

# Evaluation of Oral Health Awareness of Individuals Diagnosed with COPD or Other Respiratory Diseases

## KOAH veya Diğer Kronik Akciğer Hastalığı Tanısı Almış Bireylerin Ağız Sağlığı Farkındalığının Değerlendirilmesi

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### ABSTRACT

**INTRODUCTION:** The interaction between periodontal diseases and respiratory disorders has been reported in numerous studies. This study aims to assess the knowledge of people with chronic respiratory disorders, such as Chronic Obstructive Pulmonary Disease, about the connection between respiratory diseases and periodontal diseases.

**MATERIAL and METHODS:** In this study, 42 volunteer patients who were above the age of eighteen and had been diagnosed with any respiratory ailment were given a face-to-face survey consisting of 29 questions by the Department of Chest Diseases at the Ege University Faculty of Medicine and were assessed using the relevant statistical data.

**RESULTS:** The responses to the survey indicated no significant differences in demographic data between patients with and without COPD ( $p>0.05$ ). However, it was observed that awareness of gum disease was similarly low in both groups. When comparing the knowledge of tobacco use between smokers with and without COPD, it was determined that those without COPD were significantly more likely to want to quit using tobacco due to health threats ( $0.05$ ).

**CONCLUSION:** The results of our investigation revealed that periodontal diseases and respiratory disorders may adversely affect each other in individuals with existing respiratory diseases. The importance of dental care and reducing or quitting smoking, which are typical characteristics in this dual connection is clear.

**Keywords:** Oral health, COPD, smoking.

### ÖZ

**GİRİŞ:** Periodontal hastalıklar ile solunum yolu hastalıkları arasındaki ilişki birçok araştırmanın konusu olmuştur. Bu çalışmanın amacı, Kronik Obstrüktif Akciğer Hastalığı veya diğer kronik solunum yolu hastalığına sahip bireylerin periodontal hastalıklar ile solunum yolu hastalıkları ilişkisi hakkındaki farkındalığının değerlendirilmesidir.

**YÖNTEM ve GEREÇLER:** Bu çalışmada, Ege Üniversitesi Tıp Fakültesi Göğüs Hastalıkları Anabilim Dalı'na başvuran 18 yaşından büyük ve herhangi bir solunum yolu hastalığı tanısı almış hastalar içerisinde gönüllü 42 hastaya, 29 soru içeren anket yüz yüze uygulandı ve veriler uygun istatistiksel veriler kullanılarak değerlendirildi.

**BULGULAR:** Ankete verilen yanıtlarda, demografik verilerin KOAH olan ve olmayan hastalar arasında karşılaştırıldığında gruplar arasında anlamlı fark bulunmamaktadır ( $p>0.05$ ). Ancak, her iki grupta benzer oranda diş eti hastalığı farkındalığının düşük olduğu görülmektedir. Sigara içen kişilerin tütün ürünü kullanımı ile ilgili bilgileri KOAH olan ve olmayan hastalar ile karşılaştırıldığında KOAH olmayanların sağlığını tehdit ettiği için tütün ürünü bırakmak istemelerinin anlamlı olarak KOAH olanlardan yüksek olduğu belirlenmiştir ( $p<0.05$ ).

**SONUÇ:** Çalışmamızın bulguları değerlendirildiğinde solunum yolu hastalığı olan bireylerde periodontal hastalıklar ile solunum yolu hastalıklarının birbirini olumsuz etkileyebileceği konusunun vurgulama ihtiyacı olduğu sonucuna varılmıştır. Ağız bakımının ve bu ikili ilişkideki ortak parametrelerden olan sigara kullanımının azaltılması veya bırakılmasının önemi nettir.

**Anahtar Kelimeler:** Ağız sağlığı, KOAH, sigara

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## INTRODUCTION

Periodontitis is a multifactorial, chronic inflammatory disease characterized by the progressive destruction of the supporting structures of the teeth, with genetic, environmental, and behavioral factors contributing to its development.<sup>1</sup> The clinical manifestations of inflammation in periodontitis cases include bleeding on probing, increased probing depth, clinical attachment loss, and alveolar bone loss as assessed radiographically.<sup>2</sup> Due to its high prevalence, periodontitis is considered a significant public health concern. According to data from the Global Burden of Disease (GBD) database, in 2019, the number of severe periodontitis cases worldwide was reported to be 1.1 billion.<sup>3</sup>

In recent years, significant progress has been made in understanding the pathogenesis and pathophysiology of periodontal diseases (PD), their interactions with the host, and their associations with systemic diseases.<sup>4</sup> The oral cavity harbors a diverse microbiota, consisting of more than 700 bacterial, viral, fungal, and protozoal species.<sup>5</sup> Various studies have demonstrated that the oral microbiome plays a role in the pathophysiology of systemic diseases such as diabetes,<sup>6</sup> cardiovascular diseases,<sup>7</sup> pneumonia, chronic obstructive pulmonary disease (COPD), lung cancer, and other respiratory diseases.<sup>8</sup>

Respiratory diseases are widely prevalent and can be categorized as chronic conditions (such as COPD, asthma, and obstructive sleep apnea [OSA]) and acute conditions (such as community-acquired pneumonia [CAP] and lung abscess).<sup>3</sup> Asthma is characterized by chronic airway inflammation and increased airway hyperresponsiveness, leading to symptoms such as wheezing, coughing, chest tightness, and shortness of breath.<sup>9</sup> Despite the complexity of asthma pathophysiology, evidence strongly supports the role of inflammation in its development and progression. Consequently, inflammation and infection may be considered potential risk factors for worsening prognosis.<sup>10</sup> Pneumonia is a common infection caused by bacteria, viruses, or fungi that affect the lungs.<sup>11</sup> The pathogenic microbial spectrum of Hospital-acquired Pneumonia (HAP) includes gram-positive cocci, such as *Staphylococcus aureus* and *Streptococcus pneumoniae*, and gram-negative bacteria, such as *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *enterococci*, and *Enterobacter spp.*<sup>12</sup> Community-acquired pneumonia (CAP) occurs outside of hospitals or other healthcare facilities. The most identified bacterial pathogens associated with CAP, including *Streptococcus pneumoniae* (*S. pneumoniae*), *Haemophilus influenzae*, and *Klebsiella pneumoniae* (*K. pneumoniae*), have been detected in dental plaques.<sup>12</sup>

Lung abscess is a localized pathological lesion in the lung parenchyma, characterized by necrosis, suppuration, and fibrotic tissue reaction, typically containing air-fluid levels. Lung abscesses can be classified as primary or secondary. Primary lung abscesses result from direct infection of the lung

parenchyma in otherwise healthy individuals, often due to the aspiration of oral or gastric contents. Secondary lung abscesses, however, arise in the presence of predisposing conditions such as bronchial obstruction (e.g., foreign body aspiration, cancer), hematogenous spread (e.g., right-sided endocarditis), thoracic surgery, or impaired host defenses.<sup>13,14</sup> The classic etiology of lung abscess formation involves aspiration of oropharyngeal secretions. Patients with recurrent aspiration are more likely to have dental, gingival, or periodontal infections or paranasal sinusitis. Anaerobic bacteria originating from gingival crevices or sinuses may reach the lower respiratory tract.<sup>15</sup> Risk factors include supine swallowing and impaired enteral feeding. The condition initially manifests as pneumonitis and progresses to tissue necrosis within 7 to 14 days. The clinical features of lung abscess are often nonspecific and may mimic pneumonia. Radiographic findings of one or more cavities containing fluid-air levels increase the suspicion of lung abscess.<sup>15</sup>

COPD is a progressive respiratory disease characterized by airflow limitation and recurrent exacerbations due to an inflammatory response triggered by exposure to harmful particles or gases. The most common symptoms of COPD include chronic cough with sputum production and dyspnea.<sup>16</sup> Several reports have explored the association between periodontitis and COPD.<sup>17</sup> A cross-sectional study conducted on Japanese men found that individuals with a Community Periodontal Index (CPI) score of 3 or higher had a significantly increased risk of developing COPD.<sup>17</sup> COPD and periodontal disease share similar pathogenic mechanisms and common risk factors such as smoking, aging, and socioeconomic factors.<sup>18</sup>

Considering all these respiratory diseases, respiratory infections are thought to be linked to the aspiration of oropharyngeal flora into the lower respiratory tract, where these bacteria can proliferate and cause infections. Particularly in individuals with advanced periodontal disease, microbial dental plaque has been proposed to serve as a reservoir for respiratory pathogens.<sup>19</sup> To explain the potential association between periodontitis and the aforementioned respiratory diseases, two hypotheses have been proposed: (1) microaspiration of oral pathogens into the lower respiratory tract; and (2) the systemic effects of proinflammatory mediators produced in periodontal tissues, which may influence the respiratory system and contribute to the onset and/or progression of other inflammatory conditions.<sup>20</sup> Several investigations on the interaction between periodontal disease and respiratory disorders have found a link between poor oral health and respiratory problems.<sup>21</sup>

The objective of this survey study is to evaluate the awareness of the relationship between periodontal diseases and respiratory diseases among individuals diagnosed with COPD and other chronic respiratory diseases who seek medical care at the Department of Pulmonary Diseases at Ege University Faculty of Medicine.

## MATERIALS and METHODS

The study group consisted of 49 voluntary patients aged 18 years and older who were smokers or non-smokers and had been diagnosed with COPD or other respiratory diseases (asthma, pneumonia, obstructive sleep apnea, lung abscess) and sought medical care at the Department of Pulmonary Diseases at Ege University Faculty of Medicine between January 22, 2024, and January 26, 2024. The survey questions covered aspects such as age, socioeconomic and sociocultural status, education level, and a potential relationship between periodontal health and COPD. Data were collected through face-to-face interviews using a questionnaire form. The study questionnaire comprised 29 questions, including nine demographic questions regarding the general characteristics of participants (gender, age, height, weight, education level, employment status, job satisfaction, breakfast and exercise habits, sleep patterns, alcohol consumption, presence of systemic diseases, and tobacco product use). The second section included 15 questions related to tobacco use and exposure (types of tobacco products used, duration of use, number of cigarettes consumed daily, frequency of hookah use, reasons for tobacco use, willingness and reasons to quit, previous quit attempts and whether medical or professional help was sought, major barriers to quitting,

and tobacco use among family members, close friends, and within the household). The final section consisted of five questions assessing awareness of the relationship between oral health and respiratory diseases.

### Statistical Methods

All data collected from patients were statistically analyzed using SPSS Inc. version 21 (IBM, Chicago, USA). The reliability of the survey questions, prepared using the Likert scale, was assessed using the Cronbach's alpha coefficient, which was calculated as 0.868, indicating high internal consistency. The Chi-square test was employed to compare groups based on ordinal and nominal scales. A significance threshold of 0.05 was established to determine statistically significant differences or relationships among the groups.

## RESULTS

The individuals included in our study were evaluated as patients diagnosed with COPD or other chronic lung diseases, and their demographic data are presented in Table 1. No statistically significant differences were found between groups when comparing demographic variables between patients with and without COPD ( $p > 0.05$ ).

**Table 1:** Comparison of demographic information among those with COPD and other lung diseases (%)

Sex	With COPD		Without COPD		P
	Female	Male	Female	Male	
		3 (18.8)	14 (42.4)	19 (57.6)	0.093
		13 (81.3)			
Age (n=49)	25-34	0 (0.0)	3 (9.1)		0.385
	35-39	0 (0.0)	1 (3.0)		
	40-44	0 (0.0)	1 (3.0)		
	45-49	1 (6.3)	4 (12.1)		
	50-54	2 (12.5)	1 (3.0)		
	55-59	0 (0.0)	5 (15.2)		
	60-64	3 (18.8)	3 (9.1)		
	65-69	3 (18.8)	6 (18.2)		
	70+	7 (43.7)	9 (27.3)		
	150-155	2 (12.5)	4 (12.1)		0.435
	156-160	0 (0.0)	6 (18.2)		
	161-165	2 (12.5)	5 (15.2)		
	166-170	2 (12.5)	6 (18.2)		
	171-180	7 (43.8)	8 (24.2)		
	181-190	3 (18.8)	4 (12.1)		
Weight (n=49)	50-54	1 (6.3)	1 (3.0)		0.962
	55-59	1 (6.3)	3 (9.1)		
	60-64	3 (18.8)	7 (21.2)		
	65-69	3 (9.1)	0 (0.0)		
	70-74	1 (6.3)	2 (6.1)		
	75-79	1 (6.3)	3 (9.1)		
	80-84	3 (18.8)	5 (15.2)		
	85-89	0 (0.0)	1 (3.0)		
	90-94	2 (12.5)	3 (9.1)		
	95-99	2 (12.5)	2 (6.1)		
	100-119	2 (12.5)	2 (6.1)		
	150+	0 (0.0)	1 (3.0)		
	Education (n=49)	Primary school	8 (50.0)	16 (48.5)	
Middle school		3 (18.8)	2 (6.1)		
High school		1 (6.3)	10 (30.2)		
University		4 (25.0)	5 (15.2)		
Worker (n=49)	Yes	3 (18.8)	8 (24.2)		0.483
	No	13 (81.3)	25 (75.8)		
Job satisfaction (n=13)	Yes	3 (100.0)	7 (70.0)		0.528
	No	0 (0.0)	3 (30.0)		

Chi-Square Test \*  $p < 0.05$

Most patients reported not having an alcohol habit, while most participants either used or had previously used tobacco products (Table 2). When these habits were compared between patients with and without COPD, no statistically significant differences were found between the groups ( $p>0.05$ ).

Regarding tobacco consumption, all patients reported smoking. While tobacco use was evenly distributed in the COPD group, the majority of non-COPD participants had smoked for 30 years or more. Additionally, more than half of the patients reported smoking at least one pack per day. Half of the COPD patients and 85% of non-COPD

respiratory patients expressed a desire to quit but indicated that they had not sought professional help. A comparison of smoking-related behaviors revealed that non-COPD patients were significantly more likely want to quit smoking due to health concerns compared to COPD patients ( $p<0.05$ ) (Table 3).

In both groups, gum disease awareness was below 30%, while awareness regarding the potential interaction between periodontal and respiratory diseases was found to be below 40%. No statistically significant differences were identified between the groups (Table 4).

**Table 2:** Comparative Analysis of Habits between Individuals with and without Chronic Obstructive Pulmonary Disease (COPD), n (%)

<b>Breakfast Habits (n=49)</b>	<b>With COPD</b>	<b>Without COPD</b>	<b>P</b>
Never	0 (0.0)	2 (6.1)	0.589
Rarely	1 (6.3)	4 (12.1)	
Sometimes	2 (12.5)	2 (6.1)	
Daily	13 (81.3)	25 (75.8)	
<b>Exercise Habits (n=49)</b>			
Never	10 (62.5)	22 (66.7)	0.608
2–3 times per week	3 (18.8)	8 (24.2)	
Daily	3 (18.8)	3 (9.1)	
<b>Sleep Pattern (n=49)</b>			
Good	10 (62.5)	17 (51.5)	0.549
Poor	6 (37.5)	16 (48.5)	
<b>Alcohol Consumption (n=49)</b>			
Never	11 (68.8)	30 (90.9)	0.141
Sometimes	3 (18.8)	2 (6.1)	
2–3 times per week	2 (12.5)	1 (3.0)	
<b>Tobacco Product Use (n=49)</b>			
Quit	11 (68.8)	11 (33.3)	0.065
Yes	2 (12.5)	8 (24.2)	
No	3 (18.8)	14 (42.4)	

Chi-Square Test \*  $p<0.05$

**Table 3:** Comparison of Tobacco Product Use Information between Individuals with and without COPD, n (%)

Which tobacco product do you use? (n=10)	With COPD	Without COPD	P
Cigarette	2 (100.0)	8 (100.0)	
<b>For how many years have you been using? (n=10)</b>			
20-30	1 (50.0)	1 (12.5)	0.378
30+	1 (50.0)	7 (87.5)	
<b>How many cigarettes do you smoke per day? (n=10)</b>			
1-3	0 (0.0)	2 (25.0)	0.644
10-12	0 (0.0)	1 (12.5)	
19-21	2 (100.0)	4 (50.0)	
22-30	0 (0.0)	1 (12.5)	
<b>What is your reason for using tobacco products? (n=10)</b>			
It is smoked by family members	0 (0.0)	3 (37.5)	0.120
My friends smoke	0 (0.0)	3 (37.5)	
It relaxes me	1 (50.0)	2 (25.0)	
It gives me pleasure	1 (50.0)	0 (0.0)	
<b>Are you considering quitting? (n=10)</b>			
Yes	2 (100.0)	7 (87.5)	0.800
No	0 (0.0)	1 (12.5)	
<b>What is the most important reason for wanting to quit? (n=8)</b>			
It is costly	1 (50.0)	0 (0.0)	<b>0.018*</b>
It threatens my health	0 (0.0)	6 (100.0)	
It is not socially acceptable	1 (50.0)	0 (0.0)	
<b>Have you attempted to quit? (n=10)</b>			
Yes	2 (100.0)	8 (100.0)	1.000
<b>Have you received help to quit? (n=10)</b>			
Yes	0 (20.0)	2 (25.0)	0.622
No	2 (20.0)	6 (75.0)	
<b>Have you used any medication to quit? (n=10)</b>			
Yes	0 (0.0)	1 (12.5)	0.800
No	2 (100.0)	7 (87.5)	
<b>What is your biggest obstacle to quitting? (n=9)</b>			
Family members' smoking	1 (50.0)	0 (0.0)	0.133
I do not want to quit	0 (0.0)	1 (14.3)	
I tried but couldn't quit	1 (50.0)	6 (85.7)	
<b>Is there tobacco product use in your family? (n=49)</b>			
Yes	10 (62.5)	24 (72.7)	0.520
No	6 (37.5)	9 (27.3)	
<b>Is there smoking in your home? (n=49)</b>			
Yes	6 (18.2)	4 (25.0)	0.709
No	27 (81.8)	12 (75.0)	
<b>Do your close friends use tobacco products? (n=49)</b>			
Yes	8 (50.0)	18 (54.5)	1.000
No	8 (50.0)	15 (45.5)	

Chi-Square \*Test:  $P < 0.05$  indicates a statistically significant difference between the groups

**Table 4.** Comparison of the Evaluation of Periodontal Disease between Individuals with and without COPD

<b>There is an association between lung diseases particularly COPD and periodontal disease? (n=49)</b>	<b>With COPD</b>	<b>Without COPD</b>	<b>P</b>
Strongly disagree	0 (0.0)	1 (3.0)	0.827
Disagree	5 (31.3)	6 (18.2)	
No opinion/Not sure	6 (37.5)	15 (45.5)	
Agree	3 (18.8)	7 (21.2)	
Strongly agree	2 (12.5)	4 (12.1)	
<b>Could my periodontal disease exacerbate my current disease symptoms? (n=49)</b>			0.365
Strongly disagree			
Disagree	6 (37.5)	5 (15.2)	
No opinion/Not sure	5 (31.3)	15 (45.5)	
Agree	3 (18.8)	7 (21.2)	
Strongly agree	2 (12.5)	6 (18.2)	
<b>Could my lung disease especially COPD exacerbate my periodontal disease? (n=49)</b>			0.159
Strongly disagree	1 (6.3)	0 (0.0)	
Disagree	5 (31.3)	3 (9.1)	
No opinion/Not sure	6 (37.5)	19 (57.6)	
Agree	2 (12.5)	7 (21.2)	
Strongly agree	2 (12.5)	4 (12.1)	
<b>Periodontal disease and lung diseases especially COPD are influenced by similar factors such as cigarette smoking. (n=49)</b>			0.225
Strongly disagree	0 (0.0)	0 (0.0)	
Disagree	3 (18.8)	1 (3.0)	
No opinion/Not sure	2 (12.5)	7 (21.2)	
Agree	6 (37.5)	17 (51.5)	
Strongly agree	5 (31.3)	8 (24.2)	
<b>Due to periodontal disease, the bacterial load in the oral cavity increases, and aspiration of these contents may raise the risk of lung infections. (n=49)</b>			0.353
Strongly disagree	0 (0.0)	0 (0.0)	
Disagree	3 (18.8)	2 (6.1)	
No opinion/Not sure	7 (43.8)	12 (36.4)	
Agree	3 (18.8)	6 (18.2)	
Strongly agree	3 (18.8)	13 (39.4)	

Chi-Square \* Test:  $P < 0.05$  indicates a statistically significant difference between the groups.

## DISCUSSION

It is well known that periodontal diseases are associated with various systemic diseases, and their negative effects on respiratory diseases have been examined in different studies. Promoting understanding of the connection between respiratory ailments and oral health is crucial. A review of the current literature reveals that studies examining awareness of the relationship between chronic respiratory diseases and periodontal diseases are limited. Based on this, we conducted a survey study including 49 voluntary patients diagnosed with COPD or other chronic respiratory diseases who sought medical care at the Department of Pulmonary Diseases at Ege University Faculty of Medicine, aiming to evaluate the awareness of the potential relationship between chronic respiratory diseases and periodontal diseases. Our findings indicate that periodontal disease

awareness was similarly low among the study groups, with 69% of COPD patients and 64% of patients diagnosed with other respiratory diseases reporting limited awareness. Additionally, awareness of the potential interaction between these two conditions was found to be below 40%.

Periodontitis is an inflammatory disease that develops due to an imbalance between oral flora bacteria and the host immune system.<sup>22</sup> Dysbiosis in the oral microbiota may lead to the transmission of bacteria and bacterial metabolites to the respiratory tract, increasing the risk of respiratory infections.<sup>1</sup>

COPD is a respiratory disease affecting a large portion of the population. Recent studies have provided findings supporting the relationship between respiratory diseases and periodontal diseases.<sup>18</sup> The teeth and

periodontal tissues are considered a reservoir for respiratory infections. Dental plaque is thought to be a crucial local source for anaerobic pathogens involved in the etiology of pneumonia and other respiratory infections.<sup>19</sup> In our study, 60% of COPD patients believed that the oral microbiota responsible for gum disease would not increase the risk of lung infections, while more than half of the patients with other respiratory diseases believed it would. However, no statistically significant difference was found between the two groups ( $p>0.05$ ).

A study conducted by Sharma and Shamsuddi<sup>23</sup> found that patients with respiratory diseases had significantly poorer oral hygiene, deeper periodontal pockets, more severe gingival inflammation, and greater clinical attachment loss compared to the control group. Similarly, another study by Liu et al.<sup>24</sup> reported that a lower number of existing teeth, high plaque scores, and shorter toothbrushing durations were significantly associated with COPD exacerbations. Their findings suggest that improving periodontal health and oral hygiene may serve as an effective preventive strategy against COPD exacerbations. In a study by Scannapieco et al.,<sup>19</sup> it was found that individuals with the highest oral hygiene scores had a 4.5 times higher risk of developing chronic respiratory diseases compared to those with an oral hygiene score of zero. Based on these findings, smoking and inadequate oral care were identified as statistically significant risk factors for chronic respiratory diseases.

Hobbins et al.<sup>18</sup> highlighted that periodontal disease and COPD share common risk factors, including smoking, age, and economic status. Similarly, in our survey study, all patients reported smoking. Additionally, in the COPD group, half of the patients had been smoking for 30 years or more, and most smoked at least one pack per day. It was found that more than 65% of participants in both groups were aware that smoking affects both periodontal diseases and respiratory conditions such as COPD. However, when comparing smoking-related data, it was determined that non-COPD patients were significantly more likely to want to quit smoking due to health concerns compared to COPD patients ( $p<0.05$ ). Moreover, a study conducted by Johnson and Slach<sup>25</sup> reported that smokers have a fourfold increased risk of developing periodontal diseases compared to non-smokers and that smoking reduces the effectiveness of periodontal treatments.

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In our study, similarly both groups exhibited low awareness levels regarding periodontal disease and its potential impact on respiratory diseases. This finding aligns with the results of a study conducted by Riley et al.,<sup>26</sup> which revealed that individuals with COPD had low awareness of oral health and had received little to no education on the importance of oral care. These findings emphasize the significance of oral care in preventing and managing COPD and the necessity of encouraging patients to maintain good oral hygiene.

Furthermore, Saraf et al.<sup>27</sup> conducted a survey study in which approximately 58% of participants acknowledged a potential relationship between periodontal disease and systemic health conditions. However, awareness of the link between periodontal disease and respiratory conditions such as pneumonia and COPD was found to be limited. Considering these results, increasing patient awareness could promote better oral hygiene practices and dental care habits in individuals with respiratory issues, ultimately reducing the risk of disease exacerbation and improving overall respiratory health.

When evaluating the limitations of our study, a primary concern is the potential influence of a healthcare professional's presence on participants' responses. This may have led to response bias and social desirability bias, as participants might have provided answers they perceived as expected rather than their genuine opinions. Such biases are inherent to survey-based research and may affect the reliability of self-reported data. Although it is not entirely possible to eliminate this limitation, employing anonymous online surveys could serve as a strategy to minimize its impact and enhance the accuracy of the collected data.

## CONCLUSION

Based on the findings of our study, it has been determined that there is a need to emphasize the potential bidirectional negative impact of periodontal diseases and respiratory diseases in individuals with respiratory conditions. Educating patients on the potential role of periodontal diseases as a risk factor for respiratory diseases is crucial for promoting holistic health. Furthermore, referral of individuals diagnosed with respiratory diseases to a dentist by pulmonologists could facilitate periodontal monitoring, ultimately contributing to improved long-term prognosis in these patients.

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