

Halitosis: Aetiology, diagnosis and treatment: A review

Islam RR¹, Chowdhury AI², Hasan SM³, Alam KM⁴

Abstract

Halitosis refers to an unpleasant odour of the breath produced by volatile compounds arising from either pathological or physiological processes. The condition may originate within the oral cavity or from an extra-oral source and represents a frequent concern in the general population. Although its aetiology is multifactorial, approximately 90% of cases are associated with oral conditions, including inadequate oral hygiene, periodontal disease, tongue coating, food retention, poorly maintained dentures, defective restorations, oral malignancy and infections of the throat. Persistent malodour can adversely influence social interactions and psychological well-being. While many individuals seek professional care because of perceived bad breath, some patients report halitosis despite the absence of objectively detectable malodour. Several clinical and instrumental approaches are available for assessing halitosis. Successful management depends primarily on establishing the underlying cause and identifying the anatomical source through an appropriate clinical examination. Intraoral management may involve periodontal debridement, reinforcement of oral hygiene practices, mechanical tongue cleaning and the appropriate use of mouth rinses.

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Affiliation

Dr. Md. Refat Redul Islam

BDS

Pioneer Dental College & Hospital, Dhaka, Bangladesh.

Dr. Md. Ashiqul Islam Chowdhury

BDS

Pioneer Dental College & Hospital, Dhaka, Bangladesh.

Dr. Md. Sayem Hasan

BDS

Pioneer Dental College & Hospital, Dhaka, Bangladesh.

Professor Dr. Kazi Mehedi Ul Alam

Department of Dental Public Health

Pioneer Dental College & Hospital, Dhaka, Bangladesh.

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Address of Correspondence:

Md Refat Readul Islam

BDS

Pioneer Dental College & Hospital, Dhaka, Bangladesh

Email:refatreadulislam@gmail.com

Introduction

Human breath contains a complex mixture of substances, some of which may produce an unpleasant odour. The term halitosis is derived from the Latin word halitus, referring to exhaled air and is used clinically to describe an objectionable odour originating from the oral or respiratory breath. The condition has also been described using terms such as foetor oris, oral malodour, mouth odour, bad breath and unpleasant oral odour.¹

Halitosis can occur in individuals of either sex and across different age groups. Beyond its physical manifestation, persistent oral malodour may have considerable social and psychological consequences. Individuals who experience the condition may become self-conscious during interpersonal communication, which can subsequently influence their relationships and routine social activities.²

Prevalence

Halitosis is considered a frequent condition, with previous reports suggesting that it affects more than half of the general population. The oral cavity accounts for approximately 90% of identified sources. Extra-oral causes, including disorders involving the respiratory, gastrointestinal and urinary systems, have been reported in approximately 9% of cases. A smaller proportion, estimated at about 1%, may be associated with dietary factors or medication use.³

Most likely causes of halitosis:

An unpleasant odour immediately after waking is a common physiological finding and is not necessarily considered pathological halitosis. In contrast, persistent oral malodour is more commonly associated with disease affecting the oral cavity and, less frequently, the nasopharyngeal region. One of the principal mechanisms responsible for oral malodour is the retention of food particles and bacterial plaque on the teeth and

tongue. Inadequate oral hygiene promotes the accumulation of these deposits and may contribute to gingival and periodontal inflammation. Both gingivitis and periodontitis can be associated with unpleasant oral odour. Among the periodontal conditions, acute necrotizing ulcerative gingivitis is particularly notable for producing pronounced malodour. Adult periodontitis, in which plaque-associated periodontal attachment is progressively lost, may also produce varying degrees of oral malodour.²

Aggressive forms of periodontitis may produce a more pronounced odour because of the rapid destruction of periodontal supporting tissues and associated tooth mobility.

Impact on daily life

Because communication and close interpersonal contact are integral parts of everyday life, persistent halitosis may interfere substantially with social functioning. Some individuals are unaware that they have an unpleasant breath odour, particularly when repeated exposure has resulted in olfactory adaptation or when an underlying alteration in smell perception is present.^{4,6} Consequently, the problem may first be brought to their attention by a spouse, family member, friend, or another person with whom they have close contact. Awareness of oral malodour can cause considerable embarrassment and emotional distress. Some affected individuals may therefore reduce their participation in social activities or deliberately avoid close conversations and interpersonal encounters.

Self-care products

The social consequences of halitosis frequently lead individuals to use readily available products intended to reduce or conceal unpleasant breath. Such products, however, generally provide symptomatic rather than definitive treatment because they do not address the underlying cause of malodour. Commonly used options include chewing gum, mints, toothpastes, mouth rinses and oral sprays, many of which temporarily reduce perceived odour by introducing a more pleasant fragrance.

Chewing gum may provide additional benefit by stimulating salivary flow, thereby contributing to oral clearance and temporary reduction of malodour. Certain mouth rinses containing chlorine dioxide or zinc compounds may also reduce the release or perception of unpleasant volatile compounds.^{5,6} These measures can be particularly useful for temporarily controlling odour associated with dietary substances such as onion and garlic or with cigarette use.

Nevertheless, these products should primarily be regarded as short-term measures for improving breath freshness and patient comfort. They should not replace professional assessment and treatment when persistent or clinically significant halitosis is present.

Professional treatment

Effective management of halitosis begins with accurate identification of its underlying cause. A detailed clinical assessment is therefore essential for determining whether the odour originates from the oral cavity or from an extra-oral source. Although intraoral conditions account for most cases,

respiratory and other systemic disorders may occasionally contribute to the problem. Failure to establish the correct aetiology may result in inappropriate management and persistence of the condition.

When the oral cavity is identified as the source, reducing the bacterial burden is a central component of treatment. Periodontal therapy should be considered an important initial intervention.⁷ Conditions such as necrotizing ulcerative gingivitis, conventional gingivitis, adult periodontitis, aggressive periodontitis and deep periodontal pockets can provide favourable sites for bacterial accumulation and consequently contribute to malodour. Maintaining periodontal health is therefore important in controlling bacteria-associated halitosis.

Initial periodontal management commonly involves scaling and root planing. These procedures can reduce periodontal pocket depth, decrease gingival inflammation and remove bacterial deposits that contribute to unpleasant breath.⁴

Antiseptic mouth rinses may be used as an adjunct during periodontal treatment to further reduce the oral bacterial burden. Chlorhexidine is an effective antiseptic agent; however, prolonged use may result in adverse effects such as staining of the teeth and oral mucosal surfaces.⁵ Therefore, its use should be appropriately supervised.

Reinforcement of effective oral hygiene practices is another essential component of management. Patients should receive appropriate instruction regarding toothbrushing, dental flossing and the use of interdental brushes. Even in patients with satisfactory periodontal health, however, the tongue may remain an important reservoir of microorganisms associated with halitosis. The dorsal surface of the tongue provides a favourable environment for bacterial retention, particularly when a substantial tongue coating is present.

Tongue coating may be more pronounced in individuals with a fissured or geographic tongue. Mechanical removal of deposits from the dorsal tongue using a toothbrush, tongue scraper, or dedicated tongue cleaner can therefore be incorporated into the management plan. One reported study demonstrated reductions in volatile sulfur compound levels following mechanical tongue cleaning, with reductions of approximately 33% using a toothbrush, 40% using a tongue scraper and 42% using a tongue cleaner.⁶

Other oral conditions may also contribute to halitosis and should be identified during examination. These include xerostomia, pericoronitis, oral ulceration and malignant lesions. Xerostomia can occasionally be overlooked when the clinical examination is superficial. Reduced salivary flow removes an important protective mechanism because saliva contributes both antimicrobial activity and mechanical cleansing of the oral cavity. The cause of reduced salivary secretion should therefore be investigated rather than treated only symptomatically.

When xerostomia is associated with previous radiotherapy involving the head and neck or with salivary gland disorders, artificial saliva preparations may be considered to improve oral moisture and patient comfort. A careful medical history can also provide important clues regarding possible systemic contributors to halitosis. When the suspected source lies outside the oral cavity, the dentist should recognize the

possibility of respiratory, gastrointestinal, hepatic, renal, endocrine, or other systemic causes. In such circumstances, the dentist's role includes explaining the suspected source to the patient and arranging appropriate referral to the relevant medical specialist for further assessment.

Halitophobia and Non-Detectable Halitosis

A comprehensive assessment is particularly important because the perception of having bad breath does not always correspond to objectively detectable halitosis. Some individuals remain convinced that they have an unpleasant breath odour despite the absence of measurable evidence. This condition is commonly referred to as halitophobia and may occur in association with a monosymptomatic delusional disorder, sometimes described as delusional halitosis, or as part of olfactory reference syndrome.

Management of perceived halitosis without objective evidence may be more challenging than treatment of genuine oral malodour. Concern about breath odour can lead affected individuals to withdraw from social interaction and avoid conversations with others. Appropriate management is therefore important not only for the perceived symptom but also for its psychological and social consequences.

Before initiating treatment directed at halitosis, the absence or presence of objectively detectable malodour should be established using an appropriate assessment method. When an individual remains excessively preoccupied with the belief that they have bad breath despite negative objective findings, psychological assessment and professional counselling should be considered.

Conclusion

Halitosis is a common oral health concern with potentially important social and psychological consequences. Although disorders of the oral cavity represent the predominant source, extra-oral conditions may also produce or contribute to unpleasant breath and should not be overlooked. Persistent halitosis may occasionally be associated with clinically significant systemic disease, including serious conditions such as malignancy, making appropriate evaluation important. Assessment of halitosis may involve organoleptic examination and instrumental techniques such as a halimeter and gas chromatography. Each diagnostic approach has specific advantages and limitations and the selection of an appropriate method should take into account the characteristics of the patient, available equipment and the purpose of the assessment.

When an extra-oral cause is suspected, collaboration with relevant specialists, including an otorhinolaryngologist, periodontologist, or gastroenterologist, may be necessary to establish the underlying diagnosis. In patients with prominent psychological features, including depressive characteristics or persistent concern despite the absence of measurable malodour, psychiatric or psychological evaluation may also be appropriate.

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