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Understanding health behavior and perceptions

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Although genetic predisposition and the natural environment are factors in oral and general health, there is overwhelming evidence that behavior has a profound effect on morbidity and mortality. Consistent with the veracity of the age-old adage, "An apple a day keeps the doctor away," scientists have studied how behavior interacts with personal perceptions and the environment to play an important role in protecting the health of the individual [1,2].

Behavior and perceptions are among the many factors determining oral and general health status in minority groups, as well as all populations. Regional Research Centers for Minority Oral Health (RRCMOH) were established across the United States in response to a National Institute of Dental and Craniofacial Research (NIDCR) initiative. Many of the reports from these centers have attempted to analyze behavior and perceptions, reflecting the importance of these areas of study to the understanding of disparities in health. Examples of such interactions from RRCMOH studies are interjected herein, where applicable.

Minority groups often suffer adverse health conditions and diseases disproportionately, and many of these are modifiable through behavior. The rate of diabetes, a disorder often partially controlled through diet and exercise, is reported to be 199.1 conditions per 1000 black Americans 65 years and older, compared with 87.5 per 1000 for white Americans over 65 [3]; the rates for high blood pressure (hypertension) are 487.0 and 348.1 per 1000 for

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black and white Americans 65 and older, respectively. Similarly, there are disparities for oral health diseases and conditions. For example, the University of California at Los Angeles (UCLA)/Charles R. Drew University RRCMOH, located at an inner-city hospital in Los Angeles, found that orofacial injury occurs disproportionately among African American Black and Hispanic individuals and that there are correlations between substance abuse and orofacial injuries in the populations studied [4,5]. Comparisons by race/ethnicity, as illustrated in Fig. 1, indicated that black and Mexican American poor children of all ages have higher untreated tooth decay rates than do white children [6], although the cause has not been fully analyzed.

Determinants of health

Behavior is modifiable and provides addressable factors for health promotion efforts. Lifestyle improvement, preventive self-care behaviors, and better use of formal preventive health services are among these factors. Although many health conditions are exacerbated or ameliorated through behavior, existing studies cannot identify causation. Nevertheless, personal behaviors have an overall impact on an individual's health, and can affect

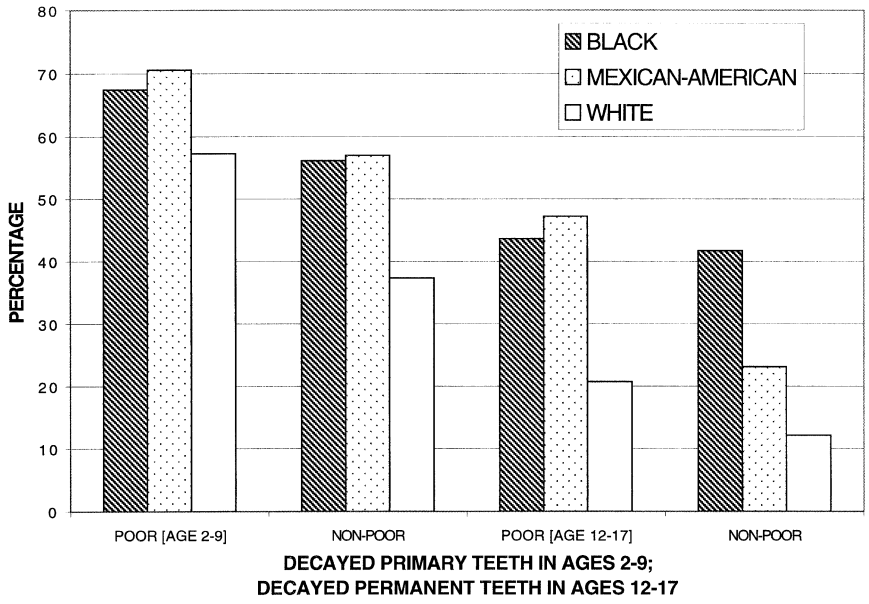

Fig. 1. Percentage of poor and non-poor children with untreated decayed teeth by age racial/ethnic category. Figure derived from data presented by the United States Department of Health and Human Services [6].

that of others. Some actions may have benefits directly linked to disease prevention (eg, brushing and flossing), whereas others may have negative effects and social costs (eg, smoking and substance abuse). The preventive self-care behaviors that an individual performs can promote or maintain personal health, typically at little cost to most Americans. Programs and policies that target associated attitudes, perceptions, and behaviors via education, communications networks, or other means could result in improved oral and general health status and reduced costs for society.

A broad conceptual framework is necessary to interpret the dynamic nature of the interactions of key variables involved in determining oral health status in minority populations. Prior to developing programs to promote oral health in minority communities, it is essential to analyze not only the demographic factors associated with the behavior and perceptions of constituent populations, but also the economic, social, and political environment. Some of the issues present potential barriers to oral health promotion and accessing disease prevention/treatment.

The task of analyzing the multifactorial relationships between key variables associated with oral health behaviors and perceptions is especially difficult in that minority communities are not homogeneous and undergo constant flux. Thus, a dynamic model is essential. Major population composition shifts are projected that show increases in proportions of Hispanic and Asian Americans, whereas white and black populations are expected to decline or remain constant. Fig. 2 illustrates the changing racial/ethnic composition of the United States population projected to the year 2050 [7].

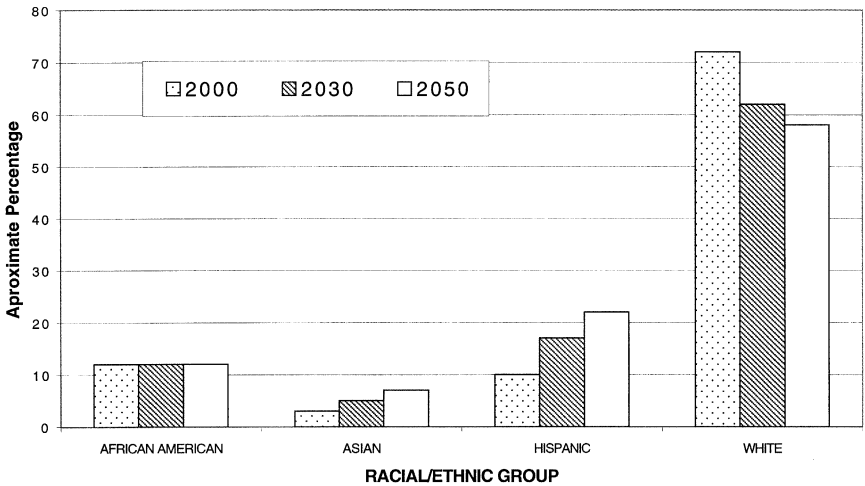

Fig. 2. Race/ethnic composition in the United States from the year 2000 projected to the years 2030 and 2050. Figure derived from data presented by Mertz et al [7].

Majority populations change slowly over a period of decades as aging occurs, but minority communities often change rapidly with immigration influxes. Although socioeconomic profiles are sometimes used to characterize immigrant populations, changes associated with acculturation [8] and assimilation do occur. Children born in another country become "Americanized" when they go to school. Individuals' incomes or social status may change as they learn the language or shift from unemployed to employed (and vice versa). Television is ubiquitous; knowledge and attitudes shift as media ads and celebrity role models influence public perceptions, particularly among populations for whom advertising is a major source of "information." Toothpaste companies bank on this observation. Public incentives and anti-incentives (eg, tobacco taxes and bans against smoking in public places) can have great impact on smoking behavior in low-income populations and ultimately on oral health.

We recognize the demographic differences and disparities among population groups and are cognizant of the dynamic nature of the variables and their interrelationships. Individual responses to the social, physical, and genetic environment are variable and may change with circumstances. It is difficult, if not impossible, to isolate the degree to which each determinant influences health. The socioeconomic milieu, interpersonal relations, media, and health services issues are among the variables that interact with those within the individual and community in determining oral health status. Furthermore, global and local transitions due to migration, changes in social mores, and the sociopolitical climate indicate a need for an adaptable viewpoint. Status quo changes and demographic trends occur not only in California and the United States, but globally as well [9]. We propose a conceptual framework with dynamic, multifactorial interrelated elements. Key determinants of behavior and perceptions are presented within a universe of environmental, social, and individual factors that interact in a complex interplay of mutable relationships.

Models for studying health and behavior

A myriad of factors impact health behavior and, ultimately, health status. Education, cultural awareness, social support programs, and public policies can have great impact on the evolution of attitudes, perceptions, knowledge, and practices that foster improved oral health. Models have been proposed to assist in understanding the factors associated with general and oral health behavior, and clinical status and satisfaction. Some models focus on the individual's behavior, whereas others consider behavior in the context of community mores and program planning. Our model (Fig. 3) incorporates concepts from older models within our conceptual framework (concentric rings surrounding health status) of dynamic interactions among the variables.

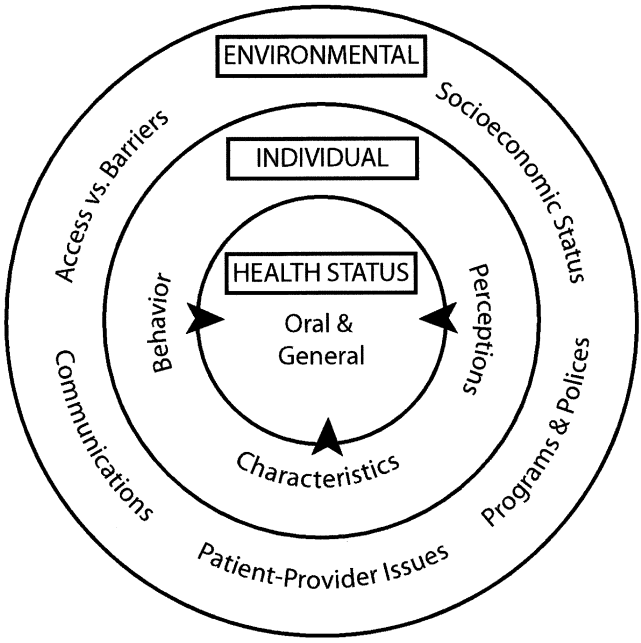

Fig. 3. Conceptual model for understanding the dynamic variables underlying oral and general health status in populations.

Evans and Stoddart [10] proposed a model that considers individual responses to the social and physical environment, along with genetic endowment, as factors determining health and disease and, ultimately, well-being. Andersen presented an early model that included the individual's background and behavior as key factors in health [11]. This "Behavioral Model for Health Services Use" [2] has been updated and applied in various health settings, including oral health [9]. In this framework, population characteristics are conceptualized as precursors to health behaviors and outcomes. Satisfaction is included as an outcome measure, along with perceived and evaluated health status. Demographic factors (eg, age, gender, income, social structure, and beliefs) are considered "predisposing" characteristics that interface with "enabling" resources in the family and community to address needs.

Predictors of health behaviors, including factors related to failure to seek dental care among disadvantaged Hispanic and black adults at low-cost medical and dental clinics, were analyzed by researchers at the Los Angeles Research Center for Minority Oral Health [12]. Among other relevant findings related to personal practices and health service utilization (discussed in the sections below), older age, lower education level, and less acculturation were correlated with poorer oral health status among the Hispanic participants [8].

Increasingly, researchers and program planners have come to recognize that understanding health behavior and community involvement are essential for program effectiveness, particularly for minority communities. The "PRECEDE–PROCEED" approach is a model for addressing the needs of targeted populations in a program planning and evaluation context. The target community is involved in needs assessment and evaluation of program goals, interventions, and progress in an iterative process [2]. The health promotion framework consists of a diagnostic phase identifying predisposing, reinforcing, and enabling constructs in educational diagnosis and evaluation (acronym = PRECEDE), followed by policy, regulatory, and organizational constructs in educational and environmental development (acronym = PROCEED). This model was applied to an oral health promotion program in a Washington, DC, inner-city Latino community [13]. Focus groups of mothers and pregnant women were involved in the initial assessment of "predisposing" knowledge and beliefs regarding oral health and dental caries prevention. The second phase of assessment involved baseline surveys of the knowledge, opinions, and practices of preschool children and their parents. A culturally appropriate intervention program was developed based on the scientific literature, focus groups, and baseline survey results. The full-scale intervention consisted of targeted presentations and a mass-media campaign. Process evaluation throughout the program was used to refine it, whereas the overall impact and usefulness were evaluated at the end of the intervention. A variety of problems, which illustrate the importance of simultaneously studying the socioeconomic and political environment, were identified:

- Community priorities (general versus oral health, unemployment, housing, violence).
- Competition and friction between community-based programs.
- Funding issues and budget cuts.
- Divisions among Hispanic/Latino subgroups.

Environmental factors and behavior

Fig. 3 also illustrates the key categories of environmental factors that can influence individual behaviors and perceptions and, ultimately, have an impact on oral and general health status. These include political, social, and provider factors, as well as the predisposing, enabling, and need variables of other models. Oral and general health status are presented as the central component subject to the effects of individual behaviors and perceptions, which are influenced by the environment. The focal outcome measures of health status include actual, clinically measured, genetic, self-perceived health status and satisfaction indicators. Individual behaviors that contribute to oral health status are influenced by the environmental milieu, which consists of a dynamic interplay among cultural,

community, interpersonal, media, policy/political, religion, socioeconomic, and other variables.

Many of the conditions are overlapping and may be secondary to underlying factors. For example, interpersonal relationships, such as social support and marital status, have been found to be associated with health, morbidity, and mortality [14–17]. This phenomenon is especially noted in minority populations—for example, among males treated at the orofacial injury center in the Los Angeles RRCMOH, where researchers reported that high scores on the support index were associated with positive reports of general health [18]. Religiosity has apparent beneficial effects on health in black populations [19,20], which may be related to its role in providing social support or health education. Patient–provider relationships, including trust and racial pairing, also have been shown to affect health behaviors, as discussed in the section below.

Health service utilization, a key behavior associated with oral health status, depends on the availability of and access to care. Suboptimal dental utilization may be a function of the health coverage accessible by the population. As shown in Fig. 4, a higher proportion of minority than white individuals have never seen a dentist [6].

Insurance is a recognized enabling variable, but the socioeconomic environment often determines the type or potential for having insurance. The type of health insurance (or lack of it) varies among different racial/ethnic groups. As shown in Fig. 5, black populations (Fig. 5, middle bar in each

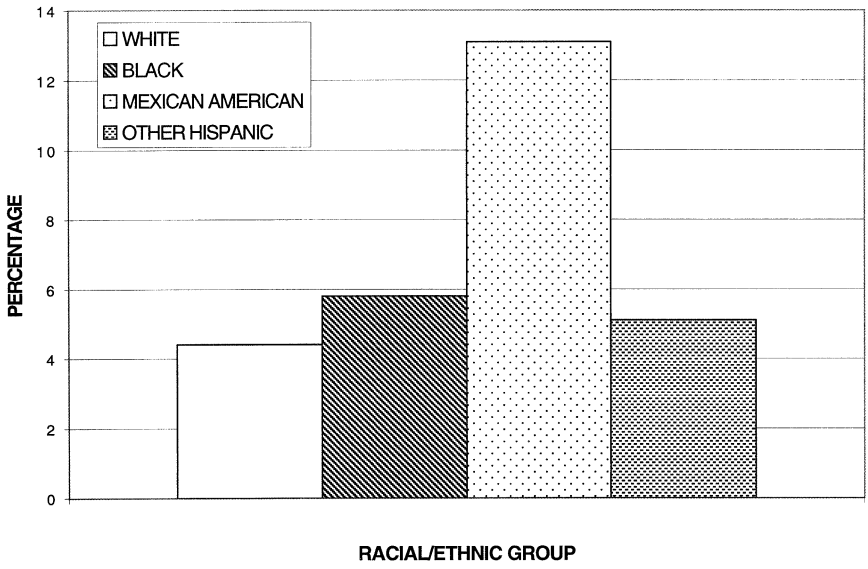

Fig. 4. Age-adjusted distribution by racial/ethnic group of persons (age 2+ years) who have never visited a dentist. Figure derived from data presented by the United States Department of Health and Human Services [6].

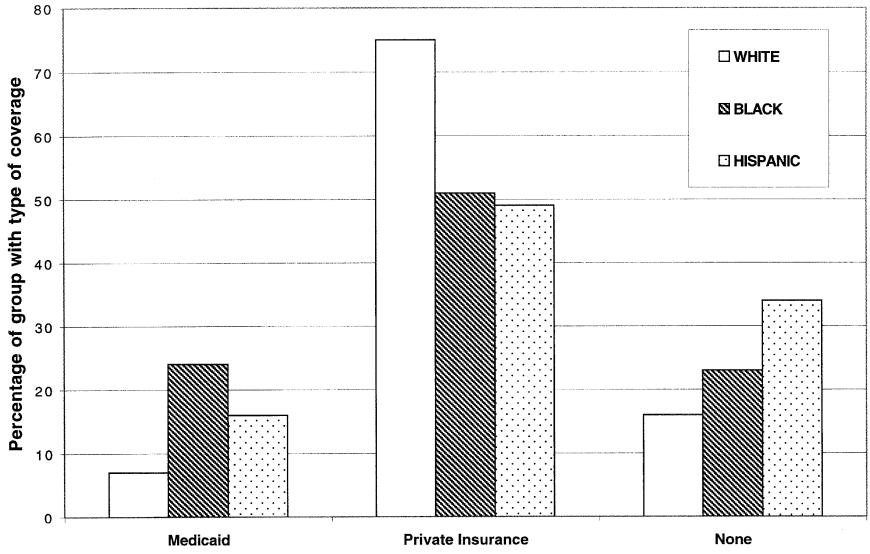

Fig. 5. Type of health care coverage by race/ethnicity in the United States, 1993. Figure derived from data presented by Andersen and Davidson [11].

group) are more likely than are whites (Fig. 5, shaded bar on the left) to be covered by Medicaid and less likely to have private insurance, whereas Hispanics are least likely to have insurance coverage [11]. Analyzing the role of this variable in influencing health behavior and health status requires care; in addition to availability of insurance, the individual must actively seek out and accept such assistance in access to care.

Even for insured people, public and private insurers may alter health coverage and public policy may change, as was the case with the recent expansion of health care coverage for low-income families enacted through the State Children's Health Insurance Program (SCHIP). California Health and Safety Code mandates improvements for low-income children with regard to access to dental care, including assistance with scheduling and transportation. The Tobacco Settlement Fund provides moneys (commencing July 2002) for expansions in Medi-Cal, Healthy Families (California SCHIP program), and other state programs (California Health and Safety Code, sections 104896–104899). Distribution of the funds may be used to change the environment of dental/oral health-related services, including the following:

- Education and outreach.
- Smoking cessation services.
- Enforcement of tobacco-related statutes.
- Expansions to clinics that serve low-income, uninsured, or underinsured Californians.

Provider and patient–provider issues

Regular preventive use of formal health services and dental visits—for example, for dental sealants—requires interaction with a health-care provider, usually with some out-of-pocket expense. Access to oral health care is dependent on the proximity of providers in the area. When considering adequacy of the provider base, several factors are relevant. Shortage areas have relatively more minority providers than do nonshortage areas. Further, minority dentists are more likely than are nonminoritiy dentists to practice in minority areas [7,21]. Urban Medical Service Study Areas (MSSAs) with shortages of providers have a higher black and Hispanic population composition than do urban nonshortage areas, as shown in Fig. 6 [22]. This observation highlights the importance of recruiting sufficient minority students to dental professions to ensure a steady stream of practitioners to decrease the provider shortage. Dental profession shortages occur in 11.2% of urban MSSAs, whereas 31.3% of rural study areas are at shortage levels [22]. In California, the median household income of rural shortage areas is lower than average; primarily agricultural Hispanics constitute a significant proportion of this population. It is evident that recruiting dentists to such areas is an important step in addressing disparities.

The literature suggests that patient-provider relationships are poorly understood and may greatly affect minority health service utilization (and research). The racial/ethnic profile of the community predicts dentist supply more consistently than does income [7]. Even where there are adequate

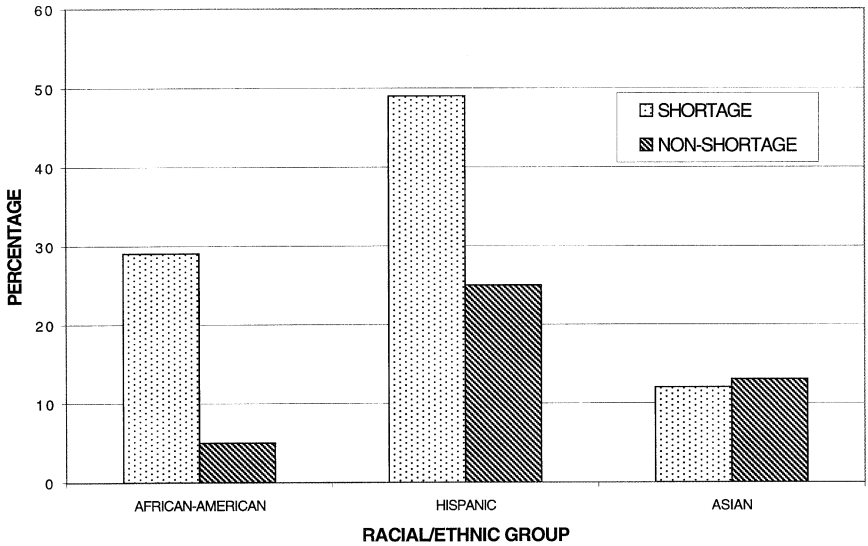

Fig. 6. Comparisons of minority composition in urban shortage versus nonshortage areas in California. Figure derived from data presented by Mertz et al [7].

numbers of providers, some reports indicate that utilization is not optimal because of lack of trust [23–26]. Perceived barriers to the use of dental services by individuals from minority ethnic groups have been found in the United States, and the United Kingdom: distrust of health-care providers was common to all ethnic groups studied [27].

Racial pairing also affects the degree of patient participation [28]. Because the ethnic distribution of dentists differs from that in the general population (Fig. 7), there is clearly an imbalance in patient-provider racial/ethnic matching.

Barriers to dental health service utilization also include differences in oral health perceptions between providers and patients [25,29]. Minority families in an ethnographic study at the Los Angeles RRCMOH expressed fear and distrust as reasons for nonuse of dental services; some providers in the same service area revealed ignorance of this perception in the community or disrespect/distrust of the patients' behaviors [30,31]. Most distressing was the observation that some dental programs serving the minority community had established policies that present barriers to meeting the service needs of the target population [31].

Dental utilization has been linked to positive health behaviors and receiving other preventive services [32]. Oral health service utilization is dependent on the individual's perceived need for care within the context of other predisposing and enabling variables. Perceptions and priorities influence such behavior. Pain, clinical health status, and access to care are key variables affecting health care-seeking behavior and oral health status [33].

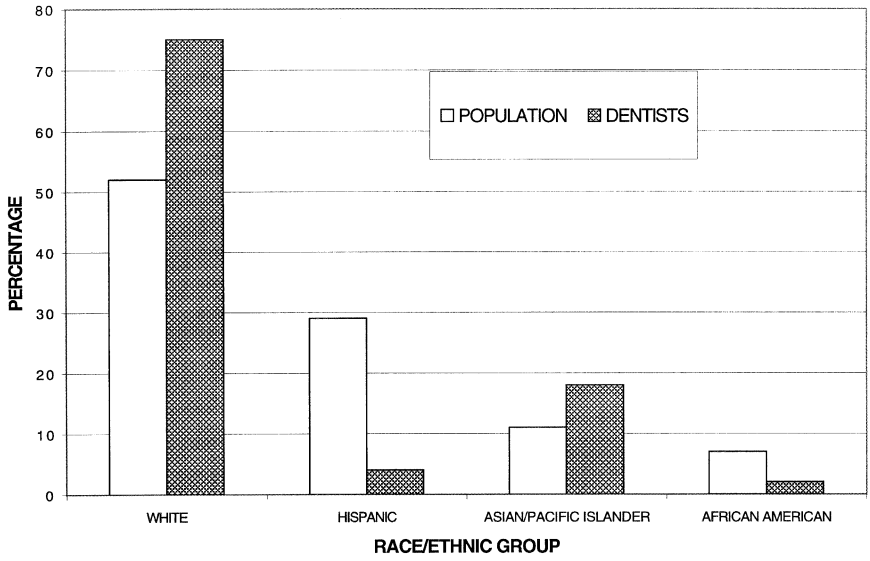

Fig. 7. Ethnicity percentages of the population and dentists in California. Figure derived from data presented by Mertz and Grumbach [22].

The complexity of interactions among the variables affecting health service utilization presents a challenge for analysis. Using the National Health and Nutrition Examination Survey, Gift et al [34] studied dental health perceptions in the context of demographic factors (predisposing, enabling) and actual conditions/needs. Hierarchical multiple regression analysis demonstrated that perceived general health and orientation to dental care, along with age and race/ethnicity (black, Mexican American), were predictors of dental health visits within the past year. Self-defined treatment need reflects a combination of the variables studied (as well as personal and perhaps subconscious perceptions) and was a key indicator.

The Veterans Health Administration (VA) provides a controlled setting for analyzing racial disparities in health care. Both minority and nonminority United States veterans have equal access, but minorities are more likely to use VA health care. Oddone et al [25] propose that patients' selection of VA care may reflect the standards and mores of their culture, rather than any bias on the part of the service sector. There could be racial differences in clinical presentation and the perceptions of symptoms. As the investigators suggest, if "black patients perceive their symptoms to be less severe," dental/oral health-provider seeking behavior may be different from that of patients who are eager to seek out treatment for lesser conditions. This observation illustrates the dynamic nature of the individual factors in the context of the environment and our model.

Knowledge, perceptions, and practices affecting oral health service utilization and oral health status

The relationships between oral health perceptions and physical status in selected racial/ethnic groups have been studied by the RRCMOH. Many of the reports reflect how behavior and perceptions affect health service utilization and oral health status. Self-reported oral health of disadvantaged Hispanic and black adults of the Los Angeles RRCMOH study, as measured by the General Oral Health Assessment Index, revealed similar correlations in the social and physical associations among these racial/ethnic groups, whereas self-perceptions of oral health found in a New York RRCMOH study [35] varied among the different Asian groups studied.

The dynamics affecting behavior and oral health status among immigrant populations are complex. Language proficiency, cultural factors, acculturation (including years of residency in the United States), legal status, experience, relationships, and behavioral factors may all influence attitudes, perceptions, knowledge, and practices to some degree. Among Hispanics in the Los Angeles RRCMOH studies [8,36], birthplace, acculturation, alcohol consumption, education, and income were associated with oral health status and positive mental health. Participants with no regular source of care reported the following reasons for not seeking professional care: cost, no

perceived need, afraid of the dentist, afraid they would catch a disease, no time, doesn't speak language, wait, and lengthy travel [12].

The New York RRCMOH [35] noted the different self-oral health perception predictors among the Asian subgroups studied (Chinese, Indian, and Pakistani). The number of missing teeth and years in the United States were associated with positive oral health perceptions among the Indian group studied, whereas "Decayed, Missing, Filled Teeth" was the significant variable in the Pakistani group. The only indicator of oral health status (suggestive) among the Chinese was income. A study from the Northeast RRCMOH [37] assessed oral health perceptions among minority inner-city adolescents and found that the Oral Health Impact Profile showed better correlations than did the RAND Short Form-36 assessment instrument.

A study comparing elderly Korean immigrants with their younger counterparts [38] showed that the former required more dental education and care, reportedly because they had not been exposed to preventive dentistry in their home countries. This cross-sectional study, however, did not explore the effects of cohort, education, and other variables. Suggestions for development of transcultural oral health promotion materials have been proposed [39].

Understanding oral health knowledge, perceptions, and practices among children is especially important. Furthermore, the information may be projected to predict future health status and costs. Caries were twice as likely to be found in children with inadequate oral health knowledge than in those with adequate knowledge [40]. Hispanics (67%) and blacks (66%) had a higher prevalence of caries than the average for the study population and children of low socioeconomic status (SES) had a higher caries prevalence than did children of high SES.

An analysis of utilization of pediatric dental services by service category and sociodemographic factors found profound disparities in the level of dental services obtained by children, especially among minority and poor youth [41]. White children were more likely than were black or Hispanic children to have received diagnostic and preventive, surgical, and restorative/other services. Although the investigators point out limitations to the interpretations, the data provide important estimates for assessment of dental health service utilization. Findings suggest that black race/ethnicity affects dental care behavior independent of SES; significant disparities exist among poor children despite the availability of Medicaid insurance coverage.

A prospective study to assess appointment-keeping behavior conducted at private and public facilities in Iowa [42] revealed higher rates of appointment failure, cancellation, and tardiness among Medicaid pediatric dental patients than among non-Medicaid patients. Identification of the reasons awaits further study, but suggested issues include transportation, language, nature of practitioners serving the population (eg, dental students), and inefficiency. Private practitioners are increasingly wary of participating in the

Medicaid program. This problem must be understood and addressed in the face of the observation that low-income mothers who have Medicaid coverage are almost three times as likely to have utilized dental services within the last year and to have perceived need for dental care as are those without coverage [43].

The usual caregivers are women with children, disproportionately represented among the poor. The proportion of untreated tooth decay in children between 2 and 4 years of age is two to three times worse for blacks, Asian/Pacific Islanders, and Mexican Americans than among white Americans, who were six times more likely to have received treatment than were Native American children the same age (see also Fig. 1 above) [44]. In addition to insurance coverage, the mother's level of education was a significant variable in predicting dental use in this population; thus, educational programs and addressing cost barriers may be key to improving oral health behavior. Other studies confirm the observations that low education and income—often associated with minority status—lower the odds of childhood dental visits [45]. Children from predominantly poor, disproportionately minority, single-parent families are often seen in the emergency department for caries-related dental pain [46]. Study of the costs, factors, and dental services associated with hospitalized Medicaid-eligible children indicates that savings would result from early and preventive interventions [47], rather than treating children's dental problems in the hospital.

Research, policy, and politics

Education and outreach may provide the key to improved oral health awareness, behavior, and health service utilization in all ages. Fig. 8 displays the differences among racial/ethnic adult populations and the effect of education on dental visits within the preceding year [6].

There are significant implications for taxpayers, policymakers, and society. Research to discover and understand the many variables involved in behavior, perceptions, and practices among minority individuals, communities, and populations and to apply the findings to health-service utilization is not an easy task, as several reports suggest [24,26,48].

In inner-city populations, alcohol and drug abuse are strongly associated with orofacial injuries [4], as discussed above. Therefore, drug-use prevention measures (eg, teen activities) and programs to reduce recidivism might be helpful. A study of teenagers reported that those who participated in organized team sports were less likely to use drugs, smoke, have sex, carry weapons, or have unhealthy eating habits [49].

A partnership of programs including Head Start and the Oral Health Initiative Team, along with parents, teachers, federal, state, and local agencies, provided a forum for improving oral health among low-income children [50]. The objectives included development of strategies to increase

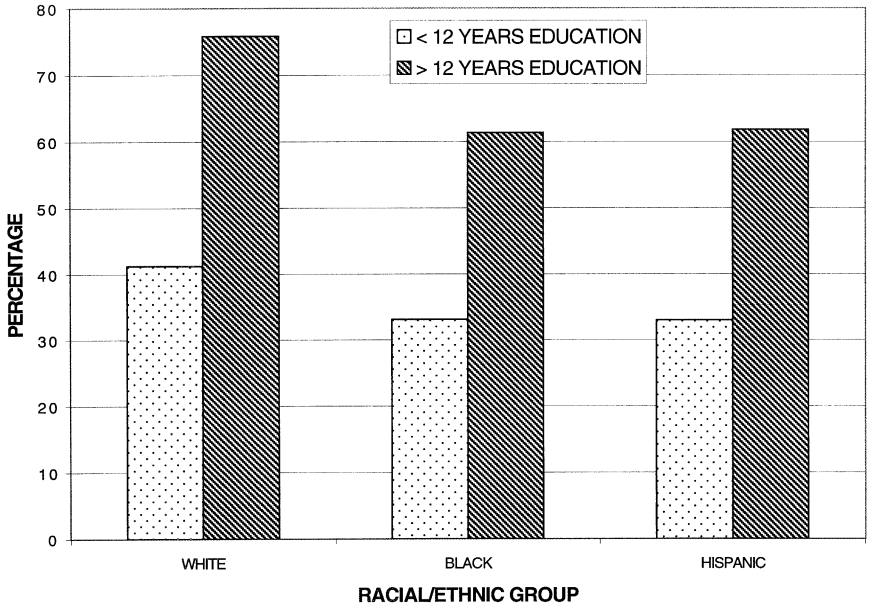

Fig. 8. Percentage of adults (age 25+ years) with a dental visit the preceding year (1993) by race and education. Figure derived from data presented by the United States Department of Health and Human Services [6].

participation of relevant groups and implement culturally-sensitive policies regarding early childhood oral health. Collaborative efforts like this can provide a basis for evaluating and implementing cost-efficient and effective policies and programs.

Existing studies of factors influencing blacks' perceptions and participation in medical research often lack control groups of other racial/ethnic groups for comparison [51,52]. Nevertheless, the notion that mistrust of doctors, scientists, and the government is the reason for underrepresentation of blacks in research, and that the Tuskegee study is a factor [53] that should be explored. Insights and strategies for recruiting black participants into research and intervention programs emerged from an Ohio study conducted by ablack investigator, who experienced distrust firsthand [24]. Working with community leaders from churches, schools, grocery stores, and community centers—although requiring considerable time and effort—provided entry and access to possible subjects for recruitment. Flier and media messages, culturally-sensitive and compatible research materials, monetary incentives, and partnerships within the community were recommended.

Public perception, lack of understanding, and politics can be major impediments to the implementation of programs and policies that benefit minority communities. In Los Angeles County, the Health Services Director yielded to political pressure and controversy after the county representative

of a high-risk black district generated anxiety and suspicion that her constituents were being used as "guinea pigs" [47]. An important public health project was curtailed when the chief epidemiologist was placed on administrative leave after he received National Institutes of Health funding to study AIDS in that population [48].

The inability of the dental profession to attract a higher proportion of minority individuals to dental school may have far-reaching impact on health utilization behavior, oral health perceptions, and, ultimately, on oral health. Recruitment of minorities to dental schools, which is important in order to develop matched doctor-patient pairing opportunities, is a challenge. Although underrepresented minority (URM) individuals comprise approximately 25% of the general population, dental schools enroll only about 11% of URM individuals [54]. The American Dental Education Association (ADEA) Center for Equity and Diversity is currently addressing these issues with programs and strategies to meet the challenges of achieving optimal representation. The legislative agenda is aimed at procuring resources and implementing policies and programs to mitigate the disparities and lack of access to care for minority groups.

Several studies have attempted to assess the knowledge and attitudes of health providers regarding smoking-cessation programs and patient counseling to reduce risk behaviors for oral cancer [55,56]. Home health nurses and dental hygienists are in a position to capitalize on "teachable opportunities" to improve oral health among their patients. Nutrition education in preschool children, along with programs that focus on healthful dietary and good oral hygiene habits [57] can have long-term effects on caries prevention.

Dental and medical schools are attempting to meet the challenges, in recruitment and in curriculum. For example, a group of faculty at the UCLA School of Dentistry, created a program with courses focusing on culture and health, including "Cultural and Behavioral Issues in Dental Care" [58,59]. Through the use of case studies and videotapes that demonstrate the cultural barriers in dentist-patient interactions, lectures that explore the issues, and small group discussion sessions, attempts are made to increase sensitivity among the dental students. In order to address racial disparities in health care, some universities have created innovative partnerships such as that between Meharry Medical College, an historically black academic center, and Vanderbilt University [60]. The ADEA legislative agenda is aimed at procuring resources and implementing policies and programs to mitigate the disparities and lack of access to care for minority groups. In addition to increased attention to the issue of underrepresentation of minorities in professional schools including dentistry, there has been a resurgence of attention to allied dental education programs focusing on preventive dentistry.

The increased presence of minorities in communications professions (including television), will no doubt provide an opportunity to promote health care issues and the importance of positive health behaviors among

underrepresented groups. For example, the *Quarterly Newsmagazine for Minority Business Professionals (Focus on Diversity)* devoted its summer 2001 issue to African Americans and health, and included the article, "Black Youth and the Dangers of Smoking." A multipronged approach is essential to confront the challenges and find effective solutions to the disparities in access to oral health care and equitable health status.

Summary

Oral health and general health status depend on a dynamic interplay of many factors, including the individual's personal characteristics, behaviors, and perceptions. There are differences and disparities among different racial and ethnic groups in terms of oral health status, and in the physical, socioeconomic, cultural, and political environment. Furthermore, response to the environment may vary among individuals and populations. Access to care and patient-provider interactions are key issues to consider. This article presents a conceptual model of the variable influences on behaviors and perceptions that determine oral health status in minority and other populations.

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