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Halitosis and Its Psychosocial Consequences on Dental Students' Quality of Life

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ABSTRACT

Halitosis is a significant oral health concern with considerable psychosocial consequences, particularly among dental students who are expected to uphold exemplary oral hygiene as future professionals. This study investigated the association between halitosis and quality of life among dental students at Universitas Prima Indonesia. A cross-sectional design was employed, involving 31 dental students selected through purposive sampling from August to September 2025. Halitosis was objectively assessed using the Tanita Breath Checker and categorized into three severity levels, whereas quality of life was evaluated using the validated Oral Health Impact Profile-14 (OHIP-14) questionnaire. The findings indicated that 51.6% of participants experienced moderate halitosis, while 58.1% reported moderate impairment in quality of life. Statistical analysis revealed a significant negative correlation between halitosis severity and quality of life ($p = 0.001$). Notably, all respondents reported inadequate tongue-cleaning and mouthwash use despite their dental training. These findings underscore a critical paradox in dental education: future oral health professionals exhibiting suboptimal oral hygiene practices that contribute to halitosis and, in turn, negatively affect their well-being. The study highlights the need to integrate targeted oral health promotion initiatives into dental curricula to address both the clinical and psychosocial dimensions of halitosis, thereby enhancing the professional competence and overall well-being of dental students.

Keyword : halitosis, quality of life, dental students

Introduction

Halitosis, commonly referred to as bad breath, is a prevalent oral health condition with implications that extend beyond physical well-being [1], [2]. Defined as an unpleasant odor originating from the oral cavity, it primarily arises from the activity of anaerobic bacteria acting on food debris and salivary proteins. This process leads to the production of volatile sulfur compounds (VSCs), the main contributors to malodor [3], [4]. Although its physiological mechanisms are well-documented, the psychosocial dimensions of halitosis merit greater attention, particularly in populations where

professional image and social interactions play a crucial role [5].

The global prevalence of halitosis affects 30-50% of adults worldwide, with varying severity levels [6], [7], [8]. However, its impact transcends mere statistics, significantly compromising oral health-related quality of life (OHRQoL) [9]. Studies utilizing the Oral Health Impact Profile-14 (OHIP-14) consistently demonstrate that halitosis induces substantial psychosocial distress, including social anxiety, embarrassment, and diminished self-esteem, ultimately impairing daily functioning and social interactions [10], [11].

Students in health professions face unique challenges that increase their risk of developing halitosis [11]. Academic demands, irregular daily routines, and poor oral hygiene often trigger this condition [12], [13]. Dental students represent a paradoxical group. They are trained to promote oral health, yet they may neglect their own personal hygiene practices [14]. Although female dental students generally show better oral hygiene and less halitosis than males, the overall prevalence remains an alarming concern among these future professionals [15].

The professional context of dental education amplifies the interplay between halitosis and quality of life. Dental students are expected to maintain optimal oral health while participating in clinical training that involves close patient interaction [16], [17]. Consequently, halitosis may influence not only their personal well-being but also professional confidence and clinical performance. The psychological burden associated with halitosis in this group can lead to avoidance of clinical engagement, hindered patient communication, and, ultimately, hindered professional development [18].

Despite existing evidence, research specifically examining the relationship between halitosis and quality of life among dental students remains scarce, particularly in Indonesia. Most available studies focus on the general population or include students from various health-related disciplines, which may obscure profession-specific patterns and limit understanding of this relationship [19], [20], [21]. Furthermore, recent national literature in Indonesia emphasizes that oral health awareness and preventive practices remain suboptimal among young adults across the country [22]. Therefore, this study aims to investigate the association between halitosis and quality of life among dental students at Universitas Prima Indonesia. The findings are expected to guide targeted interventions within dental education and student support programs, addressing both the clinical and psychosocial dimensions of halitosis among future oral health professionals.

Methods

This cross-sectional study employed a descriptive-analytical design to examine the relationship between halitosis and quality of life among dental students at Universitas Prima Indonesia. The research was conducted from August to September 2025 following ethical approval from the Health Research Ethics

Committee of Universitas Prima Indonesia (No. 012/KEPK/UNPRI/2025).

The study population comprised 107 undergraduate dental students from the 2022 and 2023 academic years. A purposive sampling technique was applied through a two-stage screening process. Initially, 45 students volunteered for an oral health screening. Following clinical examination with the Tanita Breath Checker, students exhibiting no detectable oral odor (score = 0) were excluded, as the study specifically investigated the impact of halitosis. The final sample included 31 respondents with confirmed halitosis (scores 1–4) who provided informed consent.

The independent variable, halitosis severity, was objectively measured using the Tanita Breath Checker, which quantifies volatile sulfur compounds on a 0–4 scale. For analytical purposes, scores were categorized into three clinical levels: Level 1 (almost odorless/slight odor: score 1), Level 2 (moderate odor: score 2), and Level 3 (strong/very strong odor: scores 3–4). This categorization reflects clinical relevance and increases statistical power for group comparisons.

The dependent variable, oral health-related quality of life, was assessed using the validated Indonesian version of the Oral Health Impact Profile-14 (OHIP-14). This instrument evaluates seven domains across 14 items: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. Responses were rated on a 5-point Likert scale (0 = never to 4 = very often), and total scores were categorized as good (0–18), moderate (19–37), or poor (38–56) quality of life.

Data were collected sequentially, beginning with breath examination followed by administration of the OHIP-14 questionnaire in a controlled environment to ensure procedural consistency. Statistical analyses were conducted using SPSS version 26.0. Univariate analysis was used to describe the frequency distribution of all variables, while bivariate analysis using the Chi-square test examined associations between halitosis levels and quality of life categories. Statistical significance was set at $p < 0.05$.

Results and Discussion

The demographic and behavioral characteristics of dental students reveal several scientifically significant patterns, particularly relevant within their professional educational

context (see Table 1). The predominance of female students (71%) aligns with global trends in dental education, where female enrollment has been steadily increasing, this pattern is also observed in medical education reforms worldwide [23]. However, the high prevalence of morning halitosis (58.1%) among future dental professionals is a concerning finding. It can be explained physiologically by reduced salivary flow during sleep, which diminishes the oral cavity's natural cleansing capacity and facilitates the proliferation of anaerobic bacteria that produce volatile sulfur compounds (VSCs) [24].

Table 1.
Profile of Dental Student Respondents, Oral Health Behavior, Halitosis, and Quality of Life (n=31)

Variable	n	%
Gender		
Male	9	29
Female	22	71
Most Noticeable Bad Breath Time		
Morning	18	58.1
Afternoon	5	16.1
Evening	8	25.8
Duration of Halitosis		
< 1 Year	19	61.2
1 Year	6	19.4
> 1 Year	6	19.4
Tongue Brushing Habit		
Never	31	100
Mouthwash Usage Habit		
Never	31	100
Smoking Habit		
Yes	7	22.6
No	24	77.4
Dental Visit Frequency		
Occasionally	21	67.7
Often	4	12.9
Never	6	19.4
Halitosis Level		
Almost Odorless	10	32.3
Moderate Odor	16	51.6
Strong Odor	5	16.1
Quality of Life Level (OHIP-14)		
Good	11	35.5
Moderate	18	58.1
Poor	2	6.4

Notably, the complete absence of tongue cleaning and mouthwash use (100% of respondents) among dental students constitutes a critical finding with profound implications for dental education. Despite their professional training, these students exhibit inadequate oral hygiene behaviors. The dorsal surface of the tongue, with its papillary structure that traps debris and bacterial metabolites,

serves as an ideal habitat for anaerobic bacteria. Scientific evidence attributes approximately 80-90% of intra-oral halitosis cases to the tongue [1], underscoring the significance of this behavioral pattern for future dental professionals, who should serve as exemplars in oral health practices.

Table 2.
Relationship between Smoking Habits and Halitosis Level among Dental Students

Halitosis Level	Smoker (n=7)	Non-Smoker (n=24)	p
Almost Odorless	1 (14.3%)	9 (37.5%)	0.450
Moderate Odor	5 (71.4%)	11 (45.8%)	
Strong Odor	1 (14.3%)	4 (16.7%)	

Although the relationship between smoking and halitosis among dental students was not statistically significant, it reveals a concerning trend, particularly given the students' status as future healthcare professionals (see Table 2). Smokers demonstrated a higher prevalence of moderate halitosis (71.4% versus 45.8% in non-smokers), a phenomenon explained by several mechanisms: tobacco smoke contains volatile compounds contributing directly to oral malodor; smoking impairs salivary gland function; and it alters the oral microbiome in favor of anaerobic bacteria [25].

Table 3.
Relationship between Xerostomia and Halitosis Level among Dental Students

Halitosis Level	Xerostomia		p
	Yes (n=19)	No (n=12)	
Almost Odorless	1 (14.3%)	9 (37.5%)	0.180
Moderate Odor	5 (71.4%)	11 (45.8%)	
Strong Odor	1 (14.3%)	4 (16.7%)	

Xerostomia emerged as a notable factor, with 61.3% of dental students reporting dry mouth symptoms. This high prevalence may be attributable to the demanding academic pressures inherent in dental education, encompassing clinical obligations, theoretical studies, and practical training. Xerostomia contributes to halitosis by reducing salivary flow and antimicrobial activity while increasing oral acidity, which fosters conditions conducive to VSC-producing bacteria [26]. Stress associated with dental training further

exacerbates this condition by affecting salivary secretion, thereby creating a vicious cycle where stress-induced xerostomia intensifies halitosis and psychological distress [27], [28].

Table 4.
Relationship between Dental Visit Frequency and Quality of Life among Dental Students

Quality of Life	Often (n=4)	Occasionally (n=21)	Never (n=6)	p
Good	3 (75.0%)	6 (28.6%)	1 (16.7%)	0.150
Moderate	1 (25.0%)	14 (66.7%)	4 (66.7%)	
Poor	0	1 (4.8%)	1 (16.7%)	

Table 4 shows the association between dental visit frequency and quality of life among dental students. Those who visited the dentist often (n = 4) reported the highest satisfaction, with 75.0% rating their quality of life as good and none as poor. In contrast, students who visited occasionally (n = 21) or never (n = 6) mostly reported a moderate quality of life (66.7%). The group that never visited had the highest proportion of poor ratings (16.7%) compared to 4.8% of occasional visitors. However, the p-value indicates no statistically significant association between dental visit frequency and perceived quality of life. These results align with evidence that regular dental visits generally improve oral health-related quality of life (OHRQoL), though small sample sizes may limit statistical significance. A systematic review found that routine dental attendance is linked to better oral health outcomes and enhanced OHRQoL, underscoring the importance of promoting regular dental care among dental students as future professionals [29].

Table 5.
Relationship between Halitosis Level and Quality of Life among Dental Students

Halitosis Level	Quality of Life			p
	Good (n=11)	Moderate (n=18)	Poor (n=2)	
Almost Odorless	7 (70.0%)	3 (30.0%)	0	0.001
Moderate Odor	4 (25.0%)	12 (75.0%)	0	
Strong Odor	0	3 (60.0%)	2 (40.0%)	

The statistically significant association between halitosis severity and quality of life (p=0.001) represents the central finding of this study (see Table 5). This association follows a clear

dose-response pattern, providing robust evidence for a causal link. The gradient observed, wherein worsening halitosis corresponds to declining quality of life, aligns with the psychosocial model of oral health impacts and bears added relevance considering these individuals' professional training as oral health practitioners [30].

The relationship between halitosis and quality of life can be explained by multiple psychological and social mechanisms relevant to dental students. Halitosis induces social anxiety due to fear of negative evaluation, leading to avoidance of close interpersonal interactions, which is particularly problematic in clinical settings requiring direct patient contact [31], [32], [33]. It negatively affects self-esteem and professional confidence, critical qualities for students who must exemplify oral health standards. Furthermore, halitosis may impair clinical performance and patient communication as self-consciousness about one's breath could hinder effective interaction and instruction [34], [35].

Contextualizing these findings within existing literature, the significant halitosis-quality of life association supports prior studies by Nunes et al.[36] and Briceag et al.[5], confirming the psychosocial impact of halitosis across populations. Yet, the poor oral hygiene behaviors, especially the complete absence of tongue cleaning, contrast markedly with expectations for future oral health professionals. This discrepancy suggests potential gaps in dental curricula concerning personal oral hygiene and its role [37], [38]. Furthermore, the finding that 54.8% of dental students perceived their halitosis through reactions from others underscores the social dimension of the condition, heightened in an educational environment characterized by continuous peer evaluation and clinical feedback [39].

These findings have important implications for dental education. First, even moderate halitosis significantly affects students' quality of life, indicating the need to integrate oral health monitoring and support into student wellness programs [40]. From a clinical and practical standpoint, mechanical tongue cleaning must be emphasized as a mandatory, daily routine for dental students. By actively incorporating tongue scraping or brushing into their regimen, students can effectively reduce VSC-producing bacteria. This practical implication is vital not only for treating halitosis but also for ensuring that future dentists embody the clinical standards they advocate. Second, the identified behavioral deficiencies,

notably in tongue hygiene, point to the necessity of reinforcing personal oral hygiene education in curricula [41]. Third, the psychosocial impact highlights the importance of addressing halitosis within comprehensive student health services, acknowledging its possible effects on academic and clinical performance [42].

Several limitations of this study warrant explicit acknowledgment. First, the relatively small sample size (n=31) may limit the generalizability of the findings to the broader student population. Second, the cross-sectional study design constrains the ability to infer causality between halitosis and quality of life. Third, the reliance on self-administered questionnaires (OHIP-14 and behavioral surveys) introduces the potential for self-report bias, such as social desirability, where participants might overestimate their positive habits or underreport psychological distress. Future research employing larger samples, longitudinal methodologies, and objective behavioral assessments is recommended to validate and extend these findings.

Conclusion

This study provides compelling evidence that halitosis significantly impacts the quality of life among dental students at Universitas Prima Indonesia. The findings demonstrate a clear dose-response relationship between halitosis severity and quality of life deterioration, confirming the initial hypothesis that oral health conditions extend beyond physical manifestations to substantially affect psychosocial well-being. The research reveals a concerning paradox within dental education: despite their professional training in oral health, dental students exhibit inadequate personal oral hygiene practices, particularly regarding tongue cleaning and mouthwash use, which contributes to halitosis prevalence. The psychological burden manifests primarily through diminished self-esteem and social discomfort, potentially affecting both academic performance and future clinical interactions. These findings underscore the necessity of integrating comprehensive oral health promotion programs within dental education curricula, emphasizing not only theoretical knowledge but also practical behavioral implementation. Future interventions should adopt a multifaceted approach addressing both the biochemical pathways of halitosis through proper oral hygiene techniques and the psychological aspects through counseling and

support services. Further research should explore longitudinal patterns and develop targeted educational modules that bridge the gap between professional knowledge and personal practice among healthcare students. The study ultimately highlights the critical importance of addressing halitosis as a holistic health concern that intersects both clinical dentistry and psychological well-being in academic environments training future oral healthcare providers.

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