



# Predictors of preventive dental care

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## Abstract

**Background:** It was postulated that parents would receive less preventive dental care than their children and that adults would receive more preventive dental care than parents. Other predictors were also explored.

**Methods:** A convenience sample of adults and parents, presenting to the emergency department, answered questions about age, ethnicity, education, medical insurance, dental insurance, and preventive and emergency dental care in the past year. Parents answered similar questions for a child >3 years to <18 years. Parents were defined as living with their children <18 years. Significant univariate odds ratios based on group (adult, parent or child), age, ethnicity, education, medical insurance, dental insurance and emergency dental care were then analyzed using stepwise logistic regression.

**Results:** Four independent predictors of preventive dental care were found. Adults and African-Americans received less preventive dental care while dental insurance and emergency dental care were associated with more preventive dental care.

**Conclusions:** Emergency physicians can encourage preventive dental care for all patients especially adults, African-Americans and those receiving emergency dental care. Also, those without dental insurance can be assisted.

**Keywords:** Preventive dental care, emergency dental care, adult, parent, children, African-American, dental insurance, medical insurance, level of education

## Introduction

Lower rates of preventive dental care have been associated with caries, pain, dental procedures and sedation. A US study in 2010 found that 22% of children age 2 to 17 years had not seen a dentist in the past year and that 11% in that age group had never seen a dentist [1]. For over ten years, the American Academy of Pediatric Dentistry and the American Academy of Pediatrics have recommended that infants should visit the dentist when the first tooth appears or no later than one year. Also, routine visits are recommended every 6 months [2]. High rates of dental caries have been found in American children, 28% in children aged 2-5 years and 51% in children aged 6-11 years [3]. In children with Medicaid insurance, less preventive dental care has been associated with more dental procedures [4].

Also, the number of visits and economic costs of emergency dental care are substantial. US emergency department dental

visits increased from 1.1 million in 2000 to 2.1 million in 2010. Of total ED visits, dental visits increased from 1.06% in 2000 to 1.65% in 2010. The cost in 2010 is estimated to be between 867 million and 2.1 billion [5].

We sought to determine predictors of receiving preventive dental care in the past year. Characteristics assessed included group (adult, parent living with their child(ren) <18 years and children aged  $\geq 3$  to <18 years), age, ethnicity, level of education, medical insurance, dental insurance and emergency dental care in the past year.

The primary aim of this study was to determine whether children received more preventive dental care than their parents who in turn received less preventive dental care than other adults. Secondary comparisons included: age, ethnicity, level of education, medical insurance, dental insurance and emergency dental care in the past year. We were able to make these comparisons.

## Materials and methods

A convenience sample of adults and parents completed a questionnaire which took about 5 minutes. Trained research assistants working varied days, evenings, weekdays and weekends enrolled emergency department patients. Data were collected for adults, parents and children. Parents were defined as living with their young child(ren) <18 years while adults did not live with their young child(ren). Children were defined as  $\geq 3$  years to <18 years. Data collected for adults and parents included age, ethnicity, level of education, medical insurance, dental insurance, preventive dental care in the past year and emergency dental care in the past year. For preventive dental care, adults and parents were asked whether they had seen a dentist in the past year for a cleaning. For emergency dental care, they were asked whether that had seen a dentist or emergency care (dentist, urgent care or emergency room) in the past year for dental pain or a cavity. For their children  $\geq 3$  years to <18 years, parents responded about medical insurance, dental insurance, preventive dental care in the past year and emergency dental care in the past year. For children, parental ethnicity and parental level of education were used. Exclusion criteria included age >65 years or <18 years, critically ill patients, patients unable to read or speak English, patient visit for dental pain or dental trauma, prior enrollment or refusal. IRB approval and informed consent were obtained for this study. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. Unidentified data can be obtained from the principal author.

Univariate odds ratios for preventive dental care in the past year were determined based on group (adult, parent and children), age, ethnicity, level of education, medical insurance, dental insurance and emergency dental care in the past year. Variables found to be significant on univariate analysis were then analyzed using stepwise logistic regression.

Comparing two groups and looking for at least a 10% difference, 65% of children with preventive dental care compared with 55% of adults, 380 were needed in the two groups. With 380 in the two groups, the study would have a power of 80.5%. In our groups there were 448 adults and 329 children. With these numbers and considering an 11% difference between the groups, our sample size would have a power of 85%.

## Results

Data were collected for 1,151 subjects including 448 adults, 374 parents and 329 children. Variables found significant on univariate analysis were group (adult, parent, child), age, ethnicity, level of education, medical insurance, dental insurance and emergency dental care in the past year (Table 1). They were applied to stepwise logistic regression (Table 2) which found that adults were less likely to receive preventive dental care when compared to parents who were in turn less likely to receive dental care when compared to children. Also,

**Table 1. Univariate Odds Ratios for Preventive Dental Care.**

Variable	Odds Ratio	95% Odds Ratio Confidence Interval	P value
<b>Group Missing (0)</b>			
Adult (448)	reference	--	--
Parent (374)	1.38	1.03-1.84	0.032
Child (329)	3.77	2.62-5.43	<0.001
<b>Age</b>	1.13	1.00-1.27	0.050
Adult (38.6) vs. Parent (36.7)			
<b>Ethnicity Missing (3)</b>			
Caucasian (790)	reference	--	--
Asian (16)	0.41	0.14-1.19	0.101
African-American (262)	0.43	0.32-0.58	<0.001
Hispanic (73)	0.56	0.32-0.96	0.035
Other (46)	0.57	0.31-1.08	0.083
<b>Education Missing (3)</b>			
Attended college or more (726)	reference	--	--
Graduated HS or less (413)	0.48	0.37-0.62	<0.001
Other (9)	1.06	0.34-3.26	0.920
<b>Medical Insurance Missing (4)</b>			
None (91)	reference	--	--
Private (592)	4.08	2.60-6.38	<0.001
Public (464)	1.78	1.15-2.78	0.010
<b>Dental Insurance Missing (1)</b>	3.92	2.89-5.30	<0.001
Yes (925)	--	--	--
No (225)	--	--	--
<b>Emergency Dental Care in the Past Year Missing (1)</b>	3.86	2.68-5.55	<0.001
Yes(317)	--	--	--
No (833)	--	--	--

African-Americans were less likely to receive preventive dental care. Having dental insurance but not medical insurance was associated with preventive dental care. Emergency dental care in the past year was also associated with greater preventive dental care.

Children ranged in age from 3 to less than 18 years, but exact ages were not collected. While adult and parental ages were collected and were different, the mean difference was only 1.9 years with 38.6 years being the mean age for adults and 36.7 years for parents (Odds Ratio 1.13, 95% Confidence Interval 1.00-1.27). This age difference was not felt to be clinically significant so age was not applied to the stepwise logistic regression. Also, adults or parents who attended college or received more education were not found to have visited the

**Table 2. Stepwise Logistic Regression for Preventive Dental Care.**

Variable	Odds Ratio	95% Odds Ratio Confidence Interval	P value
<b>Group</b>			
Adult	reference	--	--
Parent	1.45	1.05-2.02	0.025
Child	4.14	2.75-6.23	<0.001
<b>Ethnicity</b>			
Caucasian	reference	--	--
Asian	0.40	0.12-1.30	0.126
African-American	0.45	0.32-0.65	<0.001
Hispanic	0.70	0.38-1.30	0.257
Other	0.68	0.33-1.40	0.295
<b>Dental Insurance</b>	2.55	1.73-3.75	<0.001
<b>Emergency Dental Care in the Past Year</b>	5.12	3.44-7.62	<0.001

dentist for preventive care more than those who graduated from high school or received less education.

## Discussion

Four independent predictors of preventive dental care were found. Stepwise logistic regression found that adults and African-Americans were less likely to receive preventive dental care in the past year while dental insurance and emergency dental care in the past year were associated with preventive dental care.

Our study found that children received more preventive dental care than their parents who in turn received more dental care than other adults. In the US from 1997 to 2010, preventive dental care in children increased. This has coincided with increased public coverage of dental services for children. At the same time, adult rates of dental care have declined which has been attributed to the recession, characterized by decreased private dental insurance and increased public and non-insurance for adults [6]. Our findings may also reflect these economic changes.

In 2010, the National Health Interview Survey found that African-American and Caucasian children age 2 to 17 years had similar rates of dental visits in the past year [1]. However, like our study, many other studies have found less dental care in African-American children and adults when compared with Caucasians [7-12]. In 2004, the Medical Expenditure Panel surveyed 34,403 individuals. While African-Americans were less likely to report differences in accessing dental care than Caucasians, they visited the dentist less in the previous year [8]. The 2007 National Survey of Children's Health accounted socioeconomic status for 71% of the gap in preventive dental care between African-American and Caucasian children [9]. The type of dental insurance has not been found to affect preventive dental care in African-American children [12].

While some studies have found that medical insurance has been associated with greater dental use [13], our study did not. However, dental insurance was found to be associated with greater preventive dental care. One large study with over 33,000 children found that children with private dental insurance (68%) had more dental care in the prior 6 months than children with public dental insurance (55%) who in turn saw the dentist more than children without dental insurance (27%) [14]. Like children, adults without dental insurance have been found to receive less preventive dental care [11,12,15]. From 1996 to 2000, the incorporation of dental insurance in the State Children's Health Insurance Program and Medicaid Programs led to increased preventive dental care [16].

Our study found emergency dental care in the previous year to be associated with preventive dental care. Another study found that those receiving preventive dental care were less likely to seek emergency dental care within the following year [17].

Lower levels of parental education have been associated with less preventive dental care in their children [7,18,19]. In our study, higher level of education was not an independent predictor of preventive dental care. This may have been due to associations with other independent predictors of preventive dental care like having dental insurance.

There are limitations to our study. One is that the population studied was a convenience sampling of emergency department patients. This population may not represent other emergency departments or primary care settings. Also, parental ethnicity and parental level of education were used as surrogates for their children. By using the ethnicity and level of education of one parent, that of the other is missed. Also, the baseline dental health of the community was not assessed which may affect several of the variables studied.

## Conclusion

Four independent predictors of preventive dental care were found. Stepwise logistic regression found that adults and African-Americans were less likely to receive preventive dental care while dental insurance and emergency dental care in the past year were associated with preventive dental care. Our study supports findings of previous work for adults, dental insurance and emergency dental care in their relationship with preventive dental care. However, our study contradicts the findings for medical insurance and parental level of education. Emergency physicians can encourage preventive dental care for all patients especially adults, African-Americans and those receiving emergency dental care. Also, those without dental insurance can be assisted.

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

Authors' contributions	DD	PF	NR	CK
Research concept and design	✓	✓	✓	✓
Collection and/or assembly of data	--	--	✓	--
Data analysis and interpretation	✓	✓	--	--
Writing the article	✓	--	--	--
Critical revision of the article	✓	✓	✓	✓
Final approval of article	✓	✓	✓	✓
Statistical analysis	--	✓	--	--

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