gets further altered by decreased availability of biologically active components like amylase, calcium ions, secretory IgA, peroxidase, and lysozyme. 10 There is significant increase in serum C-reactive protein (CRP), Serum Amyloid A protein (SAA) and fibrinogen due to local or systemic inflammation and there will be changes in cortisol and salivary a-amylase output because of the activation of the hypothalamus-pituitary-adrenal (HPA) axis as well as the Sympathethic-Adernal Medullary (SAM) axis [8].

The reduced salivary rate is accompanied by a gradual increase in lactobacilli and Streptococcus mutans in the oral cavity which may be one of the major contributing factors

for the increase in caries rate. The decreased output of antibacterial components favors both bacterial colonization and plaque growth [9].

The Asthmatic patients taking medication show higher risk of developing dental caries, dental erosion, periodontal diseases and oral candidiasis. Some of the factors which contribute to such effects are salivary flow rate and pH. Patients with bronchial asthma on medication should receive special prophylactic attention [10]. The purpose of this study is to compare the oral and dental manifestation of Asthmatic patients with healthy adults.

Materials and Methods

The Study group comprises of 100 Asthmatic patients, selected randomly from the department of general medicine KIMS hospital, Bangalore, India.100 non asthmatic age and gender matched apparently healthy adults were recruited from the out-patient dept. of oral medicine and radiology, The oxford dental college. Complete medical and dental history was recorded. On clinical examination, intra oral findings were recorded. Saliva smear was collected. The Patients who are asthmatics and on inhalational corticosteroids and/ or with inhalational beta 2 agonists between the age group 16-55 years were included in the study.

The patients who are on medication for psychiatric diseases, diabetic or any other diseases which may directly or indirectly affect the oral cavity were excluded in the study. Asthmatic patients using any inhaled drug other than corticosteroids and beta agonists, immuno-suppressed patients with diseases such as AIDS, Hepatitis etc., the other respiratory disorders such as chronic obstructive pulmonary disorder, pleura-effusion and lung abscess, pregnant patients and smokers were excluded from the study.

Prior to starting the research, ethical clearance from the ethical board of The Oxford Dental College was obtained and written informed consent from the patients was taken. Asthmatic patients of both genders and age group between 16- 55 years who were willing for the study were included. A detailed medical and dental history was recorded on a Performa. Patients were asked about the taste alteration and Xerostomia Inventory questionnaire were used to assess the symptoms associated with xerostomia.

Oral examination was carried out making patient sit in upright position, DMFT for dental caries, community periodontal index (CPITN) to check periodontal changes. Un-stimulated salivary flow rate was assessed by means of modified Schimer's test. The patients were asked to refrain from eating and drinking for at least 90 min before the procedure. The flow rate was recorded for every 1, 2 and 3 minutes. Salivary pH was measured using salivary pH strip by placing it in the floor of the oral cavity. For chair side candidal detection, mucosal scrapings were taken using sterile wooden spatula. These scrapings were made in to smears on a glass microscope slides. Prepared smears were fixed with PAS solution and observed under microscope.

Statistical analysis

The study data was analyzed using SPSS [Statistical Package for Social Sciences] software V.22, IBM, Corp.

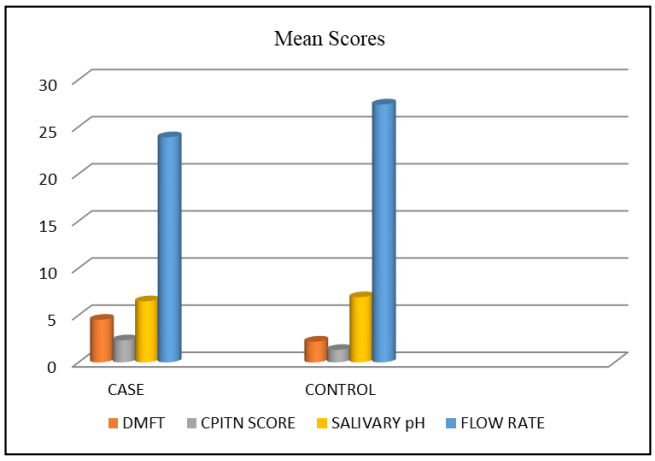
Results

The age ranged between 16-55 years. The mean age was 33 years. The maximum numbers of participants were in age range of 31-40 years (44%). The study included 62 % male and 38% female participants. the duration of medication among the asthmatic group. 11, 35 and 54 patients had history of medications between 0 to 5 years, 5 to 10 years, and 11-20 years, respectively.

Among asthmatic group the mean DMFT, CPITN score was 4.52±2.5, 2.34±0.97 respectively while the healthy adults had mean DMFT score 2.2±1.81 and CPITN score 1.32±0.08, which were stastically significant. (Table1 and Graph1) The salivary flow rate and salivary pH among asthmatic patients were 23.89±3.99ml/3 minutes and 6.48±0.43 which were slightly lower compared to the healthy adults where they had the salivary flow rate and salivary pH 27.37±3.99ml/3min and 6.92±0.2 respectively. Among asthmatic patients 54% complained of xerostomia and 79% of asthmatic patients complained of taste alteration which was stastically significant (Table2 and Graph2)

Table 1: Distribution of DMFT, CPITN score, salivary ph and flow rate among asthmatic group and control group

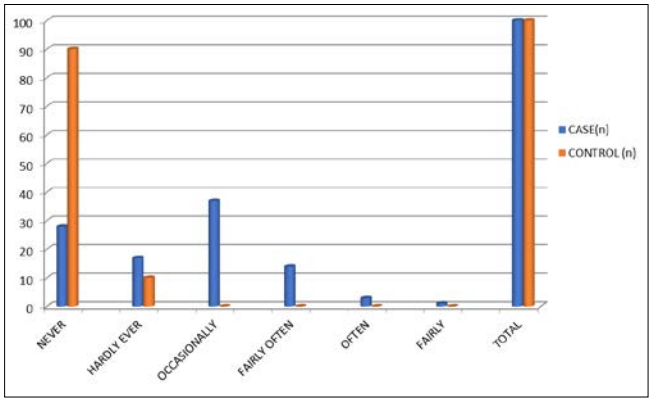
	Case		Control		p-value
Variables	Mean	SD	Mean	SD	<.0001*
DMFT	4.52	2.5	2.2	1.81	<.0001*
Cpitn Score	2.34	0.97	1.32	0.08	<.0001*
Salivary pH	6.48	0.43	6.92	0.2	<.0001*
Flow Rate	23.89	3.99	27.37	3.29	<.0001*



Graph 1: Distribution of DMFT, Cpitn score, salivary ph and flow rate among asthmatic group and control group

Table 2: Comparison of xerostomia among asthmatic group and control-group

Xerostomia	Never	Hardly Ever	Occasionally	Fairly Often	Often	Fairly	Total
CASE(n)	28	17	37	14	3	1	100
CONTROL (n)	90	10	0	0	0	0	100
TOTAL	118	27	37	14	3	1	200



Graph 2: Comparison of xerostomia among asthmatic group and control-group

Discussion

The published studies on oral health in adults with asthma are relatively few and present large variations in ages of the participants, asthma severity, duration, medication, and sample size. One explanation for this may be the difficulty involved in recruiting well-controlled, homogeneous groups with long-term disease.

The asthmatic patients in our study had higher CPITN score of 2.34±0.97 compared to healthy adults who had the CPITN score 1.32± 0.08and the difference was found to be statistically significant, suggesting gingival bleeding, inflammation of gingiva and prediction of advance periodontal diseases. This could be due to the association between asthma and periodontal disease which involve either pathological activation of the immune and inflammatory process, anti-asthmatic medications, or an interaction between them. Chung *et al* in his study stated that the platelet activating factor which is one of the mediators of allergic inflammatory reaction is also present in inflamed gingival tissues in asthmatic patients [11].

The higher frequency of caries has been observed in asthmatic subjects and the mean DMFT recorded among asthmatics was 4.52±2.5 (Table1). This could be due the reduced salivary flow and an increase in cariogenic micro-biota. The other possible reason could be antiasthma tic medications containing fermentable carbohydrate and sugar.

In our study the asthmatic subjects had salivary flow rate of 23±3.99 ml/ 3 minutes, while the control group had 27.37±3.29 ml/ 3 minutes which was stastically significant. Ryberg *et al* study suggests that the decrease in the salivary flow rate could be due to regular use of inhaled beta 2 agonists. The regulation of salivary synthesis and secretion is a rather complex system which involves adrenergic, cholinergic, and non-adrenergic nerves. The adrenergic nerves primarily regulate protein synthesis in salivary glands and stimulation of beta receptors of salivary gland cells leads to enhanced protein synthesis [12].

The lower salivary pH. in the asthma group agrees with Kargul *et al* study, who found a reduced pH. among asthmatic adolescents who used inhalers. He stated that there was a significant decrease in the salivary pH to below the critical value of 5.5 for enamel demineralization, after 30 minutes following their use [13].

We evaluated the xerostomia by questionnaire where we found 54 asthmatics complain of xerostomia. Since there was overall reduction of salivary output due to the adverse effects of beta 2 agonists, anticholinergic and ICS, the patients generally complain of difficulty in talking, swallowing, and altered taste [14]. Xerostomia produces taste changes secondary to incomplete food solubilization and by diminished transport of tasting molecules to the taste bud. In our study only 10% of asthmatics were Candida positive.

Conclusion

The results of the present study concluded that asthmatic adults using inhaled corticosteroids for longer duration had high dental caries, periodontal diseases low salivary flow rate and pH compared to non-asthmatic adults. So, the preventive measures such as promoting oral hygiene practices as well as regular periodic dental check-ups, dietary modification should be encouraged.

References

1. Locker D. Concepts of oral health, disease and the quality of life. In: Slade GD, editor. Measuring oral health and quality of life. Chapel Hill: University of North Carolina, Dental Ecology, 1997, 11-23.
2. Australian Institute of Health and Welfare (AIHW). Chronic diseases and associated risk factors in Australia, 2006. Cat. No. PHE 81. Canberra: AIHW, 2006.
3. Global Strategy for Asthma Management and Prevention. Global Initiative for Asthma (GINA), 2006.
4. Global surveillance, prevention and control of chronic respiratory diseases-a comprehensive approach.
5. Ersin NK, Gulen F, Eronat N, Cogulu D, Demir E, Tanac R, Aydemir S. Oral and dental manifestations of young asthmatics related to medication, severity and duration of condition. Pediatr Int,2006:48(6):549–554.
6. Steinbacher DM, Glick M. The dental patient with asthma. An update and oral health considerations (2001). J Am Dent Assoc,132(9):1229–1239.
7. Storms WW, Theen C. Clinical adverse effects on inhaled corticosteroids: results of a questionnaire survey of asthma specialists. Ann Allergy Asthma Immunol,1998:80:391-4.
8. Wolf JM, Nicholls E, Chen E. Chronic stress, salivary cortisol and alpha amylase in children with asthma and healthy children. Biological psychology, 78, 2008.
9. Godara N, Godara R, Khullar M. Impact of inhalation therapy on oral health. Lung India,2011:28:272–5.
10. Keles S, Yılmaz NA. Asthma and its impacts on oral health. Meandros Medical Journal,2016:17:35-8.
11. Chung KF. Platelet activating factor revisited. Thorax 52.1019-20.1998
12. Ryberg M, Möller C, Ericson T. Effect of beta 2-adrenoceptor agonists on saliva proteins and dental caries in asthmatic children. J Dent Res,1987:66:1404–6.
13. Kargul B, Tanbonga I, Ergeneli S, Karakoc F, Dagli. Inhaler medicament effects on saliva and plaque pH in asthmatic children. JClin Pediatr Dent,22:137-140.
14. Thomson WM. Measuring change in dry-mouth symptoms over time using xerostomia inventory. Gerodontology,2007:24:30-35.