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Factors Associated with Preventive Care Practice among Adults with Diabetes

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Abstract

Adherence to annual preventive care (foot, eye, and dental examinations) in this group of study participants with diabetes (n=253) was suboptimal. Participants were 2.6–5.8 times more likely to have a specific preventive care in the past 12 months if they were told to do so by a health care professional.

Annual preventive-care practices (foot, eye, and dental examinations) among patients with diabetes are efficacious in detecting, reducing the occurrence, and delaying progression of diabetes-related complications [1–3]. Despite these benefits, participation in such practices among this population has been reported as sub-optimal [4]. Given the potential benefits through preventive care, it is important to identify amendable factors, such as recommendations from health professionals, that can improve patients' adherence to preventive care.

Methods

Participants and Procedures

Participants were a convenience sample of 253 adults who identified themselves as having diabetes and residing in the US. The majority (63.6%) were recruited from a pool of Gullah-speaking African-American (AA) adults diagnosed with diabetes in an epidemiological study in South Carolina (SC) [5], and the rest were recruited from 13 other states. To identify health professionals who advised them to have annual preventive care, participants completed a questionnaire related to sources of diabetes information and use of dental and health care services. Detailed description of recruitment, the sample and the questionnaire has been reported elsewhere [6]. Specific to this study, participants were asked whether they have seen (1) a foot doctor, (2) an eye doctor, and (3) a dentist in the past 12 months, and to identify specific health professionals who advised them to have this preventive care. The study was approved by the Institutional Review Board of the Medical University of South Carolina.

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Conflicts of Interest:

I do not have any conflict of interest relative to my involvement with this study and publication.

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Data Analysis

Rather than considering the specific health professional recommending each preventive care category, I combined those participants who indicated receiving recommendations from any medical health professional (i.e., physicians, nurses/diabetes educators, or pharmacists) for annual foot and eye examinations. For dental visit recommendations, participants who indicated receiving recommendations from either medical or dental (i.e., dentists or dental hygienists) health professionals were combined.

Prior to developing logistic regression models for each preventive care category, I performed univariate regression analyses. Explanatory variables (list in Table 1) with a p-value less than 0.25 in univariate models were considered as candidates for multivariable modeling [7]. Multivariable logistic regression analyses were used to model the probability of participants having preventive care in the past 12 months (see Table 2). All p-values reported in the multivariable models were two-sided, and the type I error rate was set at 0.05.

Results

Factors associated with having foot examination in the past 12 months

Univariate analyses indicated participants who received health professionals recommending feet checks, or eyes checks once a year, seen a nurse/diabetes educator for diabetes in the past 12 months, AA, older age, longer duration of diabetes, having health insurance, lower income, or not employed were more likely to have a foot examination in the past 12 months.

Multivariable analyses indicated that factors significantly associated with having foot examination in the past 12 months were health professionals recommending feet checks once a year, longer duration of diabetes, and having health insurance.

Factors associated with having eye examination in the past 12 months

Univariate analyses indicated factors predicting likelihood of an eye examination in the past 12 months were health professionals recommending eye checks once a year, seen a nurse/diabetes educator for diabetes in the past 12 months, AA, older age, longer duration of diabetes, or lower income.

Multivariable analyses indicated three variables were significantly associated with having an eye examination in the last 12 months; health professionals recommending eye checks once a year, longer duration of diabetes, and seen a nurse/diabetes educator for diabetes in the past 12.

Factors associated with having dental visit in the past 12 months

Univariate analyses indicated that participants more likely to have a dental visit in the last 12 months were those having health professionals told to have teeth and gums checked at least twice a year, had dental insurance, higher income, more education, or perceived the condition of teeth or gums as very good/good.

Multivariable analyses revealed that factors significantly associated with a dental visit in the last 12 months were health professionals recommendations to have teeth and gums checked at least twice a year, had dental insurance, and perceived teeth condition as very good/good.

Discussion

Compared with the targets set for Healthy People 2010 diabetes objectives [8], use of annual preventive care among this group was low, especially for foot and dental examinations. However, the preventive care utilization pattern is consistent with a large epidemiological study on health of Gullah population in SC with type 2 diabetes [9]. Further support for the generalizability of findings is that AAs in this study were more likely to have annual foot and eye examinations, and less likely to have dental visits than Caucasians; this pattern is consistent national studies on diabetes preventive care [10–12].

While factors associated with preventive care varied by category, the odds of having annual preventive care are 2.6–5.8 times higher for participants who had health professionals specifically telling them to have such examinations than those who did not, after controlling for potential confounders. This significant association applies across all three categories of preventive care. Participants with lower income were more likely to have an eye and foot examination, but not a dental visit in the past 12 months can be explained by their eligibility for Medicaid (public health insurance). In most states, Medicaid covers annual eye and foot examinations for patients with diabetes, but not dental visits.

Duration of diabetes, rather than age, associated with increased likelihood of having annual eye and foot examinations is revealed in the final model; these results are consistent with a population study on regularity of preventive care for adults with diabetes in Norway [13]. Longer duration of diabetes is more likely to be associated with developing complications which may contribute to more frequent preventive care.

Despite the limitations of this study, the convenience sampling and reliance on self-report, findings highlight the role of health professionals in educating patients about the necessity of annual preventive care and the importance of category-specific recommendations [14,15]. For example, increases in annual foot examinations were not associated with participants who had health professional recommending eye checks; similarly, increases in annual eye examinations were not associated with participants who were told to have their feet checked in the final model.

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Table 1

Participants' socio-demographic information and self-reported preventive care practices

Characteristic	Mean (SD)/Count (Percent)
Age (years)	57.9 ($\pm$ 12.8)
Years since diagnosis of diabetes	13.0 ($\pm$ 11.5)
Race	
African American	188 (74.3%)
Caucasian	57 (22.5%)
Gender (female)	179 (70.8%)
Married	119 (47.0%)
Education beyond high school	102 (40.3%)
Employment (full- and part-time)	88 (34.8%)
Health insurance	205 (81.0%)
Dental insurance	138 (54.5%)
Income (US\$)	
<\$15,000	105 (41.5%)
\$15,000–\$29,999	65 (25.7%)
\$30,000–\$44,999	29 (11.4%)
>\$45,000	54 (21.3%)
Dentate	233 (92.1%)
Type 2 diabetes	210 (83.0%)
Perceived very good/good control of diabetes in the past 12 months	170 (67.2%)
Perceived very good/good condition of the teeth	117 (46.2%)
Perceived very good/good condition of the gums	158 (62.5%)
Medical doctor visit for diabetes in the past 12 months	238 (94.1%)
Seen a nurse/diabetes educator for diabetes in the past 12 months	145 (57.3%)
Foot doctor visit in the past 12 months	123 (48.6%)
Eye doctor visit in the past 12 months	180 (71.1%)
Dental visit in the past 12 months	145 (57.3%)
Had all three (foot, eye, and dental) visits in the past 12 months	53 (20.9%)

Table 2

Univariate and multivariable analyses examining factors associated with having preventive care visit/examination in the past 12 months in adults with diabetes

Explanatory Variables	Foot Examination		Eye Examination		Dental Visit [‡]	
	OR (95% CI)	Adj OR (95% CI)	OR (95% CI)	Adj OR (95% CI)	OR (95% CI)	Adj OR (95% CI)
Health professionals told to have feet checked by a foot doctor once a year	6.11 (2.60, 14.37)***	5.83 (2.35, 14.47)***	1.67 (0.83, 3.33) ^{ns}	-----	-----	-----
Health professionals told to have eyes checked by an eye doctor once a year	3.31 (1.05, 10.43)*	-----	5.15 (1.83, 14.50)**	4.33 (1.33, 14.08)*	2.12 (0.78, 5.78) ^{ns}	-----
Health professionals told to have teeth and gums checked by dentist twice a year	-----	-----	-----	-----	2.61 (1.44, 4.72)**	2.56 (1.37, 4.79)**
Age (years)	1.04 (1.02, 1.06)**	-----	1.02 (1.00, 1.05)*	-----	-----	-----
Duration of diabetes (years)	1.06 (1.03, 1.09)***	1.04 (1.02, 1.07)**	1.05 (1.02, 1.09)**	1.05 (1.02, 1.09)**	-----	-----
Race (African American)	0.48 (0.27, 0.86)*	-----	0.55 (0.30, 1.10)*	-----	1.51 (0.82, 2.77) ^{ns}	-----
Gender	-----	-----	-----	-----	1.49 (0.84, 2.63) ^{ns}	-----
Health insurance (coverage)	2.18 (1.13, 4.22)*	3.68 (1.69, 7.99)**	-----	-----	1.70 (0.89, 3.26) ^{ns}	-----
Dental insurance (coverage)	-----	-----	-----	-----	2.73 (1.59, 4.67)***	2.48 (1.42, 4.36)**
Income	0.72 (0.57, 0.89)**	0.61 (0.47, 0.80)***	0.74 (0.59, 0.93)*	-----	1.43 (1.13, 1.81)**	-----
Employment (employed)	0.47 (0.27, 0.79)*	-----	0.68 (0.39, 1.20) ^{ns}	-----	1.49 (0.86, 2.57) ^{ns}	-----
Education (beyond high school)	0.69 (0.42, 1.15) ^{ns}	-----	-----	-----	2.03 (1.18, 3.49)*	-----
Had seen a nurse/diabetes educator for diabetes in the past 12 months	2.28 (1.37, 3.80)**	-----	2.34 (1.34, 4.07)**	2.47 (1.37, 4.47)**	-----	-----
Perceived condition of teeth (very good/good)	-----	-----	-----	-----	2.73 (1.59, 4.70)***	2.52 (1.43, 4.44)**
Perceived condition of gum (very good/good)	-----	-----	-----	-----	2.10 (1.23, 3.61)*	-----

Note.

[‡] Analyses were performed on 233 dentate adults with diabetes;

OR=odds ratio; CI = confidence interval; Adj OR = adjusted odds ratio

*** p<.001;

** p<.005;

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not significant at $\alpha=.05$

$p<.05$;

ns