ANTIBIOTICS

Addressing inappropriate antibiotic prescribing

BACKGROUND

The inappropriate prescribing of antibiotics is a major contributing factor to antibiotic-resistant infection development. Over 2 million illnesses and 23,000 deaths occur in the United States each year as a result of antibiotic-resistant infections. These infections are more difficult to treat than others and carry a higher risk for morbidity and mortality. The use of antibiotics is associated with higher rates of *Clostridiodes difficile* infections (CDIs) and visits to the emergency departments for adverse drug events. The role dentists play in the development of antibiotic-resistant infections and possible actions that could be taken to reduce the risks associated with these infections were discussed.

DENTISTRY AND ANTIBIOTICS

It's been estimated that 30% of outpatient antibiotic prescriptions are given without following guidelines for indications, correct drug, or duration of administration. Many countries have documented that dentists are responsible for substantial inappropriate antibiotic prescribing practices, with the numbers varying by provider and geographic location. In the United States, dentists are the third most numerous prescribers of antibiotics by volume, so a large number of them could be prescribing antibiotics inappropriately.

Often dentists are not witness to the adverse effects of antibiotic prescribing. These effects include adverse reactions and CDIs. As a result, dentists may be less familiar with the problems of inappropriate antibiotic prescription.

Between 2014 and 2016 a study of Utah dental clinics found that just 10% of the prescriptions given were consistent with preprocedure prophylaxis guidelines. In addition, nonprophylactic antibiotics were given for an average of 8.3 days. This study also identified a higher frequency of CDI after antibiotic-associated encounters in these dental offices.

Because there are no national guidelines for the treatment of specific dental infections, dentists may overestimate patient demand for antibiotics and underestimate the effectiveness of informed communication. Often patients who come to hospital emergency departments for dental-related conditions are given antibiotics and opioids, which reflects not just a lack of access to dental care providers but also a reduced use of preventive dental care.

ACTIONS DENTISTS CAN TAKE

Some important actions can be taken by dental professionals to help reduce the problem of inappropriate dental antibiotic prescribing. First, when planning continuing education programs and developing criteria for the recertification of dentists, the topics of antibiotic resistance and prescribing should be among the priorities. This includes ensuring that updates on antibiotic prophylaxis for preventing bacterial endocarditis and infection of prosthetic joints after dental procedures are provided, along with any new data on preventing infection of adjacent tissues and diagnosing and treating established oral infections. Ways to improve communication with patients using behavioral science–based strategies should be taught in these educational encounters.

Second, dentists should also seek to work with local, state, and national organizations to develop evidence-based guidelines for the treatment of specific dental conditions. These guidelines should be based on rigorously performed studies.

Third, efforts should be made to determine which non-dentist physicians are prescribing antibiotics prophylactically or for the treatment of dental conditions. In concert with any antibiotic-prescribing physicians in the community, dentists

Clinical Significance

Antibiotic-resistant infections cost lives and are associated with an increased number of people who are ill. Fewer drugs are available to treat the infections, and fewer drugs are in development. All health care providers who prescribe antibiotics need to be aware of the existing prescribing guidelines and evaluate whether these guidelines are supported by well-researched evidence. If not, they should engage with their professional organizations to develop evidence-based guidance for the antibiotic prescriptions. Dentists need to do their part to avoid creating more monsters in the form of antibiotic-resistant strains of bacteria.

should engage and promote consistent practices regarding antibiotics. Some physicians who should be included are infectious disease specialists, cardiologists, and orthopedic surgeons. The expansion of access to preventive oral health services should also be promoted.

Fourth, trends in antibiotic prescribing within each dental practice should be tracked. Electronic billing can be a source for tracking data. The data should be audited to provide feedback to the dental providers with the hope of improving antibiotic prescribing practices.

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IMPLANTS

Prevalence and projected prevalence of implant use

BACKGROUND

Implant placement has become a desirable course of treatment for replacing missing teeth because of its high rate of success and predictable outcomes. Patients especially value the retention of adjacent tooth structure and bone and experience better masticatory function and better quality of life. The impression is that the prevalence of dental implant use among the US population has been steadily increasing. The data collected through the National Health and Nutrition Examination Survey (NHANES) from 1999 to 2016 were evaluated to determine trends in the prevalence of dental implants among adults as well as sociodemographic characteristics of implant recipients and projections regarding implant use to 2026.

METHODS

Seven NHANES from 1999 to 2016 were reviewed. Dental implant prevalence data among adults missing any teeth were estimated for each survey period according to sociodemographic characteristics of the implant recipients. Absolute and relative differences were calculated from 1999-2000 to 2015-2016 and fitted to logistic regression models to estimate changes with time. Multivariable logistic regression was used to estimate any independent associations of sociodemographic covariates with the presence of an implant. Using all these data, a projection was made regarding the proportion of patients who would be treated with dental implants in 2026 under various assumptions of how the temporal trend would continue.

RESULTS

Of the US adults age 18 years or older, 32,758 had at least 1 missing tooth and 618 had at least 1 implant. Fifty-six percent of these individuals were women, and 77% had more than a high school education. Twenty-eight percent of the individuals were age 65 to 77 years, 80% were White, and about 54% had private health insurance.

When individuals with missing teeth who did not have implants were considered, a slightly lower proportion of women was noted. In addition, just 59% had a high school education, 70% were White, and a much lower proportion had health insurance compared to those with implants.

From the 1999-2000 data, the prevalence of implants in adults missing at least 1 tooth was 0.7%, but this increased in 2009-2010 to 1.9%, then jumped to 5.7% in 2015-2016. A similar increasing trend was seen across all the sociodemographic variables that were evaluated. The highest absolute increase in implant prevalence was 12.9% and occurred in individuals age 65 to 74 years. The largest relative increase was 1034% among those age 55 to 64 years.

The implants were placed fairly equally in mandibular and maxillary sites. Most were in posterior sites, except in 1999-2000, when almost 54% were placed in anterior sites. The most common tooth replaced by an implant was either number 19 or number 30.

From 1999-2000 to 2015-2016, the average covariate-adjusted increase in implant prevalence per year was 14%. Specific characteristics linked to a higher use of implants included a nearly 13-fold increase in prevalence in adults age 65 to 74 years compared to those age 18 to 34 years. Having private insurance and an education exceeding high school were each associated with a 2-fold increase in implant prevalence. The temporal trend was much stronger for those age 65 to 74 years, with a considerably slower increase in implant prevalence among people without medical insurance compared to those with either public or private insurance. People with a high school education or less had a much slower increase in implant prevalence compared to those having more than a high school education.

Projections to 2026 under the most conservative scenario were less than 10% (Figure 2). However, if the trend toward the use of