

Emerging Evidence of Periodontal Disease and Cardiovascular Markers for Children with Diabetes

Dr. Anwar Merchant, an epidemiologist with the Arnold School of Public Health, was awarded funding from the University of South Carolina's Research Opportunity Program to examine the relationship between periodontal disease and complications from diabetes among a cohort of youth participating in the national SEARCH study.

South Carolina is one of the six SEARCH study sites across the United States. Funded by the Centers for Disease Control and Prevention (CDC) and National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), SEARCH is an ongoing study that enables researchers to track diabetes trends among youth in the United States. The study has been invaluable in helping researchers better understand how the disease affects different age and ethnic groups.

Previous research indicates there is a link between periodontal disease and diabetes for adults. Diabetes is an increasing prevalent chronic disease distinguished by high levels of glucose in the blood. Periodontal disease, caused by an infection that leads to inflammation of the gums, is suspected to contribute to a difficulty in controlling blood glucose levels. Elevated glucose levels have been associated with complications from diabetes, such as cardiovascular disease, blindness, and renal disease.

Most of the research in this area has been among adults, but little information is available on the potential complications of diabetes and periodontal disease among children, Merchant said.

"Because I have a background in dentistry, this was a good opportunity to fill a gap in the understanding of diabetes and periodontal disease in a cohort of children," Merchant said.

In addition to Merchant, other researchers on the project included Dr. Beth Mayer-Davis, a former Arnold School researcher now at the University of North Carolina, Chapel Hill, and Dr. Angela Liese of the Arnold School's Department of Epidemiology and Biostatistics.

In 2008, a sample of SEARCH study participants participated in a pilot study. Researchers asked parents for permission to contact the child's dentist(s) for a history of radiographic images (X-rays), which were digitally scanned and printed on photographic paper for analysis. Typically, periodontal disease is diagnosed by a dentist during a clinical exam. However, because of the number of study participants and for future larger studies, the seed grant enabled Merchant to develop a feasible and valid method for assessing periodontal disease. Obtaining radiographic images for each study participant allowed Merchant and colleagues to re-construct a cohort with historical records of their oral health.

Preliminary analysis from the pilot study indicated that there was a difference in the relationship between periodontal disease and cardiovascular markers (HDL, LDL, triglycerides) for children with type I and type II diabetes. Children with type II diabetes and periodontal disease have a lower ability to produce fasting plasma c-peptide, which is a marker of the pancreas' ability to produce insulin, compared to those without periodontal disease.

Key Points

- Research indicates there is a link between periodontal disease and diabetes for adults, but little is known about the relationship among children.
- Periodontal disease is suspected to contribute to difficulty in controlling blood glucose levels, which have been associated with complications from diabetes.
- This study found a difference in the relationship between periodontal disease and cardiovascular markers for children with type I and type II diabetes.
- The results from this study will be used to apply for a grant to further study diabetes types among children in relation to periodontal disease and cardiovascular markers.

Additionally, a recent study has influenced Merchant's research interests. The study indicated a sub-set of microorganisms causes periodontal disease and contributes to cardiovascular disease among children.

The findings, coupled with emerging evidence linking heart disease to oral microorganisms associated with periodontal disease, will provide the foundation for a grant submission to the National Institutes of Health. The grant will address diabetes types among children in relation to microorganisms associated with periodontal disease and cardiovascular markers.

"What started out as a feasibility study has developed into good ideas to pursue in larger prospective studies. Future research will help us better understand mechanisms and outcomes of diabetes and periodontal disease among children," Merchant said.