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How Do Social Determinants of Health Manifest in Oral Health?

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The Social Determinants of Oral Health

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Abstract

This research looks at the cause and effect of oral health inequities in the United States. The field of dentistry is a specialized form of health care that is devoted to preventing and treating oral disease and maintaining oral health. Successful patient outcomes in oral healthcare rely on a two-pronged approach. One is quality care delivered by dental providers, and the other is the adoption of daily oral self-care by the patient. Achieving oral health is the sum of collective circumstances not exclusive to an individual's social, economic, biological or behavioral factors. Health equity is achieved when everyone has the same opportunity to reach his or her optimal health potential and is in no way disadvantaged from attaining a positive individual health status because of socially-determined circumstances. Through a critical and integrative literature review of case studies, this analysis provides a framework for how the social determinants of health manifest in oral health outcomes and how essential elements of these social determinants can be addressed by the dental profession to improve patient oral health outcomes.

The Social Determinants of Oral Health

Introduction

The profession of dental hygiene focuses on disease prevention, with a primary focus on teaching patient self-care methods to prevent and control oral disease. A component of teaching hygienists to teach patients self-care methods involves learning about Maslow's Theory and the hierarchy of needs associated with individual behavior. Teaching self-care would seem straightforward, a watch-learn-do process could potentially prevent oral disease. However, patient compliance with self-care is not that simple because it involves behavioral change, which according to Maslow is most effectively embraced at the self-actualization level in the hierarchy of needs. The social determinants of health create deficiencies in the lower levels of the hierarchy, creating opposition to achieving self-actualization.

Oral diseases are largely preventable, yet oral health prevention has not been widely promoted like other preventable systemic diseases. In a report from 2000, the United States Surgeon General reported tooth decay to be the most common chronic disease among children ages 5 to 17 (USDHHS,2000). Limitations relating to the supply of dental providers, access to care and insurance coverage often magnify the disparities existing in oral healthcare across populations, in income levels and in cultures. As a model for patient motivation, Maslow's Theory would indicate that a hungry patient suffering from food insecurity or a patient who has not paid a utility bill and has no electricity is likely not in the frame of mind to learn or apply the behavioral changes recommended by a dental or healthcare provider.

In general healthcare and in oral healthcare the measures believed by patients and providers to cause ineffective disease treatment or prevention often circle back to inadequate medical care,

poor patient compliance or unsuccessful treatment modalities. We may be looking too narrowly at the cause and effect of inefficiency. Ideally the bidirectional patient-provider relationship diagnoses, treats, and teaches prevention, and the is maintained by patient compliance with self-care. Blaming either the patient for not complying or the provider when disease occurs does not improve the process. The existing model frustrates patients and providers alike. The social determinants have been shown to create disparities in both general and oral health outcomes. When these barriers exist, they dilute out opportunity for health equity. Looking more broadly at the effort to change health behaviors requires a more comprehensive understanding of how the social determinants of health impact diagnosis, treatment, compliance and utilization in oral healthcare.

Research on the social determinants of health and their manifestations on oral health outcomes are an important to developing how healthcare providers holistically assess a patient. The information in this research may support future screening metrics for providers when evaluating their patients' potential ability to comply with treatment, and when evaluating patient's risk in for declining health. This research is also important from a public health perspective by potentially making inequities in healthcare more transparent, which could bring attention to public health measures that reduce healthcare disparities.

The purpose of this paper is to examine how the social determinants of health manifest in oral healthcare. Through research I will explore the confounding nature of how social gradients influence oral health outcomes and shift the balance of oral health equity in our population. I will survey ideas and considerations that may influence the approach to oral health promotion, oral health behavior change, and oral healthcare utilization across populations and the lifespan.

Literature Review

Optimal oral health is a complex entity of physical health that is distinctly influenced by several factors. Understanding these factors is essential for both healthcare planners and providers to effectively coordinate and deliver patient-centered treatment modalities. The United States health care system has treated oral health care as a separate treatment process from the general healthcare delivery system. Though the mouth is linked to other physical systems, functions and conditions, oral healthcare is not considered an essential part of routine healthcare. Globally, the four primary chronic diseases leading to mortality are cardiovascular disease, diabetes, cancer, and respiratory disease. There is strong scientific evidence demonstrating poor oral health is associated with each of these diseases. Access to general healthcare is a challenge for many Americans, and dental care can be even more difficult to obtain. Dental care has become an out-of-reach expense for many Americans (MacDougall,2018).

This literature review will provide a discussion of the disparities that exist in oral healthcare and the social determinants of health that impact overall oral health outcomes, as well as solutions to address the ongoing need for acknowledging and addressing the social determinants of health in the treatment of dental disease.

In its normal state, the natural environment of every human mouth is host to the components that contribute to oral disease. The primary determining factor to an individual's oral health is the level of self-initiated care administered to maintain oral health. The next section discusses the contributing risk factors to oral disease that are present in all human mouths.

Oral Disease: Everyone is at Risk

Dental Caries The natural bacterial flora of the human mouth contains upwards of 700 species of bacteria (Aas,2005). Some of these bacteria are associated with halitosis, gingivitis, periodontal disease, staining of the teeth, calculus formation and tooth decay. Every human mouth is constantly in the process of forming dental plaque. Plaque is a sticky biofilm that consists of saliva, colonies of bacteria, sloughed cells from the oral cavity and food residuals. Plaque is especially adherent to the hard tissues in the mouth. The best method of removal of plaque is the mechanical action of a toothbrush and floss against the tooth surface. Consistent removal of plaque twice daily reduces the risk for tooth decay and periodontal disease (Gallagher,2009).

Dental caries is commonly referred to as tooth decay, cavities or holes in the teeth. A result of the caries process is holes in the teeth, but caries is a complex and multifactorial disease process. As the bacteria in the mouth metabolize carbohydrates, they produce acids that demineralize tooth enamel. The process can be impacted by removal of the plaque and minimalization of dietary consumption of moderate-to-high carbohydrate foods. Untreated dental disease can affect surrounding tissues, develop infections that can spread to the brain or become systemic, causing septicemia. In rare cases dental caries may advance to secondary infections that can be fatal (Naiara,et al 2015).

Periodontal Disease and Tooth Decay Gingivitis and periodontal disease are caused by different types of bacteria than those that cause dental caries. The types of bacteria that cause gingivitis and periodontal disease are aggressive and attack both the hard and soft tissues in the mouth. It is estimated that over 47 percent of people over the age of 30 have some form of

periodontal disease, and 70 percent of people over age 65 have periodontal disease (Yamamoto, 2010). Advanced periodontitis can cause severe infection, tooth sensitivity, pain, difficulty chewing, halitosis, bleeding, swollen gums and tooth loss. Consistent, adequate removal of bacterial plaque can reduce the risk of gingivitis and periodontal disease.

Chronic and Acute Dental Disease Aside from acute pain from infection or traumatic dental injuries, dental issues associated with caries and periodontal disease arise from chronic bacterial conditions. Routine preventive dental care is the best defense against the disease process. Untreated dental disease can become symptomatic often leading to intractable pain. Dental providers do treat acute dental needs, but their primary focus is to treat the etiology of disease both to restore a state of health for the patient and to prevent potential disease or escalation of active oral disease (Taggart, 2009).

Acute dental care in hospital emergency department settings is treated with pain alleviators and antibiotics, which can reduce the acuity of the problem but does nothing to address the etiology, or to reduce the risks associated with recurrence of the acuity. Dental disease is preventable with daily self-care and routine dental visits. As with many other health conditions, early detection and intervention offers the best outcome, reduces the severity of the condition, and lessens the need for more complicated procedures (Xiang, et al 2012).

Health Disparities

The Underserved Population The dentally underserved population in the United States is defined by the United States Department of Health and Human Services (USDHHS,2018) as groups or regions of people in areas designated by the Health Resources and Services Administration that may have too few medical, dental or mental health care providers, a high

numbers of low-income and Medicaid eligible populations, a high incidence of income below the poverty line, a high level of elderly population, and that may be designated a medically vulnerable and/or geographically isolated region. Dentally underserved populations are those that are outside the purview of traditional healthcare programs because of poverty, socioeconomic conditions, minority status, geographic isolation, limited availability of resources, barriers accessing care, limited access to education, limited or no availability of public transportation, lack social support, and limited access to media and emerging technologies.

Disparities in access to dental care are far reaching. Untreated dental disease can start small and exist asymptomatically but may become serious enough to require urgent or emergent care, creating high treatment costs, missed work days or absenteeism from school, and has the potential to cause or exacerbate other systemic health problems. Access to care can be restricted for people residing in underserved communities regardless of income or their insurance status. The number of people living in dental professional shortage areas creates health care inequities across populations and life spans (HRSA, 2013).

Social Determinants of Health

General determinants of health are factors that contribute to a person's overall well-being. The contributing factors that relate to an individual's health are biological, socioeconomic, psychosocial, behavioral and social. The social determinants of health are described by the Center for Disease Control and Prevention as the conditions shaped by the amount of money, power, and resources that people have, all of which are influenced by policy choices (CDC,2018).

These factors related to health outcomes include the following:

- The amount of education a person obtains

- Ability to obtain and maintain employment
- The type of work a person does
- Food security
- Access to quality health services
- Housing status
- Income level
- Race
- Discrimination and social support

This set of factors strongly relates to the social patterning of health, and the prevalence of disease and illness. These are often overlapping factors that directly and indirectly influence quality of life and lifespan. These factors can drive health outcomes in any population. In the next section I will discuss the social determinants of health and their influence across the lifespan.

The Social Determinants of Health and Their Influence

Children and Youth According to the 2016 study by Yang, et al, in the United States youth population, children from low-income backgrounds have five times higher rate of untreated cavities than children living in higher income households. Children with untreated decay and poor oral health miss more school, and those who are in pain from untreated dental conditions are less capable of concentrating in school due to the pain they experience. Dental pain can also put the child at risk for inadequate nutrition if they cannot consume the nutritious foods that require chewing. Finding dental care can be a challenge for low-income families and

may make parents' employment status vulnerable when taking time off from work, especially if they are among the working poor (Yang, 2016).

Adults A lack of routine dental care and poor oral health for the adult population can contribute to limitations in employability, especially for jobs in the service industry, lost work hours, and frequent visits to the emergency department. Untreated chronic dental disease can manifest to acute disease requiring urgent treatment. However, emergency department care for dental disease is a palliative solution that addresses acuity but does not treat the etiology or chronicity of dental problems. According to Wall and Nasseh (2013) the number of emergency room visits to treat acute dental problems has increased substantially, from 1.1 million in 2000 to 2.1 million in 2010. Emergency department visits to treat dental issues may offer pain reliever and an antibiotic, but as a solution those are only temporary. The dental problem will recur if left untreated by a dental professional. Additionally, with the current opioid crisis our nation is facing, prescribing pain relievers should be a last resort to treat dental issues.

The Elderly Population As a profession, dentistry has accomplished success in its work of preventing disease. More Baby Boomers are entering their golden years having benefited from preventive dental care and fluoridated public water systems, and many in this generation have spent a fair amount of time and money maintaining their oral health. More people are entering retirement with their natural teeth than have generations past. The chronic conditions associated with aging also bring oral health changes (NIDCR,2014). Aging reduces the natural flow of saliva which increases the risk of tooth decay. Saliva is the natural cleanser of teeth, its components cleanse and buffer the teeth, helping to safeguard them from decay. Most medications prescribed for chronic conditions such as arthritis, hypertension, diabetes, and heart disease also cause reduced salivary flow. In addition to the potential detriments of aging on oral

health is the lack of an adult Medicaid benefit in most states (MacDougall, 2018). Without private insurance the options for dental care are self-pay or emergency department care. Retirement commonly includes fixed incomes, in which dental care is an additional expense that can easily fall off the list of financial priorities

Addressing Oral Health Disparities

Traditional Dental Care Delivery Model Since dentistry's inception as a health profession, dental practices have long been independent providers outside of the medical profession. In its earliest days, dentistry was performed in barber shops where bloodletting, leaching and other forms of dental surgery took place. In the medical profession coordination of care across specialties occurs daily. The medical profession has become masterful in managing care between primary care and specialty care teams. With advancements in electronic medical records, the approach to holistic care is becoming more of a realty shared among providers. It is not uncommon for cardiologists, gastroenterologists, urologists, radiologists, oncologists or neurologists to work with primary care providers as a team to treat their patients. Yet dentistry remains a completely siloed sector of the health profession. As the medical profession moves closer to a value-based care model dentistry remains a fee-for-service model (Fitzgerel,Gutkowski, 2007).

The Emergency Medical Treatment and Labor Act (EMTALA) was enacted in 1986 and ensures public access to emergency medical services regardless of patient's ability to pay (CMS.gov, 2018). Private practice dental providers, even if they accept Medicaid, are not regulated by the requirements of EMTALA and can legally deny treatment based on a patient's ability to pay. Reimbursement rates are significantly lower for patients with Medicaid benefits, which makes private dental practices less willing to accept patients insured by Medicaid.

Patients who have private insurance also have difficulty obtaining dental care when their coinsurance payments are not affordable (Beazoglou, et al 2010). For many people in the United States, private practice dental care is neither accessible nor affordable. This is a result of our history, culture and the dental profession fighting fiercely to maintain their autonomy.

Safety Net Programs As a strategy to address accessibility of dental care, Federally qualified health centers (FQHCs) and rural health centers (RHCs) have begun to include public health safety net dental clinics as part of their fixed sites, and sometimes in the form of outreach services. According to the American Dental Association (2010) public dental insurance is another strategy to improve access to care, but there are limitations of the dental Medicaid program. The poor are not guaranteed eligibility, dental reimbursement rates are less than operational costs, and program administration is commonly a barrier to dentist participation. In the United States only 26 percent of private dental providers accept Medicaid insurance (ADA, 2010).

Other Methods of Closing Gaps in Access As a response to address the increasing shortages in dental providers, as well as regional shortage areas, several measures have been put in place by the federal and state government. Federal and state student loan repayment programs incentivize student loan repayment opportunities by helping to recruit and retain dental professionals to the designated dental professional shortage areas (Witz, Zemon, 2018).

Social Determinants of Health and Their Impact on Oral Health

Research confirming the manifestations of the social determinants of health in oral health reveals a direct relationship between the incidence of chronic disease, decreased life expectancy and high-risk factors are primarily associated with systemic health (Singh, Harford, Schuch, Watt, & Peres, 2016). Risk factors associated with the social determinants of general systemic

health and chronic disease are the same risk factors that impact chronic oral disease. As the social determinants of health exist or increase, the relating risk factors for oral disease also increase. The risk of tooth decay, tooth loss due to disease, oral infections, gingivitis, periodontal disease, poor nutrition relating to inability to masticate, impaired communication due to tooth loss, lowered self-esteem and negative impacts on employability increase with the social determinants of health (Farmer, McLeod, Siddiqi, Ravaghi, & Quiñonez, 2016)

Economic Instability Substantial changes in employment status and household income have a direct impact on distribution of financial resources. The influence of economic instability on health equity manifests through fluctuations or consistently lowered income levels that drive family spending. Low-income levels are linked to consumption of poorer quality foods, higher consumption of carbohydrates, and reduced consumption of fruits and vegetables (Wolf, Morrissey, 2017). Oral imbalances associated with consumption of a high-carbohydrate diet are a significant risk factor in tooth decay, and low-nutrient food consumption increases the risk of periodontal disease.

Education A 2011 study found there has yet to be a systematic evaluation of the direct effect of education on health (Baker, Leon, Smith, Collins, Movit, 2011), but the relationship between education and population health may be proximal. Education does appear to support skills-based health education which helps people form behaviors and attitudes about health. The scientific and industrial revolution in the United States have gradually contributed to increased education while simultaneously increasing life expectancy. Education may lead to more employment opportunities which may be relative to more social and psychological benefits that support healthier behaviors.

Social and Community Support Social capital and the influences of its values on behaviors adopted by communities and cultures can be a powerful driver of health behaviors. Social capital can promote public health measures, encouraging trust and reciprocity in communities. It creates a sense of connectedness that has been shown to facilitate participation and support, which can manifest as protective factors and resiliency, consecutively promoting better social and health outcomes. Oral health promotion is linked to improved population health, healthier behaviors and lifestyles. (Wilkinson, Pickett, 2010).

Social and cultural behaviors associated with dental care utilization and oral health promoting lifestyle choices can mediate pathways to care in communities. Individual values, motivation and health preferences collectively form community representation and demand. Cultural perceptions of competent levels of care can lead to and support better access to care in neighborhoods and environments through localized activism in government and health planning (Grembowski, Nucci, Lee, Patrick, Jolles, Milgrom, 2006).

Addressing the Social Determinants of Oral Health

As we look at the factors that influence the current state of dentistry in the United States there is a notable gap between dentistry as a specialized medicine, and dentistry as a financially and geographically accessible form of health care. A repercussion of the current system is the estimation that 1.6 billion dollars annually is being spent on emergency department visits for dental issues (Wall, Vujicic 2015). Considering this amount of money being spent on emergency department visits for dental care, it is unnecessary to dissect the pecuniary value further because emergency department treatment is palliative and does not treat disease. The money is not contributing to a decrease in disease prevalence.

The social determinants of health are often overlapping. Poverty, inability to access health care, education levels, lack of available resources, limited access to transportation, minority status and socioeconomic conditions each can contribute to a person's ability to achieve a positive health status (Lee et al, 2018). The combination of social determinants and regional areas of dentally underserved communities further exacerbate the previously identified access to care issues. It is estimated by the U.S. Health Resources and Services Administration that 49 million (HRSA, 2013) Americans live in dental professional shortage areas.

The best defense against dental disease is self-care. Considering Maslow's Theory, as sighted in Aanstoos, 2013, food insecurity, access to education or public safety, access to care or any of the other listed social determinants of health could disrupt the hierarchy, dispelling the achievement of self-actualization where an individual is most likely to grasp concepts around self-care. According to a study performed Carroll-Scott in 2015, children born to parents who have not completed high school are at higher risk to live in environments that hinder a state of health such as lack of safety, food insecurity, and substandard housing (Carroll-Scott, 2015). These children are also less likely to have sidewalks, parks or playgrounds, recreation centers, or a library to encourage physical, social and intellectual development. The stress created by these environments can negatively affect health across the lifespan potentially having a multi-generational effect. The social determinants of health are important to consider for improving overall health and to extend an effort to reduce health disparities associated with socioeconomic disadvantages. The social determinants of health often impact patients' health before they are born into socioeconomic disadvantage.

Comparatively, the United States pays higher costs for healthcare than other nations, with significant inequities, difficult access and average outcomes in treating and preventing disease

(Shi, Leiyu; Singh, Douglas 2013). The focus of improving healthcare outcomes has historically been to scrutinize methods of delivery, and by enhancing research and development of new technologies and remedies to treat illness. I disagree that these important solutions will solve the disparities that exist, especially those related to the social determinants of health.

The relationship between oral health and general health are not only connected systemically but share the similar benefits of prevention. The growing movement of integrating oral health with systemic health through safety net programs that also offer general healthcare systems holds some promise to breaking down barriers to care. These programs offer some hope of integrating a full-scale approach of addressing the social determinants of health because federally qualified health centers offer access to full-service healthcare systems and access to ample patient-support resources. Both FQHCs and RHCs have an opportunity to coordinate initiatives across medical, dental, mental health, public education systems, social services and public health sectors to address issues that presently serve as barriers to underserved populations such as transportation, food insecurity, access to education, medical and dental care. Addressing the social determinants of health may mean taking an intense look at how social injustice contributes to disease and how to effectuate an equitable solution that allows people to live healthier across the lifespan (Shi, Leiyu; Singh, Douglas 2013).

Another View of Health Inequality and Social Determinants of Health

Sapolsky's (2018) article addresses the health-wealth gap and its impact on physical and mental health. Sapolsky (2018) describes the existence of inequities being more prevalent in socioeconomically heterogenous societies, with homogenously socioeconomic societies

experiencing less disparity and more equality. Sapolsky (2018) cites that lower socioeconomic status does not always relate to access, poverty, and education, but more so the psychosocial stressors that accompany these determinants. He advances the idea that the gradient of health disparity exists in countries that offer universal healthcare systems, and if access to care is a primary determinant of outcomes, the gradient should vanish in a universal healthcare system. Sapolsky's (2018) research does beg the question of whether working to neutralize inequities in healthcare would in fact resolve the poor health outcomes associated with the social determinants of health.

Summary

The social determinants that contribute to poor oral health outcomes can be multifactorial circumstances that sometimes exacerbate one another, hindering attainment of stable health and active health promotion. Adding to the complexity and power of the social determinants of health is the practice model of traditional dentistry itself. Operating primarily as a cottage industry outside the general health profession, dentists have held fast to practicing in an autonomous environment. The traditional dental practice model does little to close the gap that exists between the one side who have dental insurance or can afford to self-pay for their care, and the other side that includes those who cannot afford any form of dental care. Few dentists accept government-funded Medicaid insurance, with legitimate claims that reimbursement rates are too low to compensate their operational costs. The subsidy to insure low-income individuals maintains and explains underutilization of the benefit (Herndon, Tomar, Catalanotto, Vogel, Shenkman, 2015).

While the social determinants of health play a role in the health of uninsured and underinsured individuals, insured and self-pay patients face social determinants to oral

healthcare as well. Social support, community, education, geographic isolation and access to care can be barriers to those who have the financial means to pay for routine dental care.

The multifaceted issues associated with the social determinants of oral health weave together, enshrouding poor oral health outcomes throughout regions of the United States. Solutions such as addressing functionality of dental practice models, improving provider willingness to treat all patients, amelioration of government-funded dental plans, solving barriers to patient motivation, or addressing social determinants alone cannot solve these issues.

Framework for Analysis

The research for this project was performed using a qualitative content analysis of existing published studies. Through systematic analysis of qualitative data, reports and studies, this method of analysis complies with multidisciplinary health research that was specific to my research question. The research question of how the social determinants of health manifest in oral health inquires specificity of situational implications and poses a broad question of the role that social gradients have in oral health equity. Using the Granite State College Library, published journals, textbooks, Google Scholar search engine, and data derived from national organization websites, I was able to streamline well-documented and reliable information sources to answer the research question and explore potential solutions to the ongoing problems associated with oral health inequity. Keywords I used to search were social determinants of health, health equity, oral health inequity, access to dental care. Other than the use of baseline data, I specifically sought data that had been collected within the past 5 years. I also sought peer-reviewed journals and publications, professional journals and textbooks for my research.

For the theoretical portion of the research I sought older resources that served as long-standing references to the theories.

Discussion

The history dentistry in the United States has shown it to not only operate outside the scope of general healthcare, but for practice models to be moving toward spa dentistry. General practices offering makeovers, chairside whitening, Botox, Restylane treatments, veneers and instant braces are emerging throughout the country, offering services beyond the biological intention of teeth. As general dental providers now seem to be on the verge specializing in cosmetic dental services, the dental profession continues to inch away from its role as a health profession and more toward a business model. The challenge and profit margin for these cosmetic procedures offer a departure from the monotony of standard drill-and-fill workdays for dental providers, which is conducive to continued growth of this practice model.

The practice model that may be the best to address basic needs of patients who lack insurance or financial ability to pay may be comprehensive care through federally-funded dental clinics. Safety net practices are an opportunity to obtain dental treatment at sliding fee rates, and FQHCs accept Medicaid coverage. Creatively operated FQHCs could strive for a mixed payer clientele and provide contracted value-based care through mobile outreach services at long-term care facilities and nursing homes to balance out their payer model while reaching a growing underserved population.

Government funded insurance is another area where improvements could be made. The ongoing issues relate primarily to low reimbursement rates for dentists and difficulty obtaining payment from Medicaid. Increasing reimbursement rates may make private dental practices

more inclined to accept government-funded Medicaid coverage. However, some private dental practices do not accept Medicaid because the population with government-funded dental coverage often do not have reliable transportation, increasing vacancies in the dentist's schedule.

Addressing the social determinants of health may be possible through a screening process at dental visits. Prior to administration of dental treatment personal demographic patient information is recorded as well as the patient's medical and dental histories. At follow-up visits this information is updated. This could be a time when screening for social determinants could be addressed. The screening could be simplified to include some basic questions that identify potential barriers to health outcomes.

Screening for social determinants to oral health would require being prepared for sharing resources to address identified determinants to support health equity. I am convinced that these types of resources exist within all communities, but more collaboration of resources would be imperative to connect patients to the appropriate resources. Examples of this might be if a dental patient is identified as a tobacco user, in a culturally appropriate manner it would be in the patient's best interest to offer local resources to support smoking cessation opportunities. This would take some training in cultural competency and perhaps motivational interviewing to generate a health-related conversation about smoking cessation with the patient.

Conclusion and Recommendations

As more research may be required to determine how to achieve improved patient outcomes by addressing the social determinants of health, a consideration may be to engage providers and patients in a more community-based approach to healthcare. Research identifying

the relationship between poor health outcomes and the social determinants of health is available, but there are gaps in research relating to potential solutions for addressing the determinants.

Research associated with providers' engagement with patients relating specifically to the social determinants of health would be helpful to study. The potential for both the medical and dental professions to work collaboratively in their efforts of cultural competency, motivational interviewing, referrals and use of regional resources, and employing appropriate screening questions that could more clearly identify the social determinants of health in the patient population are all areas for improvement if there were current data supporting these efforts. Awareness of available regional resources would be key to facilitating cross-provider referrals to support and benefit patient outcomes and contribute to a more holistic approach to care, ultimately leading to improved value-based oral and systemic health outcomes.

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