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Evaluation of Common Interventions to Manage Halitosis Based On Organoleptic Scoring

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ABSTRACT

Objective: To determine the efficacy of interventions undertaken to manage common causes of halitosis based on organoleptic scoring.

Study Design: Quasi-experimental study.

Place and Duration of Study: Combined Military Hospital, Pano Aqil Pakistan, from Sep 2021 to Aug 2022.

Methodology: Three hundred patients with halitosis fulfilling the inclusion criteria were treated as per their root cause of halitosis and evaluated by organoleptic scoring method on a fortnightly basis for one month. Pre-treatment organoleptic scoring was compared with post-treatment organoleptic scores.

Results: Among 300 patients, 177(59%) were females and 123(41%) were males. Halitosis due to poor oro-dental hygiene was seen in 92(30.66%) cases, food-related halitosis in 90(30%), periodontal diseases in 47(15%) cases, while 33 patients (11%) have halitosis due to ENT diseases. A comparison of pre-treatment and post-treatment organoleptic scores revealed a marked decrease in the number of patients having persistent halitosis (*p*-value 0.001).

Conclusion: The most common etiological factor is poor oral hygiene. An organoleptic scoring system is a simple and quick method to recognize and grade halitosis without requiring costly gadgetry.

Keywords: Halitosis, Organoleptic, Pseudo-halitosis.

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INTRODUCTION

Halitosis or bad breath is an unattractive and unpleasant smell from the mouth experienced by the individual or another person in near vicinity.[1] The majority of people (80-90%) with genuine halitosis have aetiology lying in their oral cavity.[2] Rest have issues related to the paranasal sinuses, nose, nasopharynx, oropharynx, hypopharynx, oesophagus, lungs, liver and stomach.[3] Oral halitosis is mainly because of the layer of microorganisms, including bacteria, fungi and other organisms that are usually found on the posterior third of the tongue, teeth and gingival borders, and it is called biofilm.[4] In the oral cavity, there are 500-700 species of bacteria, mostly Gram-negative and proteolytic obligate anaerobes.[5,6] They cause protein breakdown into amino acids and thus produce volatile sulphur compounds like dimethyl-sulfide, methyl-mercaptan, and hydrogen sulfide, which are the main cause of halitosis.[7] In addition, pathological lesions and infections of the oral cavity, such as chronic tonsillitis, periodontal diseases, and tooth decay, people with orthodontic braces and prostheses in the mouth, i.e., partial/complete dentures, implants and bridges, are also sources of halitosis.[8] Oral malignancies may present with halitosis. Extra-oral aetiology includes H pylori infestation, chronic kidney disease and metabolic disorders that usually have associated halitosis along with other symptoms.[9]

In 1990, Rosenberg introduced a Gold standard test for analyzing halitosis, i.e., organoleptic assessment; it is globally accepted and followed nowadays.[10] The organoleptic score (OS) was charted from 0-5 depending upon the severity of halitosis, as shown in Table-I. The purpose of this study was to find out the aetiology of halitosis and to evaluate the common interventions for managing halitosis based on organoleptic scoring, thereby creating awareness amongst the patients about halitosis.

METHODOLOGY

After permission of the Hospital Ethical Review Committee, the quasi-experimental study was conducted at the ENT Department, CMH Pano Aqil Pakistan, from September 2021 to August 2022. The sample size was calculated using the Raosoft sample

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size calculator, taking reported prevalence of halitosis was 75.1%.[11]

Inclusion Criteria: Patients of either gender aged 18-50 years, who had persistent halitosis presented in the Outdoor Department were included in the study.

Exclusion Criteria: Patients with neoplasms and those who were immune-compromised were excluded from the study.

The designed questionnaire was distributed to gather information. The general physical, systemic, ENT and dental examination was performed to determine the underlying cause of halitosis. Pre-treatment organoleptic scoring was done on these participants. These patients were treated as per diagnosis, and all those with poor oral hygiene were advised to improve it per protocols. All the patients were reviewed fortnightly for one month, and post-treatment organoleptic scoring was again done on completion of 1 month to see and compare the results.

Statistical analysis was conducted on the Statistical Package for Social Sciences (SPSS), version 26. The chi-square test was used to calculate the association of organoleptic scoring. The *p*-value of ≤0.05 was considered statistically significant.

RESULTS

Among 300 patients, mean age was 29.01±1.77 years. There were 177(59%) females and 123(41%) males. In 92(30.66%) participants, inadequate oral hygiene was the cause of halitosis. It was followed by food-related halitosis in 90 individuals (30%). Halitosis due to ENT-related diseases was seen in 33(11%), while 47 patients (15.66%) have halitosis due to periodontal diseases, as enumerated in Table-II. The pre-treatment organoleptic score of ≥2 was noted in 50% of the participants. A comparison of pre-treatment and post-treatment organoleptic scores revealed a marked decrease in the number of patients having halitosis. This was significant (*p*-value 0.001), as shown in Table-III.

Table-I: Organoleptic Score (OS)

Category	Description
Absence of Odour	Odour cannot be detected
Questionable Odour	Detectable Odour, though the examiner could not recognize it as malodour
Light Malodour	Odour is considered to pass the threshold of malodour recognition
Moderate Malodour	Definite Malodour
Strong Malodour	Malodour detected, tolerable by examine
Severe Malodour	Very intense malodour detected and is intolerable by examiner (examiner spontaneously averts the nose)

Table-II: Aetiology of Halitosis among the Participants (n=300)

Aetiology	n(%)
Inadequate Tooth Brushing/Oral hygiene	92(30.66%)
ENT related problems	33(11%)
Dental and Gums issues	47(15.66%)
Systemic problem / Drugs	9(3%)
Food related	90(30%)
cigarette smoking	29(9.6%)

Table-III: Pre and Post Treatment organoleptic Score (n=300)

Organoleptic test score	Pre treatment	Post-treatment	*p*-value
Score 1	33(11%)	5(1.6%)	0.001
Score 2	150(50%)	17(5.6%)	
Score 3	71(23.66%)	11(3.66%)	
Score 4	35(11.66%)	9(3%)	
Score 5	11(3.6%)	1(0.33%)	

DISCUSSION

This study was conducted to figure out the aetiology of halitosis and to evaluate interventions done to overcome halitosis using organoleptic scoring. The organoleptic test scoring system is a simple method to differentiate and grade the severity of halitosis, and it was successfully adopted in our study. Muhammad *et al*. also recommended organoleptic scales as a good and easy way to chalk out halitosis as this method is simple and does not require any costly gadget.[11] One study confirmed that organoleptic scoring is a very helpful method to segregate halitosis of different intensities.[12] The organoleptic scoring is declared the gold standard for measuring and assessing unpleasant breath because of cost and is simple and practical.[13] In our study, the females were found to have halitosis at 59% as compared to the male population of 41%. It is because, in addition to the specific aetiology of halitosis, females, due to hormonal changes during menstruation and pregnancy, have more dryness of oral mucosa, leading to changes in gums and halitosis.[14] The Organoleptic scoring method was successfully used in our study to measure halitosis both qualitatively and quantitatively. Ashwani et al. found organoleptic scoring more effective than the halitosis instrument for assessing halitosis.[15,16]

Good oral hygiene plays an important role in preventing halitosis. In our study, 92(30.66%) students were having halitosis because of their unsatisfactory

oral hygiene. Ingredients like onion and garlic are used in almost all continental food recipes. These are aromatic and, if used as a salad or taken in excess, can cause halitosis. In our study, 90(30%) individual were found to be fond of these types of food, and their halitosis vanished once they were stopped from using it. Bahadir *et al.* also found that a diet rich in onion, garlic and spicy food can enhance halitosis. He further added that tobacco, alcohol, betel, amphetamines and nitrates can cause halitosis and organoleptic scoring performed.[5]

Pathology of the oral cavity and dental lesions, i.e. gingivitis, periodontitis and dental caries, are common benign lesions that can lead to halitosis. We found 47(15.66%) individuals having halitosis due to these problems. Soder *et al*. found a significant correlation between halitosis with such diseases. Patients of periodontitis have more severe halitosis than other oro-dental diseases.[17] Delanghe *et al*. declared halitosis is frequent (87%) as a result of orodental issues, i.e. dental caries, gingivitis, and periodontitis.[18] According to them, assessment of the quality of the odour using organoleptic scoring is a very useful method but requires trained clinical staff. Disease of the nose and throat can also cause halitosis. In our experience, 33(11%) participants had recurrent tonsillitis, pharyngitis and rhinosinusitis, causing halitosis in addition to other symptoms.

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CONCLUSION

Halitosis is a worldwide problem commonly seen in ENT patients and is seen in all age groups. Although various mouthwash, gums and sprays are available to mask halitosis, simple measures, including regular tooth brushing and flossing of teeth along with treatment of the root cause, can prevent halitosis and its associated social embarrassment. Organoleptic scoring is a simple and effective technique to grade halitosis in any setup without requiring costly gadgetry.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

AAK: & ZA: Conception, study design, drafting the manuscript, approval of the final version to be published.

STR: & SAAM: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

UAM: & MAK: Critical review, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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