PREVALENCE OF ORAL MANIFESTATION OF RESPIRATORY DISEASES IN PATIENTS ADMITTED TEACHING MEDICAL HOSPITAL IN SULAIMANI CITY

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ABSTRACT

Background

Many Respiratory disorders, such as chronic obstructive pulmonary disease, asthma, and pneumonia, all have clinical and therapeutic involvement of the oral cavity, emphasising the need for routine dental examination and close inspection of the oral cavity, as well as active cooperation between dentists and pulmonologists.

Objectives

To find the prevalence of oral manifestations of hospitalised patients with respiratory diseases.

Patients and Methods

This cross-sectional study was conducted from October 2019 to March 2020 in an internal medical teaching hospital in Sualimani-Iraq, which included one hundred patients admitted and diagnosed with respiratory diseases. Patients were interviewed regarding oral manifestations of respiratory diseases, and they were subjected to complete oral mucosal examination. In addition, required data were collected through a specially designed questionnaire.

Results

Females were predominant (55%) with a mean age (64.00 ± 14.08) years old. The age groups (51-60) and (61-70) among COPD and Asthmatic patients were more affected by respiratory diseases, with significant sex differences being more in females. ($P < 0.001$). The most frequent oral manifestation was oral candidiasis (35%), mainly on the palate, mostly in asthmatic and COPD patients. Oral ulceration (12%) primarily on lower labial mucosa and tongue was statistically significant ($P <0.001$) than other sites. Other reported manifestations were gingival enlargement (49%), coated tongue (10 %), geographic tongue (4%), fissured tongue (6%), hairy tongue (3%). The predominant subjective symptom was the feeling of dry mouth (89%); most of the patients (49%) had adequate oral hygiene.

Conclusion

females and asthma were more reported in hospitalised respiratory diseased patients. Oral candidiasis predominantly on the palate and dry mouth (xerostomia) was the predominant patients' symptom.

Keywords: *Asthma, Chronic Obstructive Pulmonary Disease (COPD), Pneumonia, Pulmonary fibrosis, Candidiasis, Oral Ulceration, Dry mouth, Oral hygiene, Oral lesions.*

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INTRODUCTION

Oral diseases such as dental caries, periodontal disease, tooth loss, oral mucosal lesions, oropharyngeal cancers, and oriental trauma are major public health problems worldwide. Poor oral health profoundly affects general health and quality of life [1]. Many systemic diseases and conditions manifest themselves initially in the mouth. Thus early diagnosis by a dental professional can lead to an early referral to the appropriate health professional [2]. There is an anatomical connection between the oral cavity and the lungs. As a result, the oral cavity serves as a potential reservoir for respiratory pathogens; these pathogens should defeat the immunological and mechanical defence mechanism to reach the lower respiratory tract [3].

The immune system can prevent these pathogens from entering the respiratory tract. Therefore, healthy individuals are not affected despite the high bacterial load found in the oral cavity and upper respiratory tract [3]. Most often, the examination of the oral cavity in cases of pulmonary diseases is neglected; the oral cavity will help in the clinical diagnosis of the diseases [4].

Respiratory diseases include a myriad of pulmonary conditions, ranging from acute to chronic, which may be bacterial, fungal or virus-based. Frequent respiratory diseases include asthma, COPD, and pneumonia [5].

The American thoracic society defines COPD as a disease characterised by airflow obstruction due to chronic bronchitis or emphysema. The airflow obstruction is generally progressive and may be accompanied by airway hyperactivity which may be partially reversible [6]. It is a slowly progressing disease with a long asymptomatic phase, during which lung function continues to decline [7]. Smoking attributes to about 87% to 91% for COPD development [8].

The typical oral manifestations in general COPD patients are oral thrush, the most common mucosal disease, dental plaque, gingival bleeding, gingival pocket formation, tooth mobility which may proceed to tooth loss [9-11].

In some cases, the patients have been exposed to an increased risk of tobacco-related oral cancers [12].

Asthma is a disease characterised by chronic airway inflammation and increased airway responsiveness, leading to symptoms such as wheezing, coughing, chest tightness, and dyspnoea. Although it is characterised by airflow obstruction that varies over a short period and is reversible, either spontaneously or with treatment [13], dental caries, erosions, periodontal disease, and oral candidiasis have been the most common associated oral health conditions [14].

Most asthmatic patients will have mouth breathing habits, resulting in dryness of the gingiva and developing gingivitis [15].

On the other hand, pneumonia is a pulmonary parenchyma infection caused by many infectious agents, including bacteria, viruses, fungi, and parasites. It can be a life-threatening infection, especially in the elderly and immune-compromised patients, and is a significant cause of morbidity and mortality in patients of all ages [16]. Patients with pneumonia generally have poor oral hygiene than those without any respiratory disease [17]. Patients with definite aspirational pneumonia are 3.3% more likely to have periodontitis [18].

Furthermore, pulmonary fibrosis (PF) is the end stage of several diffuse parenchymal lung diseases, characterised by excessive matrix deposition and the destruction of the lung architecture, leading to respiratory insufficiency. Although the most common form of pulmonary fibrosis is idiopathic pulmonary fibrosis (IPF) [19], the aetiology of IPF remains poorly understood. However, several risk factors and predisposing factors have been proposed, including cigarette smoking, viral infections, and surfactant protein polymorphisms [20, 21].

This study aimed to determine the oral manifestations of hospitalised patients with respiratory diseases.

PATIENTS AND METHODS

This cross-sectional study was conducted in an internal medical teaching hospital in Sulaimani - Iraq, from October 2019 to March 2020. The study included one hundred patients admitted and diagnosed with respiratory diseases.

The Research Ethics Committee approved this research of the Kurdistan Board of Medical Specialties; all patients were randomly selected and informed consent to participate in the research in written format.

Data were collected in a specifically designed case sheet that included age, gender, patient medical history, medication and clinical history of onset of the disease. The inclusion criteria included hospitalised adult patients with respiratory diseases. Exclusion criteria

were patients under 18 years old.

Dental and a thorough oral examination (lip, labial mucosa, buccal mucosa, gingiva, tongue, floor of mouth, hard and soft palate) were performed under artificial light using a mouth mirror, and tongue depressor and findings were recorded.

The degree of gingival enlargement was also scored following the Carranzas' (2006) classification, which included: [22]

• Grade 0: No signs of gingival enlargement.

• Grade I: Enlargement confined to the interdental papilla.

• Grade II: Enlargement involves interdental papilla and marginal gingiva.

• Grade III: Enlargement covering three quarters or more of the crown.

The patient's oral hygiene status was assessed using the Simplified Oral Hygiene Index, designed by Greene and Vermillion (1964). Six tooth surfaces (minimum of 2) were examined, including four posterior teeth and two anterior teeth. The amount of debris and calculus was measured, and the OHI was computed using a unique formula. The values range from 0-6 and are accordingly defined as good (0-1.2), fair (1.3-3) and poor (3.1-6). [23]. Data were tabulated and analysed using statistical SPSS software 24th edition. The Chi-square test was used to test the nonparametric variables. The p-values of 0.05 or less were used as breakpoints for the significance of the statistical test.

RESULTS

The studied sample consisted of (% 55) females and (% 45) males. Forty patients were asthmatics, (30) were COPD, (19) had pneumonia, and (11) suffered from pulmonary fibrosis (PF). Although a higher prevalence of asthma 25 (62.5%), pneumonia 11 (57.9%), and pulmonary fibrosis 10 (90.9%) were observed in females while COPD 21 (70.0%)was more reported in males, there was a significant sex difference in disease type distribution regarding gender (P <0.001) (Table 1).

The mean age of the total sample was (64.00 ± 14.08) years old with no sex differences among different respiratory diseases; the maximum number of participants was below the age group of (61-70) years, while the minimum was observed in (81-90) years of age group (Figure 1).

The prevalence of COPD and asthma was higher in the (61–70) year's age group, whereas pneumonia prevalence in the (51-60) years age group, while pulmonary fibrosis had a high prevalence in the older age group (71 – 80) years.

Table 2 presents a summary of the oral lesions that were observed during the period of the study. The most common oral manifestation was oral candidiasis 35 (35%) on the palate, which was mostly in asthmatic patients 18(45%) and COPD 10(33.3%) patients, followed by

Oral ulceration 12(12%), which was Recurrent Herpes Ulcer 6(6.0%) and Recurrent Aphthous Stomatitis (RAS) 6(6.0%) on lower labial mucosa and tongue, which was in pneumonia 6(31.6%) patients and in the asthmatic patient 4(10.0%), which was statistically significant (P <0.001), other oral manifestations were gingival hyperplasia which found in

49(49%) of participants mostly (Grade 1), the highest number of participants for (grade 1) was recorded in asthmatic patients 19(47.5%), while the highest numbers for (grade 2) were recorded in pneumonia patients 2(10.5%). 51(51%) of the study participants were recorded with (grade 0), the majority of the patients had a subjective oral complaint, dry mouth was the predominant symptom 89(89%) with no significant gender difference, and the highest number was recorded in asthmatic patients 39(97.5), (P <0.001), which was statistically significant,

Concerning oral hygiene, 49(49%) had adequate oral hygiene. The highest number was recorded in asthmatic patients, 20(50.0 %), whereas it was poor in 4(4%), good in 9(9%), and 38(38%) was edentulous. (P=0.19).

Furthermore, other oral manifestations were coated tongue 10(10%), fissured tongue 6(6%), geographic tongue 4(4%), and hairy tongue 3(3%), which was statistically non-significant (P=0.38) .

Table 1. Age and gender distribution according to the diagnosis of the respiratory disease.

% 100		Asthma no. (%)	COPD no. (%)	PF no. (%)	Pneumonia no. (%)	Total no. (%)	P-value
Total		40	30	11	19	100	
Gender	Male	15(37.5)	21(70)	1(9.1)	8(42.1)	45(45)	<0.001*
	Female	25(62.5)	9(30)	10(90.9)	11(57.9)	55(55)	
Age	Mean ± SD	58.6 ± 14.31	65 ±12.47	64.82± 14.14	57 ±14.66	64 ± 14.08	0.11§
	Range	20-83	25.0-85	35- 80	23-80	20 -85	

*COPD = chronic obstructive pulmonary disease , Pulmonary fibrosis= PF, *= Achi-square (X2) test, §=ANOVA test

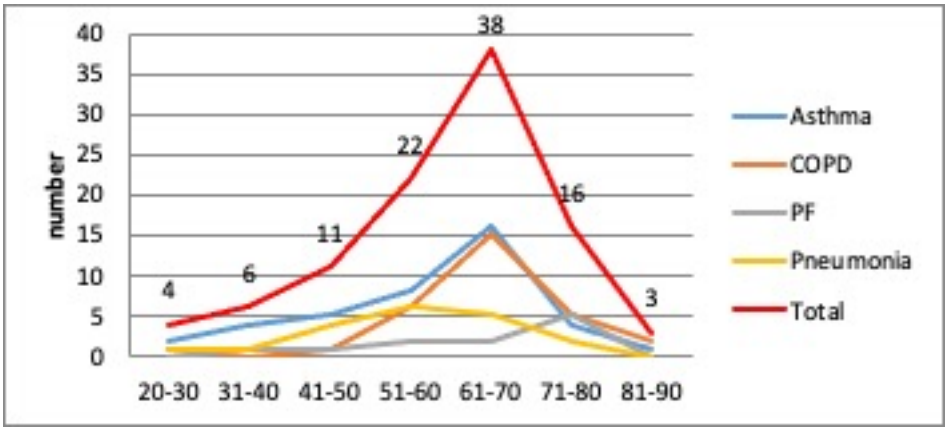

Figure 1. Age groups distribution according to the diagnosis of the respiratory disease.

Note: No significant differences among age groups distribution within different respiratory diseases, X2 test P =0.3

Table 2. Total Oral lesions finding in respiratory diseases patient.

%100		Asthma No. (%)	COPD No. (%)	PF No. (%)	Pneumonia No. (%)	Total No. (%)	P-value
Total		40	30	11	19	100	
Candidiasis (Erythematous)	Yes	18(45)	10(33.3)	3(27.3)	4(21.1)	35(35.0)	0.07
	No	22(55.0)	20(66.7)	8(72.7)	15(78.9)	65(65.0)	
Site	Palate	15(37.5)	9(30.0)	2(18.2)	4(21.1)	30(30.0)	
	Palate & tongue	3(7.5)	1(3.3)	1(9.1)	0(0.0)	5(5.0)	0.5
	Standard (not present)	22(55.0)	20(66.7)	8(72.7)	15(78.9)	65(65.0)	
Ulcer	Yes	4(10.0)	0(0.0)	2(18.2)	6(31.6)	12(12.0)	0.005
	No	36(90.0)	30(100.0)	9(81.8)	13(68.4)	88(88.0)	
Site	Lower labial mucosa	1(2.5)	0(0.0)	0(0.0)	6(31.6)	7(7.0)	
	Tip of tongue	3(7.5)	0(0.0)	1(9.1)	0(0.0)	4(4.0)	
	Buccal mucosa	0(0.0)	0(0.0)	1(9.1)	0(0.0)	1(9.1)	<0.001
	Standard (not present)	36(90.0)	30(100.0)	9(81.8)	13(68.4)	88(88.0)	
Dry Mouth	Yes	39(97.5)	21(70.0)	11(100.0)	18(94.7)	89(89.0)	<0.001
	No	1(2.5)	9(30.0)	0(0.0)	1(5.3)	11(11.0)	
Gingival Enlargement	Grade 0	20(50.0)	17(56.7)	7(63.6)	7(36.8)	51(51.0)	
	Grade 1	19(47.5)	13(43.3)	3(27.3)	10(52.6)	45(45.0)	0.31
	Grade 2	1(2.5)	0(0.0)	1(9.1)	2(10.5)	4(4.0)	
Oral Hygiene Index	Good	3(7.5)	1(3.3)	1(9.1)	4(21.1)	9(9.0)	
	Fair	20(50.0)	14(46.7)	4(36.4)	11(57.9)	49(49.0)	0.19
	Poor	2(5.0)	0(0.0)	1(9.1)	1(5.3)	4(4.0)	
Other findings	Edentulous	15(37.5)	15(50.0)	5(45.5)	3(15.8)	38(38.0)	
	White Coated Tongue	5(12.5)	2(6.7)	0(0.0)	3(15.8)	10(10.0)	
	Fissured Tongue	2(5.0)	1(3.3)	2(18.2)	1(5.3)	6(6.0)	
	Geographic Tongue	2(5.0)	1(3.3)	1(9.1)	0(0.0)	4(4.0)	
	Hairy Tongue	1(2.5)	1(3.3)	1(9.1)	0(0.0)	3(3.0)	0.38
	Linea alba	2(5.0)	0(0.0)	0(0.0)	0(0.0)	2(2.0)	
	Herpes Labialis	1(2.5)	0(0.0)	1(9.1)	1(5.3)	3(3.0)	
	Standard (not present)	27(67.5)	25(83.3)	6(54.5)	14(73.8)	72(72.0)	

***COPD = chronic obstructive pulmonary disease, Pulmonary fibrosis= PF**

DISCUSSION

The results of this study showed that the majority of patients were in the age group of (51-60) years and above, which was similar to the findings of Adeniyi BO et al. as they found that most of the patients with respiratory diseases who were admitted to hospitals were over 45 years [24].

With regard to the gender distribution of respiratory diseases, the results of this study showed that women were slightly more affected than men (55% vs 45%), unlike Adeniyi BO et al., where slightly more than half (54%) of the patients admitted to hospital were males [24].

Inhaled corticosteroids and bronchodilators were the most commonly used drug in patients with respiratory diseases especially asthmatic and COPD patients. Accordingly, oral manifestations were familiar with the use of inhalers [25, 26].

A common finding among inhaler users was oral candidiasis due to immunosuppressive and anti-inflammatory effects of steroids, which can predispose to low salivary flow rate and higher salivary glucose concentration that could promote growth and proliferation of candida species [27, 28].

Oral candidiasis was the most frequent manifestation (35%) of patients, which was seen on the palate, most of whom were asthmatic and COPD patients; this study was similar to the finding of Ayinampudi et al. as oral candidiasis accounted for (27.1%) which was in asthmatic and in COPD patients [29]. The present study was also similar to the finding of Gaphanchi et al. [30], as the most prevalent oral lesions reported in asthmatics were oral candidiasis.

Based on the current study results, patients with pneumonia and asthma had oral ulceration, which accounted (12%) of lower labial mucosa, tongue and, buccal mucosa, and oral ulceration might be due to immune suppression and xerostomia caused by inhaled drugs. The reported percentage (12 %) was lower than that of Ayinampudi et al. (29) as the count of ulceration (36.6 %) on the tongue and mucosa of the mouth, which can be attributed to the difference in sample size, as the current sample study size was (100) patients which is small than the size of Ayinampudi et al. which was (250) patients.

Other oral lesions clinically found in the study included fissured tongue, coated tongue (10%), geographic tongue (4%), and hairy tongue (3%). Their findings were nearly similar to the finding of Gaphanchi et al. [30] as they reported the oral lesions in asthmatics patients were fissured tongue (13%), hairy tongue (5%) due to the decrease in salivary protection owing to the reduced in salivary flow rate.

Dry mouth (xerostomia) has also been seen due to the use of inhaled immunosuppressants and caused burning sensations, taste alterations, or sores in the mouth [29]. In our study, dry mouth was the predominant symptom (89%) with no significant gender difference, and the highest number was recorded in asthmatic patients, which was similar to the finding of Ayinampudi et al. (89.6%) [29].

Regarding the gingival condition, gingival enlargement might occur due to a decrease in salivary protection due to the reduced in salivary flow rate and concentration of secretory immunoglobin A (IgA), which can lead to alteration in immune response with increasing concentration of immunoglobin E (IgE) in the gingival tissue [31, 32].

The study found that gingival enlargement accounted for (49%) of patients; however, Ayinampudi et al. [29]. found that gingival enlargement was higher (66.2%), especially in an asthmatic patient. This dissimilarity can be attributed to the difference in the sample size.

The results of the current study indicated that the patients with uncontrolled respiratory diseases had fewer remaining teeth, as (38%) of patients in our study were edentulous, they are old patients, and the respiratory condition is accumulative with age, especially asthmatic and COPD patients, similar to the finding of Nilanjana Dwibedi et al. as they reported that the patients with COPD and asthma had fewer remaining teeth and were edentulous (38.3%) than those with no asthma and COPD patients [33].

This finding was also similar to the finding of Zuomin Wang et al. that indicated the patients with COPD had fewer remaining teeth and a higher plaque index [11].

Hospitalised patients with respiratory diseases have consistently shown poor oral hygiene and poor periodontal status, primarily COPD, pneumonia, and aspiration pneumonia [34].

Concerning oral hygiene behaviours, the results of our study showed that almost half of the patients (49 out of 100) had adequate oral hygiene. In contrast, it was poor in (4%), good in (9%) of the studied sample;

this finding was similar to the finding of Bhavsar et al. as they reported patients with pulmonary disease had significantly lower brushing frequency, poor periodontal health (OHI and PI), increased gingival inflammation. [34], The finding was also similar to Rastogi et al. as they reported that individuals with pulmonary diseases had a higher value of periodontal disease index (31%) and poor oral hygiene [35].

In conclusions; The research showed that various oral manifestations could be seen in a hospitalised patient with respiratory diseases. Female patients were slightly more than males, and asthma is the more frequently reported disease. The most common oral finding was oral candidiasis on the palate. Dry mouth (xerostomia) was the predominant patients' symptom. Proper patient management requires that dentists know about the symptoms and manifestations of respiratory diseases concerning the adverse effect of the therapy. Routine oral exams for those patients may help in early diagnosis and proper management of these associated oral problems.

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