

## Original Research

### Assessment of association between oral manifestations and inhaler use in asthmatic and chronic obstructive pulmonary disease patients

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#### ABSTRACT:

**Background:** Asthma is a major non-communicable disease characterized by recurrent attacks of breathlessness and wheezing. The present study was conducted to assess association between oral manifestations and inhaler use in asthmatic and chronic obstructive pulmonary disease patients. **Materials & Methods:** 60 patients of asthma and COPD using inhaler of both genders were divided into 3 age groups: Group I-less than 25 years, Group II-25-50 years, and Group III-above 50 years. Oral lesion on tongue, buccal mucosa, periodontium were recorded. Xerostomia and teeth affected were also recorded. **Results:** Out of 60 patients, males were 34 and females were 26. On tongue, candidiasis was seen in 12, 11 and 12, depapillation in 5, 4 and 2, ulcerations in 2, 2 and 3 and taste alterations in 1, 3 and 3 in group I, III and III respectively. Buccal mucosa showed ulcerations in 15, 14 and 13 and pigmentations in 5, 6 and 7. Teeth not affected in 13, 8 and 6 and affected in 7, 12 and 14. Periodontium had gingivitis in 11, 7 and 3, gingival enlargement in 5, 6 and 9 and periodontitis in 4, 7 and 8. Xerostomia was seen in 16 in group I, 8 in group II and 5 in group III. Oral manifestation in MDI, DPI, nebulizer and inhaler with spacer on tongue was candidiasis seen in 5, 4, 6, depapillation seen in 2, 2, ulcerations in 6, 10, 5 and 13 and taste alterations in 13, 4, 9 and 7 respectively. Buccal mucosa had ulcerations seen in 16, 15, 20 and 18, pigmentations in 4, 5, 0 and 2. Teeth were affected in 15, 16, 17 and 18. Periodontium showed gingivitis in 10, 12, 2 and 5, gingival enlargement in 6, 7, 10 and 8, periodontitis in 4, 1, 8 and 7 and xerostomia in 12, 13, 10 and 11 respectively. The difference was significant ( $P < 0.05$ ). **Conclusion:** It was found that asthmatics and COPD patients are at a higher risk of developing oral diseases during inhalation therapy.

**Key words:** Asthma, COPD, ulcerations

Received: 25 March, 2022

Accepted: 29 April, 2022

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**This article may be cited as:** Gupta V, Gupta A, Kudyar N. Assessment of association between oral manifestations and inhaler use in asthmatic and chronic obstructive pulmonary disease patients. J Adv Med Dent Scie Res 2022;10(5):127-131.

#### INTRODUCTION

Asthma is a major non-communicable disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. Asthma is a global health problem affecting around 300 million individuals of all ages, ethnic groups, and countries. It is estimated that around 250,000 people die prematurely each year as a result of asthma.<sup>1</sup> The concepts of asthma severity and control are important in evaluating patients and their responses to treatment as well as for public health, registries.

In addition to side effects on general health, asthma has been reported to cause poor oral health, however, contradictory aspects exist. While some researchers have reported that asthma has no effect on oral

health, many studies revealed the impacts of asthma on oral health. In mild and moderate types of asthma, decrease in saliva flow, increase in caries and gingivitis, mucosal changes associated with chronic mouth breathing, posterior cross bite, increased overjet, long face, and jaw abnormalities like V-shaped palate can also be observed besides general symptoms.<sup>2,3</sup>

Inhaled anticholinergics can cause side systemic effects that include cardiac events such as tachycardia and gastrointestinal involvement such as constipation, as well as urinary retention and urinary tract infections.<sup>4</sup> Concerning tiotropium (the only anticholinergic drug approved in severe asthma) it has been reported in asthmatic adults and in children that there were low or absent systemic side effects in

all age groups.<sup>5</sup> The present study was conducted to assess association between oral manifestations and inhaler use in asthmatic and chronic obstructive pulmonary disease patients.

### MATERIALS & METHODS

The present study comprised of 60 patients of asthma and COPD using inhaler of both genders. All were informed regarding the study and their written consent was obtained.

Data such as age, gender, type, frequency and duration of inhaler usage, also type and dosage of medication were noted. The patients were divided into 3 age groups: Group I-less than 25 years, Group II-25-50 years, and Group III-above 50 years. Mouth mirrors, explorers and tweezers were used for examination. The oral manifestations observed on the

tongue, buccal mucosa, teeth, periodontium, palate, floor of the mouth, lips, and xerostomia in inhaler users were considered. On the tongue, the oral manifestations considered were candidiasis, ulcerations, depapillation, taste alterations, and other tongue lesions (petechiae, median rhomboid glossitis, and pigmentation). In the buccal mucosa, pigmentation and ulcerations were seen. Periodontal diseases considered were gingivitis or gingival enlargement, gingival pigmentation and periodontitis. Presence of xerostomia and teeth affected with dental caries, abrasion, erosion, and recession were also observed. Other oral lesions included were the lesions seen on the palate, lips, and the floor of the mouth. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant ( $P < 0.05$ ).

### RESULTS

**Table I Distribution of patients**

Total- 60		
Gender	Males	Females
Number	34	26

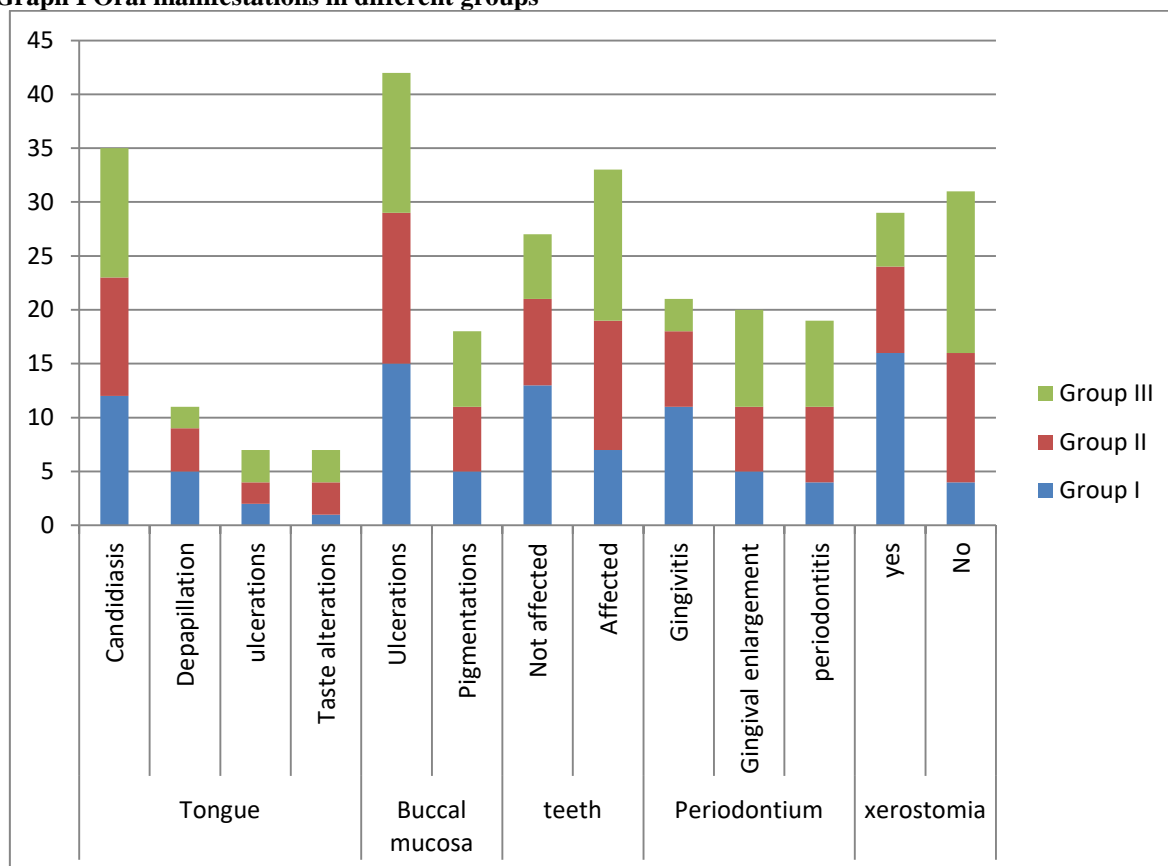
Table I shows that out of 60 patients, males were 34 and females were 26.

**Table II Oral manifestations in different groups**

Parameters	Variables	Group I	Group II	Group III	P value
Tongue	Candidiasis	12	11	12	0.12
	Depapillation	5	4	2	
	ulcerations	2	2	3	
	Taste alterations	1	3	3	
Buccal mucosa	Ulcerations	15	14	13	0.05
	Pigmentations	5	6	7	
teeth	Not affected	13	8	6	0.02
	Affected	7	12	14	
Periodontium	Gingivitis	11	7	3	0.01
	Gingival enlargement	5	6	9	
	periodontitis	4	7	8	
xerostomia	yes	16	8	5	0.02
	No	4	12	15	

Table II, graph I shows that on tongue, candidiasis was seen in 12, 11 and 12, depapillation in 5, 4 and 2, ulcerations in 2, 2 and 3 and taste alterations in 1, 3 and 3 in group I, II and III respectively. Buccal mucosa showed ulcerations in 15, 14 and 13 and pigmentations in 5, 6 and 7. Teeth not affected in 13, 8 and 6 and affected in 7, 12 and 14. Periodontium had gingivitis in 11, 7 and 3, gingival enlargement in 5, 6 and 9 and periodontitis in 4, 7 and 8. Xerostomia was seen in 16 in group I, 8 in group II and 5 in group III. The difference was significant ( $P < 0.05$ ).

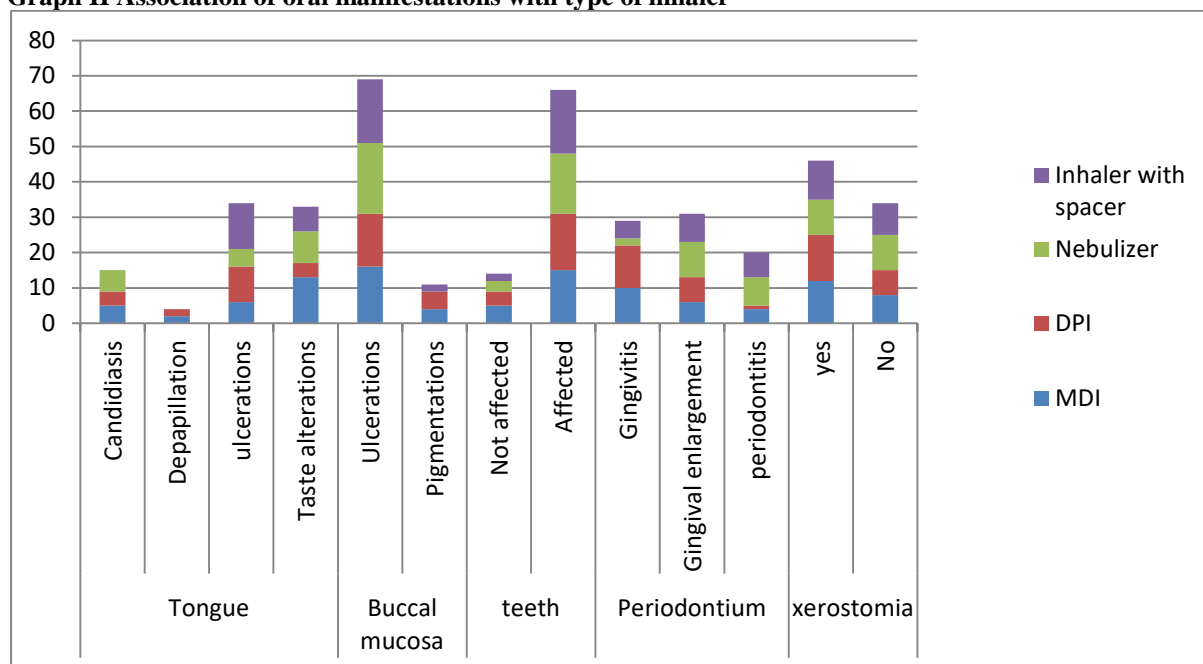
**Graph I Oral manifestations in different groups**



**Table III Association of oral manifestations with type of inhaler**

Parameters	Variables	MDI	DPI	Nebulizer	Inhaler with spacer	P value
Tongue	Candidiasis	5	4	6	0	0.05
	Depapillation	2	2	0	0	
	ulcerations	6	10	5	13	
	Taste alterations	13	4	9	7	
Buccal mucosa	Ulcerations	16	15	20	18	0.04
	Pigmentations	4	5	0	2	
teeth	Not affected	5	4	3	2	0.01
	Affected	15	16	17	18	
Periodontium	Gingivitis	10	12	2	5	0.01
	Gingival enlargement	6	7	10	8	
	periodontitis	4	1	8	7	
xerostomia	yes	12	13	10	11	0.02
	No	8	7	10	9	

Table III, graph II shows that oral manifestation in MDI, DPI, nebulizer and inhaler with spacer on tongue was candidiasis seen in 5, 4, 6, depapillation seen in 2, 2, ulcerations in 6, 10, 5 and 13 and taste alterations in 13, 4, 9 and 7 respectively. Buccal mucosa had ulcerations seen in 16, 15, 20 and 18, pigmentations in 4, 5, 0 and 2. Teeth were affected in 15, 16, 17 and 18. Periodontium showed gingivitis in 10, 12, 2 and 5, gingival enlargement in 6, 7, 10 and 8, periodontitis in 4, 1, 8 and 7 and xerostomia in 12, 13, 10 and 11 respectively. The difference was significant (P< 0.05).

**Graph II Association of oral manifestations with type of inhaler**

## DISCUSSION

Asthma is a chronic inflammatory disease characterized by increased airway responsiveness to various environmental triggers and by symptoms such as wheezing, coughing, chest tightness and dyspnoea.<sup>6</sup> The diagnosis is based on clinical evaluation and functional demonstration of reversible airway obstruction, either spontaneously or after medical treatment. Different mechanisms of inflammation are involved in the pathogenesis, leading to heterogeneous phenotypes of the disease.<sup>7</sup> This includes T Helper 2 (TH2) pathway in which eosinophils play the main role and the non TH2 pathway with neutrophilic, mixed or paucicellular infiltrates. Asthma is a growing health problem affecting over 300 million people worldwide.<sup>8,9</sup> The present study was conducted to assess association between oral manifestations and inhaler use in asthmatic and chronic obstructive pulmonary disease patients.

We found that out of 60 patients, males were 34 and females were 26. On tongue, candidiasis was seen in 12, 11 and 12, depapillation in 5, 4 and 2, ulcerations in 2, 2 and 3 and taste alterations in 1, 3 and 3 in group I, III and III respectively. Buccal mucosa showed ulcerations in 15, 14 and 13 and pigmentations in 5, 6 and 7. Teeth not affected in 13, 8 and 6 and affected in 7, 12 and 14. Periodontium had gingivitis in 11, 7 and 3, gingival enlargement in 5, 6 and 9 and periodontitis in 4, 7 and 8. Xerostomia was seen in 16 in group I, 8 in group II and 5 in group III. Ayinampudi et al<sup>10</sup> examined the association between oral manifestations and type, frequency and duration of inhaler usage, also type and dosage of medication used in asthmatic and chronic obstructive pulmonary disease (COPD) patients. A cross-sectional study was conducted on 250 patients of

both sexes suffering from asthma and COPD who were using inhalers. Ulceration (36.6%) and candidiasis (27.1%) on the tongue were most commonly found among those who were 25-50 years old and the elderly group, respectively. The differences were not statistically significant ( $P = 0.081$ ). A significant association was observed ( $P < 0.05$ ) for a higher percentage of females (59.7%) with gingivitis/gingival enlargement and periodontitis in males (25.6%). The teeth were affected in all types of users but it was not statistically significant ( $P > 0.05$ ). Gingivitis/gingival enlargement (53.6% and 51.5%) was almost similar but periodontitis was higher in those using  $>500 \mu\text{g}$ . Significant association ( $P < 0.05$ ) was observed with duration.

We observed that oral manifestation in MDI, DPI, nebulizer and inhaler with spacer on tongue was candidiasis seen in 5, 4, 6, depapillation seen in 2, 2, ulcerations in 6, 10, 5 and 13 and taste alterations in 13, 4, 9 and 7 respectively. Buccal mucosa had ulcerations seen in 16, 15, 20 and 18, pigmentations in 4, 5, 0 and 2. Teeth were affected in 15, 16, 17 and 18. Periodontium showed gingivitis in 10, 12, 2 and 5, gingival enlargement in 6, 7, 10 and 8, periodontitis in 4, 1, 8 and 7 and xerostomia in 12, 13, 10 and 11 respectively. Ryberg et al<sup>11</sup> have reported that the risk for caries lesion progression increased through the decreased salivary flow rate and increased salivary levels of streptococcus mutants and lactobacillus in patients who use  $\beta$ -2 agonists. Decreased salivary flow rate causes saliva buffering capacity to decrease and the benefit of saliva in elimination of the fermented food from the oral environment cannot be gained. Kargul et al<sup>12</sup> have stated that oral pH decreases below 5.5 which is the critical pH for enamel demineralization during the

first 30 minutes of time following the use of  $\beta$ -2 agonist.

### CONCLUSION

Authors found that asthmatics and COPD patients are at a higher risk of developing oral diseases during inhalation therapy.

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