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Halitosis among racially diverse populations: an update

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Abstract: The aim of this paper is to highlight the cultural perceptions of halitosis to dental professionals. Halitosis (oral malodour or bad breath) is caused mainly by tongue coating and periodontal disease. Bacterial metabolism of amino acids leads to metabolites including many compounds, such as indole, skatole and volatile sulphur compounds (VSC), hydrogen sulphide, methyl mercaptan and dimethyl sulphide. They are claimed to be the main aetiological agents for halitosis. Gastrointestinal diseases are also generally believed to cause halitosis. In general, physicians and dentists are poorly informed about the causes and treatments for halitosis. The paper reviews the prevalence and distribution of halitosis, oral malodour, its aetiology, concepts of general and oral health and diseases and their perception among racially diverse population. Eating, smoking and drinking habits and understanding of halitosis as a social norm among different people has been highlighted. The treatment options have also been presented very briefly. A brief discussion about general importance within existing healthcare services has been highlighted. Oral malodour may rank only behind dental caries and periodontal disease as the cause of patient's visits to the dentist. It is a public social health problem. The perception of halitosis is different in culturally diverse populations. So the dental professionals should be aware of the cultural perceptions of halitosis among racially and culturally diverse populations. There is a need to integrate the cultural awareness and knowledge about halitosis among the dental professional for better understanding of halitosis to treat patients with the social dilemma of halitosis to improve the quality of life and well-being of individuals with the problem. It is concluded that dental professionals (especially dental hygienists) should be prepared to practice in a culturally diverse environment in a sensitive and appropriate manner, to deliver optimal oral health and hygiene care.

Key words: cultural perception; dental professionals; halitosis; oral health awareness; racially diverse populations; VSCs

Halitosis

Halitosis is a medical term, first coined by the Listerine Company in 1921, used to describe unpleasant breath, regardless of its sources, oral or non-oral (e.g. expired air) (1). The scientific term, oral malodour is especially used to describe the odour from the oral cavity. It has been estimated that 90 million Americans or approximately 30% of the US population currently suffers from bad breath on a regular basis (2). In other studies, 20–60% of the population suffers from chronic oral malodour, and in approximately half of these individuals, the problem becomes serious enough to create personal discomfort and social embarrassment (3, 4). Malcmacher (2) noted that oral malodour is no laughing matter and can actually be an indication of more serious health concerns such as infections. He also stated that treatment plans only help reduce – but not treat – bad breath. Temporary solutions ranged from toothpaste to mouthwashes, but does not stay in the mouth long enough to have any long-term impact on halitosis. Individuals who suffer from oral malodour often impact their personal life by attempting to mask their disease with mints, and chewing gums, compulsive brushing, and repeated use of mouthrinses (3).

Although the causes of oral malodour are not entirely understood, most unpleasant odours are known to arise from food debris trapped in the mouth which is processed by normal mouth flora. There are over 700 bacterial species or phylotypes, of which over 50% have not been detected in the oral cavity (5). Several dozen of these can cause trouble when allowed to flourish or are genetically disposed to overpopulate. Large quantities of these naturally occurring anaerobic, mainly Gram-negative bacteria are often found on the dorsum of the tongue and periodontal pockets, where they are undisturbed by normal activity. The problem of oral malodour has been shown to originate in the oral cavity, where conditions favour the retention of anaerobic bacteria. There are various compounds that produce unpleasant smells in the human oral environment specifically volatile sulphur compounds (VSC; hydrogen sulphide, methylmercaptan and dimethyl sulphide). The VSC arise from bacterial metabolism of amino acids and mainly contribute to oral malodour (6). Replogle and Beebe (7) demonstrated that the intensity of clinical bad breath is significantly associated with amount of intraoral VSC levels. VSC also accelerates destruction of periodontal tissues, which may explain why patients with periodontal disease often complain of oral malodour (8). Research has shown that the vast majority of patients with halitosis, approximately 80–90% originates within the oral cavity and not in the stomach, which many individuals believe. Increased production of VSC may represent a further mechanism of increased susceptibility to periodontitis in smokers and also help to explain the reported association between smoking and halitosis. The percentage of sites per subject with high levels of sulphides detected in moderate (4–6 mm) and deep (≥7 mm) periodontal pockets was found to be significantly higher in smokers, compared with non-smokers (9).

Oral health

To begin the quest for a deeper understanding of cultural, social and ethnic perceptions of oral health and disease, a fundamental question need to be answered.

What is oral health?

Oral Health *per se* involves the orofacial complex and it exists in a biological inter-relationship with the entire body and is therefore influenced by the same factors as general health. Darby and Walsh (10) describe health as a state of well-being with both objective and subjective aspects that exists on a continuum from maximal wellness to maximal illness. And a persons' health may change along this continuum under the influence of biological, psychological, spiritual, social and cultural factors that are inter-related and fluctuate over time (1). Oral health can have an effect on general health through oral infections and conversely oral health is an indicator of an individual systemic health. For example, oral cancer and its complications due to antibiotic therapy is a systemic disease that can produce oral changes. According to Darby and Walsh, the oral cavity is analogous to other body cavities, and its health status is governed by the same physical and chemical laws and physiological principles, and affected by the same social, cultural, psychological and spiritual factors as other body cavities. Oral health is defined as the oral condition that results from the interaction of individuals with their environment, under varying levels of human needs fulfilment (11).

Perception of oral health and disease among racially diverse populations

During the past decade, reports have shown a continuing trend of low level of knowledge regarding disease symptoms and their preventions. Racial and ethnic minorities and groups with low levels of formal education demonstrate the least knowledge of prevention of oral diseases. For example, 76% of those with more than 12 years of schooling know the preventive purpose of water fluoridation, compared with 61% of those with 12 years, and 36% of those with <12 years of school (12). While general level of oral health has improved steadily in recent decades, the prevalence of dental caries in 18- to 19-year olds had an average of 12 tooth surfaces decays and periodontal disease continue to be a persistent problem (11). For example, in the mid-80s, 40–50% of employed adults and 60% of 15-year olds experienced some gingival inflammation, while 24% of employed adults had lost at least 4 mm of periodontal attachment and at least one tooth, and one in five adolescents had lost at least 2 mm of attachment (11). Toothbrushing and dental flossing constitute the most common self-care behaviours for the preservation of human oral health (13). Oral hygiene levels resulting from these behaviours show an inverse relationship with both destructive periodontal disease (14) and dental caries (15). Significantly increased frequencies of daily toothbrushing and dental flossing have been found among females, Asians, more educated individuals, and persons with higher incomes (16). Davidson found that older 65- to 74-year olds ethnic groups exhibited a more varied distribution of edentulous individuals as well as lower use of dental floss. Among middle-aged persons, ethnic groups were least likely to use dental floss than that of Whites (13). In addition, Davidson found that oral hygiene scale scores, Whites had significantly higher mean scores than ethnic groups.

Oral health knowledge seemed to be limited and very few background factors were associated with it. A study made by Al-Ansari *et al.* (17) on oral health knowledge among male Kuwait College students found that more half of the students had visited a dentist during a 12-month period, and only one-third of students were brushing twice a day or more often. There has been a favourable trend in reducing caries and periodontal disease with improvements in oral hygiene and decrease in the consumption of sugar products in industrialized countries but has not been seen in several developing countries or in the Middle East. Twice-a-day toothbrushing seems to be an established practice in countries, such as United States and United Kingdom, this goal is still very far from being realized in several other countries, including Turkey, Lebanon, Saudi Arabia, and Kuwait (16).

Perceived importance of oral health and barriers were found to be the strongest predictors of self-care and utilization patterns. Compared with White adults, Asians were less knowledgeable about the definitions of disease processes, but were more concerned about the aesthetic and social consequences of poor oral health. In contrast, older Korean-Americans were less knowledgeable about periodontal disease compared with younger respondents from the same ethnic group (18). Nakazono noted that White adults aged 35–44 years reported significantly stronger belief in the benefit of preventive practices compared with ethnic minority groups. White adults also expressed more positive belief in the benefit of preventive practices compared with African-American and Hispanic adults respectively (17). Similarly age cohort differences were significant, with middle-aged adults reporting more positive beliefs in preventive practices compared with older persons in almost every racial-ethnic group. Several social-behavioural variables were also found to be positively related to better oral hygiene behaviour across several diverse ethnic groups, including female gender, education, certain oral health beliefs, household income, and having a usual source of dental care (13) and married persons (17).

Integration of eating, smoking, drinking habits of racially diverse populations

Eating

Societal contexts can inhibit healthy choices. However, within these constraints, behaviours adopted by individuals can make a negative or positive contribution to health. For children, parents and family members' influence on oral health in particular is central (19). Dental caries is widely recognized as an infectious disease induced by diet. Less than twice daily toothbrushing and sugar snacking between meals have been identified as key behaviours explaining the presence of dental caries in children (20). Adair *et al.* found that parents' perceived ability to control sugar snacking in their children are lower than parents' perception of the importance that they should do so. There were only three exceptions found to this pattern, parents from Belgium, Norway and Denmark strongly believe that they can control their child's sugar snacking but do not believe as strongly in the importance of doing so (21). In addition parents of children with less favourable oral health behaviours are less likely to report that their children have favourable sugar snacking habits (20).

Smoking

Cultural norms, availability of different types of tobacco products, tobacco control strategies, and, perhaps most importantly, tobacco industry behaviour to promote tobacco use are the determining factors of tobacco consumption among the worlds' youth. At the beginning of the 21st century, tobacco use among young people is already well established in many parts of the world. Nearly 20% of 13- to 15-year olds an estimated 34.8 million use some type of tobacco product, and among these who smoke cigarettes, nearly 25% smoked their first cigarette before the age of 10 years (22). Countries with high smoking rates of over 60% are Chile, Poland, Russian Federation, Ukraine, Northern Mariana Islands and Palau while Nagaland, India had the highest current rate of tobacco product use of 62.8% (21). Ethnic group comparisons between White, Black, Hispanic and Asian Pacific adolescents on variables relevant to cigarette smoking revealed a pattern in which the highest vulnerability was observed for Blacks, intermediate risk for smoking was observed for Hispanics and Whites and lowest vulnerability was observed for Pacific Asians (21).

Drinking

Men born in India but living in Britain have higher than expected treated prevalence rates of alcohol-related disorders. Sikhs were most likely to be regular drinkers followed by Whites and Hindus (23). In both these groups, older men reported consuming more alcohol than did young men. However, age was confounded with generation: heavier levels of consumption were reported by Sikhs and Hindus born in India than by Sikhs and Hindus born in Britain (22). Among regular drinkers, Sikhs had higher average Alcohol Problem Scale Scores than did White men or Hindus (22). However, among males the patterning of drinking and the prevalence of alcohol problems by age change dramatically according to ethnicity. Among White males drinking and problems decrease abruptly from the 20s to the 30s, as was traditionally found in the US general population (24). Among Black males the trend is exactly the opposite of that for Whites, while among Hispanic males there is also a decrease but not quite as large as that for Whites, and the frequency of heavy drinking and problems is always higher than for the other two groups (23).

Halitosis a social norm, stigma and dilemma for racially diverse populations

Society uses odour as means to define and interact with the world. The olfactory, smelling experience is intimate, emotionally charged and connects us with the world. It follows that the smell from mouth breath odour can connect or disconnect a person from their social environment and intimate relationships. In a retrospective qualitative study, Mckeown (25) reviewed 55 client records at the Breath Odour Clinic. He found that 75% of the cases reviewed, decreased self-confidence and insecurity in social and intimate relations led clients to seek treatment at the specialized breath odour clinic. When a person perceives a constant bad breath problem, she/he uses defence techniques, and may avoid social situations and social relations. This affects a person's well-being (24). As with other human perceptions (sight, hearing, pain, etc.), smell is subjective and is affected by emotional and cognitive variables. People who are not aware of their bad breath may encounter romantic, social and professional rejection without knowing why. As bad breath and other body odours are intimate topics, few are willing to confront people who have this problem. A most intriguing problem regarding bad breath is the apparent inability of not knowing whether one has it and to what extent (13). The life of these patients who believe rightfully or not that they suffer from oral malodour is often strongly affected (26). The inability to be sure whether or not halitosis is present makes them very unhappy (27).

Discussion

The disparity in oral health status between Whites and minority groups is striking. Compared with White children and White adults, a higher prevalence of dental caries and greater severity of periodontal disease is generally found among minority children and adults, including Blacks, Hispanics and Native Americans from poor and low income families (28). Among adults, the percentage of individuals having teeth with untreated decay is greater among Blacks than Whites at all ages (27). Minority and low-income groups have less access to primary and preventive dental services than the general population. Factors that contribute to this difference include cost, availability of dental insurance, willingness or inability of providers to provide uncompensated care and the effect of public assistance programmes (29). Nationally, 96% of dental spending, which totalled nearly $46 billion, was either from out-of-pocket sources or private dental insurance (30). As minority and low-income populations have lower rates of dental insurance coverage, more costs for dental services are borne by the individual and are often prohibitive for those populations (31).

Dental practitioners face numerous economic barriers in providing care to the poor and uninsured. Historically, the track

record of public spending on oral health services has been poor; of the nearly $46 billion spent on dental services, only $1.8 billion, or <4%, was funded by public sources (29). A report by the US Department of Health and Human Services, Office of the Inspector General (OIG), alarmingly revealed that only one in five eligible children receives preventive dental services. This was attributed to a shortage of dentists willing to accept public assistance programmes because of inadequate reimbursement, complexity of the claims process, slow payments, arbitrary denials, and prior authorization requirements for routine services. In addition, there are competing priorities and the lack of understanding among public assistance programme beneficiaries of the benefits of good oral health (32). Given the role dental practitioners play in protecting and assuring overall health, their historical role in serving underserved families, and their sensitivities to how culture and ethnicity can affect treatment and outcomes, dental practitioners occupy a unique position in affecting positive changes in oral health.

A student clinical experience with clients of diverse cultural background is dependent upon the cultural makeup of the community. Dhir *et al.* (33) found that there was a moderately strong positive relationship between the ethnic/racial group composition of students in dental hygiene programmes and the corresponding state population. However, there was a weak-positive relationship between faculty in dental hygiene programmes and the corresponding state population of the same ethnic/racial groups (31). In programmes where the community's diversity is limited, the programme might arrange for exchange programmes with other dental hygiene programmes with a more culturally diverse clientele. Organizing community outreach focus groups, attending cultural events and developing collegial relationships with other health professional from various ethnic and minority groups would allow dental hygienists to become more familiar with different cultures and their oral health practices, attitudes, self-care beliefs and concerns.

A substantial improvement in the diversity of the oral health student body and eventual workforce is a critical and necessary element in achieving the goals of improving oral health and quality of life and eliminating health disparities. Clients' values and general oral healthcare beliefs are rooted in culture.

Treatment

Before treating oral malodour the dental practitioner should assess all oral disease and conditions that may contribute to oral malodour. Methods that have proven their effectiveness to a variable level are tongue cleaning specifically the dorso-posterior region of the tongue, mechanical reduction of microorganisms through improved oral hygiene procedures, toothpastes containing triclosan and a copolymer or sodium bicarbonate were reported to reduce certain amounts of VSC and chewing gum containing sugar was also shown to reduce VSC in mouth air through an active pH change in the oral cavity (5). Periodontal treatment is required because periodontal conditions contribute to oral pathological halitosis and although dental caries may not be a significant cause of oral malodour, caries treatment is recommended. Over the counter (OTC) oral health products are numerous in the market and while some may actually be genuinely effective in reducing the number of bacteria, others may only mask the odour which only last for a brief period.

When treating patients with bad breath, clinicians should relate not only to physiological odour and associated parameters, but also to the nature of the subjective complaint. Eli *et al.* (28) found that both actual and perceived bad breath should be dealt with as continuous parameters. In addition, because of the multifactorial complexity of the problem, those who have bad breath should be treated individually, rather than be categorized (27).

Oral malodour diagnosis and management should be incorporated and considered seriously in comprehensive dental care. While most oral malodour have a simple cause, no single therapy is always effective. Diagnosis and treatment needs to be a team approach involving the dentist, dental hygienist, periodontist, an ear, nose and throat specialist, dietitian, pharmacist, internal medicine specialist and psychologist.

Conclusion

The current population demographics reveal an increasingly multicultural society in the United States of America. Therefore, dental professionals and especially dental hygienists must be prepared to practice in a culturally diverse environment in a sensitive and appropriate manner, to deliver optimal oral health and dental hygiene care to those with halitosis.

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