Less Than Optimal Dental Care Among Rhode Island Adults with Diabetes: The Need to Assure Oral Health Care for All Adults with Diabetes

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Recent decades have seen an increase in the prevalence of diabetes in both Rhode Island and the United States. In 2010, it was estimated that approximately 8% of Rhode Island adults age 18 years and older were living with a diagnosis of diabetes, a percentage amounting to more than 64,000 individuals.[1] This trend of increasing diabetes prevalence is projected to continue in coming years due to the increasing rate of obesity, decreased physical activity, and growing elderly and minority populations.[2]

Periodontal disease is a major complication of diabetes. The association between periodontal disease and diabetes, particularly type II, is bi-directional.[3,4,5] Chronic hyperglycemic conditions increase the risk of oral health complications such as periodontal disease via altered immune responses and compromised wound healing. In addition, periodontal disease provides a chronic bacterial inflammation and infection source that may adversely affect insulin sensitivity, which in turn deteriorates glycemic control. The oral health status of patients with diabetes should be closely monitored to reduce and eliminate periodontal infection and avoid further worsening diabetic condition.

Given the current evidence, treating periodontal infection is considered an important component of overall diabetes management and care. The Centers for Disease Control and Prevention (CDC) and the American Diabetes Association (ADA) recommend that people with diabetes have a dental exam at least once every six months.[6,7] Patients who have advanced periodontal disease or whose diabetic condition is not well controlled, should be seen by a dentist more frequently.

The objectives of this report are to document the recent estimates of Rhode Island diabetic adults who received preventive dental care in the past year, and to assess determinants of disparity that may exist in the receipt of dental care among adults with diabetes.

Methods

Data used for this analysis were obtained from the 2006, 2008 and 2010 Rhode Island Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an ongoing telephone health interview survey of non-institutionalized U.S. adults age 18 years or older. Details of the BRFSS are described in the CDC website.[8] In even-numbered years, since 2000, oral health questions were included that asked adults if they received preventive dental care in the past 12 months (having visited a dentist or dental hygienist for a checkup or cleaning). For the three years, a total of 15,900 adults participated in the survey.

Table 1. Rhode Island Adults Age 45 Years and Older Who Reportedly Received Preventive Dental Care (Dental Checkup or Cleaning) in the Past 12 Months by Diabetes Status, 2006, 2008 and 2010 BRFSS

Variable	Adults diagnosed with diabetes		Adult with no diabetes		P-value
Category	Sample size*	Weighted % (95% CI)	Sample size*	Weighted % (95% CI)	
All	1,209	72.7(69.7–75.8)	9,140	83.5 (82.6–84.4)	<.0001
Gender					
Male	524	72.6 (68.2–77.0)	3,229	82.7 (81.2–84.2)	<.0001
Female	685	72.9 (68.8–77.0)	5,911	84.1 (83.0–85.2)	<.0001
Age (Years)					
45–64	586	72.8 (68.3–77.3)	5,741	84.2 (83.1–85.3)	<.0001
≥65	623	72.7 (68.6–76.7)	3,399	81.8 (80.3–83.3)	<.0001
Race/Ethnicity					
Non-Hispanic White	1,008	75.2 (72.0–78.4)	8,266	84.6 (83.7–85.6)	<.0001
Other	180	59.5 (50.0–69.0)	747	72.0 (68.1–75.8)	<.05
Education					
≤ High School	566	67.7 (63.1–72.3)	3,289	74.8 (73.0–76.6)	<.01
> High School	638	76.6 (72.5–80.7)	5,829	88.0 (87.0–89.0)	<.0001
Dental care coverage					
Yes	480	74.9 (70.2–79.6)	4,071	90.4 (89.3–91.5)	<.0001
No	373	66.5 (60.5–72.5)	2,381	69.6 (67.3–71.8)	0.3565

* Unweighted sample sizes for each category may not add up to total sample size because of missing and excluded data (responses of "don't know," "not sure," or refused). CI = confidence interval

Table 2. Receipt of Diabetes Management and Care in the Past 12 Months among Rhode Island Adults Age 45 Years and Older with Diabetes, 2006, 2008 and 2010 BRFSS

Variable	Preventive dental care		Foot check		Eye exam	
Category	Weighted %	AOR (95% CI)	Weighted %	AOR (95% CI)	Weighted %	AOR (95% CI)
All	72.7	–	79.2	–	82.4	–
Gender						
Male	72.6	0.94 (0.68–1.29)	79.2	0.97 (0.69–1.37)	82.7	1.09 (0.74–1.60)
Female (reference)	72.9	–	79.2	–	81.9	–
Age (Years)						
45–64 (reference)	72.8	–	79.6	–	78.7	–
≥65	72.7	0.99 (0.72–1.35)	78.8	0.94 (0.65–1.34)	86.6	1.86 (1.25–2.78)*
Race/Ethnicity						
NHW (reference)	75.2	–	78.8	–	83.6	–
Other	59.5	0.51 (0.33–0.79)*	79.5	1.05 (0.63–1.73)	74.7	0.64 (0.36–1.15)
Education						
≤ 12 years	67.7	0.64 (0.47–0.88)*	78.3	0.91 (0.64–1.31)	80.5	0.73 (0.49–1.10)
> 12 years (reference)	76.6	–	79.8	–	84.0	–

* P-value<.01 CI = confidence interval; AOR = adjusted odds ratio; NHW= Non-Hispanic White

The outcome variable, receipt of preventive dental care in the past 12 months, was cross-referenced with self-reported diabetes status (coded from the question: "Have you ever been told by a doctor that you have diabetes, other than during pregnancy?"), selective demographic variables (gender, age, race/ethnicity and educational attainment), and dental care coverage. Since oral healthcare use is strongly associated with having teeth, and diabetes, particularly Type II, is highly prevalent among middle-aged and older adults, analyses were restricted to dentate adults age 45 years and older (n=10,355).

Bivariate analyses using the chi-square test were done to identify any significant differences between diabetes status and co-variables with respect to adults' receipt of preventive dental care in the past year. Multiple logistic regression analyses were also conducted to determine important predictors of the outcome variable, controlling for possible confounders and other correlates. Finally, associations between preventive dental care and demographic variables among adults with diabetes were compared with receipt in the preceding year of two other recommended diabetes management and care interventions: foot check (having feet checked for any sores or irritations by a health professional in the past 12 months) and dilated eye examination (having an eye examination in which the pupils were dilated in the past 12 months).

Data were weighted to the probability of selection and adjusted to reflect the age, gender, and race/ethnicity of Rhode Island's adult population. The statistical significance was tested at P<0.05. SAS survey procedures were used for the analyses in the study to account for the complex sampling design.

Results

In the BRFSS years of 2006, 2008 and 2010 combined, 11.0% (95% Confidence Interval (CI): 10.3%–11.7%) of Rhode Island dentate adults age 45 years and older were estimated to have diagnosed diabetes. Among them, 72.7% (95% CI: 69.7%–75.8%) received a dental checkup or teeth cleaning in the past year. The proportion was significantly lower than that of adults who did not have a diabetes (83.5%, 95% CI: 82.6%–84.4%, p<.0001) (Table 1). The difference by diabetes status persisted across all subgroups of adults, even among individuals who attained a higher than high school education or adults who had any type of dental coverage. Therefore, data supports the conclusion that diabetes status adversely affected the rate of preventive dental care.

The prevalence of dental care at least once a year among adults with diabetes was lower than those for foot checks (79.2%, 95% CI: 76.3%–82.1%) or eye examinations (82.4%, 95% CI: 79.4–85.3%) (Table 2). The results of the multiple logistic regression analysis show that race/ethnicity or education level independently affects the likelihood of having received dental care. Racial/ethnic minority adults (OR=0.51, 95% CI: 0.33–0.79) or those who had high school or lower educational attainment (OR=0.64, 95% CI: 0.47–0.88) had lower odds of having received preventive dental care in the past year than their adult counterparts, when controlled for other variables. The prevalence of foot checks or eye examinations did not indicate a similar disparity by race/ethnicity or educational level.

Discussion: Opportunities to improve oral health care for all adults with diabetes

Adults with diabetes are more susceptible to periodontal disease and other oral health conditions that would require more frequent dental visits than adults without diabetes concerns. It was anticipated that adults with diabetes would be more likely to obtain dental care as a part of diabetes management and care. However, according to the 2006, 2008 and 2010 BRFSS findings, the utilization of preventive dental care among Rhode Island adults with diabetes was lower than among adults without diabetes. Among adults with diabetes, racial/ethnic minority adults or those who had lower educational attainment had lower odds of receiving dental care. The disparity by race/ethnicity or educational level is pronounced for dental care, as compared with other diabetes care practices, such as foot check and eye examination.

There could be several multi-faceted reasons behind this finding. Individuals with diabetes may be unaware of the importance of maintaining good oral health as part of their diabetes management plan, and often do not perceive a need to visit a dentist.[9] For some patients, particularly the publicly-insured, limited access to oral health services due to a lack of or inadequate insurance coverage is a major barrier that may prohibit patients with diabetes from seeking preventive oral health care.

Medical and oral health providers do often miss opportunities to explain and educate about oral health-diabetes interaction to their patients with diabetes. Medical providers diagnose and monitor glycemic control and complications of diabetes, but may not screen risk of oral diseases or refer patients for oral health care. Dental providers are not usually part of interdisciplinary diabetes management team with other medical providers, including primary care providers, endocrinologists, podiatrist, and ophthalmologists/optometrists.

Developing strategies to address less than optimal oral health care among adults with diabetes can lead to improved overall health outcomes, including greater diabetes control, management and a reduction in diabetes-associated complications. The Rhode Island Department of Health recommends that all stakeholders support and undertake the following objectives:

- Improve the awareness of the bi-directional link between diabetes and oral health among people with diabetes, health care providers, and the general public;
- Train and educate non-oral health professionals involved in diabetes care about the importance of oral health care anticipatory guidance and referrals;
- Include oral health care in diabetes management and care;
- Promote policy change to improve access to routine and preventive oral health care of all adults with diabetes, especially racial/ethnic minorities, adults with lower education and income, and those who lack dental insurance; and
- Expand partnerships between organizations focused on diabetes care and oral health.

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Authors and/or their spouses/significant others do not have financial interest to disclose related with this study.

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