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Gender Medicine, Volume 6, No. 1 (April 2009): 272-276, DOI.

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Factors Associated With Receipt of Preventive Dental Treatment Procedures among Adult Patients at a Dental Training School in Wisconsin, 2001-2002

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Gender Medicine, Vol. 6, No. 1 (April 2009): pg. 272-276. DOI. This article is © Elsevier and permission has been granted for this version to appear in e-Publications@Marquette. Elsevier does not grant permission for this article to be further copied/distributed or hosted elsewhere without the express permission from Elsevier.

Abstract:
Background: Gender differences in oral health-related quality of life and the fear of dental pain in seeking and receiving preventive dental care have been recognized and documented. Preventive dental treatment procedures (PDTPs) are commonly accepted as the primary approach to prevent dental disease. **Objective:** We examined whether the likelihood of receiving PDTPs differed by gender in adult patients receiving dental care at a dental training institution in Milwaukee, Wisconsin. **Methods:** Data from the Marquette University School of Dentistry electronic patient management database for 2001 through 2002 were analyzed. Descriptive, bivariate, and multivariable analyses were performed. The preventive procedures used in the study were those coded in accordance with the American Dental Association's classification system: D1110 (adult prophylaxis: professional cleaning and polishing of the teeth), D1204 (adult topical application of fluoride), D1205 (adult topical application of fluoride plus prophylaxis), and D1330 (oral hygiene instruction). **Results:** Of the 1563 consecutive patient records (888 women, 675 men) reviewed for the years 2001-2002, 794 individuals (51%), aged 18 to 60 years, were identified as having received PDTPs. At the bivariate level, a significant gender difference in the receipt of PDTPs was identified (423 women [48%] vs 371 men [55%]; $P = 0.004$). In the multivariable analyses, age, race/ethnicity, marital status, poverty level, and health insurance type (public, private, none) were significantly associated with the receipt of PDTPs (all, $P < 0.05$), but gender was not. **Conclusions:** Gender differences in receiving PDTPs were not found in this dental school patient population. Receipt of PDTPs was associated with other demographic factors such as age, race/ethnicity, marital status, income level, and health insurance.

Introduction

Gender differences in oral health-related quality of life, dental health behavior, fear of dental pain, and preventive dental visits have all been recognized and documented.[1-5] Gender differences in dental disease burden, access to care, and how women and men react to disease prevention and health promotion activities have also been described.[6,7] However, little attention has been paid to the relationship between the health care system and individual-level factors that influence gender differences in the receipt of preventive dental treatment procedures (PDTPs), Desvarieux et al[8] found gender differences in cardiovascular morbidity or mortality, based on the contribution of novel risk factors across gender following the examination of the relationship between periodontal disease, tooth loss, and atherosclerosis. The study reported that atherosclerosis was associated with clinical attachment loss and tooth loss in males but not in females. Furthermore, a higher percentage of males had periodontal depth ≥5 mm.

Studies have noted that the most likely users of dental services are female, white, college-educated urban dwellers who earn high salaries, have dental insurance, and are in good general health.9 It is well known that compared with men, women seek more care for acute and chronic conditions and access health services more frequently.10 To our knowledge, very little has been reported on whether females are more likely to be provided with PDTPs than are males. With females being the most likely users of dental care, one might expect them to have a higher probability of receiving PDTPs to prevent the occurrence of the 2 most common dental diseases, dental caries and periodontal disease, which are also chronic conditions.

Preventive dental visits are essential to establishing and maintaining good oral health.[1] The receipt and utilization of PDTPs also promote and maintain good oral health-related quality of life. In addition, preventive dental interventions are effective in reducing the incidence of dental caries and their associated expense.[11] Studies have documented that gender is a determinant of dental services utilization and that differences exist in dental visit patterns.[12,13] However, the use of PDTPs, which is different from self-reported dental visits and preventive dental visits, has received limited attention. In particular, little is known about whether women and men are equally likely to receive PDTPs. Our study objective, therefore, was to examine whether there is a gender difference in the likelihood of receiving PDTPs among adult patients under dental care at a dental training institution.

Methods

We analyzed administrative data from the electronic patient management database at Marquette University School of Dentistry in Milwaukee, Wisconsin, for the years 2001 through 2002. The study included all consecutive active adult patient records (ie, patients who were seen for comprehensive care, not emergency walk-ins) at the dental school. The database contained information on patient age, gender, race/ethnicity, marital status, poverty level, and health insurance type. In our analyses, insurance status was defined as private/commercial, public (Medicaid and/or Medicare), out of pocket (patients who were uninsured and/or paying for treatment out of pocket), and unknown, Income was categorized as either below or above poverty level, based on US Census Bureau classification.[14] Other information available included the different types of PDTPs provided to patients, coded in accordance with the American Dental Association's procedure classification. The following PDTP codes were included in our study: D1110 (adult prophylaxis: professional cleaning and polishing

of the teeth), D1204 (adult topical application of fluoride), D1205 (adult topical application of fluoride plus prophylaxis), and D1330 (oral hygiene instruction).

Statistical Analysis

Because the focus of the present study was on gender differences, the analysis was limited to those patients who provided complete information that included gender. To determine significant differences between subgroups of the study population, $\chi 2$ testing was employed. Information on age was used as a continuous variable in all analyses. A logistic regression model was used to model the probability of receiving PDTPs while adjusting for other covariates such as age, race/ethnicity, marital status, income, and health insurance. A statistical goodness-of-fit test was employed to assess the appropriateness of our final model. All statistical analyses were performed using SAS version 9.1 software (SAS Institute Inc., Cary, North Carolina). Statistical significance was set at $\alpha = 0.05$, and all tests were 2-tailed.

Results

Overall, 1574 adult patients were seen at the clinic from 2001 through 2002. Of these patients, complete database information was available for 1563 patients for the final analysis. Fifty-seven percent of the patients seen at the clinic were women. White patients comprised 50% of the study population, blacks 22%, Hispanics 6(%), others 5%, and unknown 17%. Individuals with public health insurance, those paying out of pocket, and those who had private insurance accounted for 45%, 32%, and 23% of all patients, respectively. In both years, approximately half of the patients seen at the clinic had incomes below the poverty level.

The results of a bivariate analysis for factors associated with rates of receipt of PDTPs are shown in Table I. Fifty-one percent of the patients, 48% of women, 60% of whites, and 53% of public insurance holders received PDTPs. A significant gender difference was evident between the women and men who received PDTPs (48% vs 55%, respectively; $P = 0.004$). White patients were more likely to have PDTPs compared with Hispanics (45%) and blacks (41%) during the study period. In addition, age and income level were significant factors affecting receipt of P OTPs.

Table II presents results of the logistic regression model on the probability of receiving PDTPs while adjusting for age, race/ethnicity,

marital status, poverty level, and health insurance. After adjusting for these covariates, gender was not a significant predictor of receiving PDTPs, although women had numerically lower odds of receiving PDTPs than did men (adjusted odds ratio [AOR] = 0.83; 95% CI, 0.67-1.03). Age was significantly associated with the receipt of PDTPs ($P < 0.001$); the odds of receiving PDTPs significantly rose with every additional year of age (AOR = 1.03; 95% CI, 1.02-1.04). Compared with whites, blacks had lower odds of receiving PDTPs (AOR = 0.44; 95% CI, 0.33-0.58), whereas Hispanics were not statistically different from whites (AOR = 0.70; 95% CI, 0.44-1.10). Patients with incomes above the poverty level were significantly more likely to receive PDTPs compared with patients who had incomes below the poverty level (AOR = 1.36; 95% CI, 1.01-1.83]. For individuals who paid out of pocket, the adjusted odds of receiving PDTPs were significantly lower compared with individuals who were covered by public health insurance (AOR = 0.65; 95% CI, 0.50-0.84).

We also adjusted for the possibility of a correlation between patients who could visit in both years; however, we found similar results.

Discussion

In the present study, ~1 of every 2 active patients undergoing dental care at the study facility received PDTPs. Women were significantly less likely to receive PDTPs; however, the difference between women and men was not significant after adjusting for covariates. It is difficult to directly compare our findings with those of others who have reported on regular and preventive dental visits, frequency of dental checkups, and use of dental services and providers, because most studies have analyzed data from a national database,[11,15,16] whereas ours used actual patient records from a dental training facility. Moreover, the information from the national database was self-reported, and no effort was made to verify it with patient records.

After adjustment for other covariates, race/ethnicity was significantly associated with receipt of PDTPs. Blacks were less likely than whites to receive PDTPs, a finding congruent with what is generally reported in most dental health services research.[1,15,16] In the present study, Hispanics were found to be numerically less likely than whites to receive PDTPs, but the difference between the 2 groups was not statistically significant. Older age was significantly associated with an increase in the probability of receiving PDTPs. However, the reason why older patients appear to receive more PDTPs requires further

investigation from other databases in which diagnostic codes are available to serve as a covariate in the study.

To apply the findings from the present study, dental health professionals should continue to educate all patients, reinforcing the need for PDTPs in addition to addressing their primary complaints. Dental health professionals should also educate their patients and the community about the benefits of preventive therapy regardless of gender, race/ethnicity, income, or the level of dental disease burden. This supports a comprehensive, whole-population approach to dental care and the concept of a dental "home" for all patients.

Certain strengths and limitations of our data should be noted. One limitation of this study is that a single institution's database was used, and thus these results cannot be generalized beyond the studied sample. Nonetheless, the data set included specific PDTPs and relevant demographic and income information. Another limitation is that the analyses did not adjust for potential confounders such as the number of teeth, oral health status, the patient's dental disease burden or disease diagnosis, status as a recall patient, or the number of years the patient was seen at the dental school. We also recognize that most people receive their dental care from private dental practices, and that findings from those settings could be different. This study's findings have important implications for dental health care provision for any setting that seeks to provide equitable care regardless of gender or race. Studies in other settings, especially private practice, are required to determine if gender differences actually exist, given what we know about self-reported preventive dental visits and the most likely users of dental services.

Conclusions

Among those receiving care in this dental training institution, no significant gender difference was observed in the receipt of PDTPs. Other factors such as age, race/ethnicity, marital status, income, and health insurance were associated with the receipt of PDTPs.

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Appendix

Table I: Bivariate analysis of factors associated with dental patients' receipt of preventive dental treatment procedures (PDTPs). Unless otherwise indicated, data are no. (%) of patients

Variable	Rate of Receiving PDTPs	*P*
Patients	794/1563 (51)	
Gender		0.004
Female	423/888 (48)	
Male	371/675 (55)	
Median age (range), y	43 (18–60)	0.003
Race/ethnicity		<0.001
White	470/779 (60)	
Black	140/343 (41)	
Hispanic	43/95 (45)	
Other	33/75 (44)	
Unknown	108/271 (40)	
Marital status		0.190
Single	393/765 (51)	
Married	215/399 (54)	
Divorced, widowed	112/234 (48)	
Unknown	74/165 (45)	
Poverty level		<0.001
Above	185/313 (59)	
Below	368/791 (47)	
Unknown	241/459 (53)	
Health insurance		0.213
Public	368/700 (53)	
Private	62/113 (55)	
Out of pocket	252/504 (50)	
Unknown	112/246 (46)	

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Table II: Multivariable analyses of factors associated with dental patients' receipt of preventive dental treatment procedures (PDTPs).

Variable	AOR (95% CI) of Rate of Receiving PDTPs	*P*
Gender (Referent: male)		0.085
Female	0.83 (0.67–1.03)	
Age	1.03 (1.02–1.04)	<0.001
Race/ethnicity (Referent: white)		<0.001
Black	0.44 (0.33–0.58)	
Hispanic	0.70 (0.44–1.10)	
Other	0.57 (0.35–0.93)	
Unknown	0.41 (0.29–0.59)	
Marital status (Referent: married)		0.015
Single	1.24 (0.94–1.64)	
Divorced, widowed	0.73 (0.52–1.03)	
Unknown	1.04 (0.68–1.59)	
Poverty level (Referent: below poverty level)		0.034
Above	1.36 (1.01–1.83)	
Unknown	1.34 (1.02–1.76)	
Health Insurance (Referent: public)		<0.001
Private	0.65 (0.42–1.02)	
Out of pocket	0.65 (0.50–0.84)	
Unknown	0.55 (0.40–0.75)	

AOR = adjusted odds ratio.

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