

Predictors of the Utilization of Oral Health Services by Children of Low-income Families in the United States: Beliefs, Cost, or Provider?

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Purpose. This study examined the predictive factors enabling access to children's oral health care at the level of financial barriers, beliefs, and the provider.

Methods. In-depth interviews were conducted with 320 immigrant mothers of low-income families regarding their use of oral health services for children aged four to eight years old. Access to oral health care was measured with frequency of planned dental visits, continuity of care, and age at first visit to dentist.

Results. The mother took her child to the dentist at a younger age if she received referrals to a dentist from pediatrician. Regular dental visits were significantly related to household income, provider availability on weekends, and insurance coverage. The extended clinic hours in the evenings, and the belief in the importance of the child's regular dentist visits increased the likelihood of continuing care. The mothers perceiving a cost burden for the child's dental care were also less likely to return to the dentist.

Conclusion. The available care delivery system, coordinated medical care, and health beliefs were among important predictors of the health service use. The study findings suggest need for culturally competent dental health interventions to enhance access to oral health care among particularly vulnerable populations such as low-income children in Korean communities.

Key Words: Access to care, Oral health, Low-income population, Attitude to health

INTRODUCTION

Racial, ethnic, and socioeconomic-related disparities in children's health are among the most serious public health problems in the United States (John, Fedele, Bolden & Bloom, 1994; U. S. Department Health and Human Services, 2000). Oral diseases continue to be a cause of health problems for many low-income and mi-

nority populations (Edelstein, 2002; Garcia & Juarez, 1978). In addition, the low utilization of health services is a serious public health problem. The Surgeon General's National Call to Action (Stewart, Alexander, Ortega, Dausey & Rosenheck, 2002) emphasized expanding efforts to improve oral health and to address disparities in oral health in every community in the country. Understanding the underlying factors related to accessing health service can contribute to increased ac-

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cess to care and subsequent improvement in oral health status.

Oral health is not equally available to all segments of society, and those who need care the most are often the least likely to receive it (Caplan, & Weintraub, 1993; Edelstein 2002; Davidson, Cunningham, Nakazono, Andersen, 1999). According to previous studies, low-income children in the United States have limited access to dental services and are more likely to have unmet dental needs (Estrada, Trevino & Ray, 1990; Nakazono, Davison & Andersen, 1997; Saha, Komoaromy, Koepsell & Bindman, 1999). For instance, the 20 million children and adolescents under age 19 in families with low incomes account for 80% of all tooth decay (Mouradian & Wehr, 2000). The children who come from low-income families often live in areas where there are no practicing dentists and therefore have the least access to oral health care. Identifying barriers to care among low-income children is important for reducing disparities in all health outcomes. Ma, Park, and Horowitz (2002) found that low-income children in Korea are also disproportionately affected by inadequate access to oral care, not only for acute but also for preventive services. Thus, the study findings are applicable to vulnerable populations, such as low income children in Korean communities, to improve access to health care.

Dental caries are the most common chronic disease facing children today (Edelstein & Douglas, 1995). Among Hispanics, the prevalence of dental caries is disproportionately higher than for Caucasian or African Americans (Morales, Lara, Kington, Valdez & Escarce, 2002; Shiboski et al., 2003). Hispanic children are more likely to be poor, uninsured, and have parents with limited education attainment (Flores & Vegas, 1998). This study explored factors related to the care delivery system and individual health beliefs and value as well as socioeconomic status among low income Hispanic children in the United States. Some researchers suggest that disparities in health service use should be traced back to differences among socioeconomic groups, while others argue that the relationships among these variables remain unclear (Aday & Fortthofer, 1992).

The purpose of this study was: (1) to examine the variations in use of oral health services due to individual predisposing factors (health beliefs and financial barriers) or the delivery system (provider availability and care coordination) and (2) to identify significant factors affecting the type of health service use for regular planned dental

visits, age at first visit, and continuity of care.

METHODS

Study Participants

The participants in this study were 320 Hispanic mothers of children aged four to eight years attending public schools and Head Start Centers in three targeted community areas in Chicago. The community areas were chosen based on 1990 U. S. Census and City of Chicago Planning Council data of community indicators (e.g., percentage of persons living in poverty, overcrowded areas, and dilapidated housing). Neighborhoods that included both Puerto Rican and Mexican-American residents were selected if they had more than 30% of their residents identify themselves as Mexican-American or Puerto Rican and if over 30% of residents were below the poverty level. Three community areas fit these criteria and provided our sampling frame.

Sampling Procedures

Thirty-five public elementary schools were listed in these three-community areas (Persky & Slezak, 1994). Of these, 17 schools had at least 30 percent Puerto Ricans and 20 to 30 percent Mexican-Americans among their student population. After obtaining permission from the Chicago Public Schools Central Administration, the researchers attended the monthly principals' meeting to explain the study and invite the principals to allow parents of students in their schools to participate in the study. Notices were sent to the parents of children in participating schools to invite mothers of children aged four to eight years to participate. If the mother wished to be contacted to learn more about the study or to participate, she returned the notice to the school with her contact information. Bi-lingual and bi-cultural (Spanish and English) interviewers conducted the interviews in the language preferred by the mother. The research protocol, sample recruitment, and informed consent were approved by the University of Illinois at Chicago (UIC) Institutional Review Board.

Study Instruments

The interview questions used in this study were developed through focus groups consisting of a total sample of 69 Mexican American and Puerto Rican mothers and fathers. The researcher also reviewed questions from large national data sets such as the National Health

Interview Survey and the U.S. Census. Survey Research Laboratory personnel at the UIC to check for formatting and data tracking reviewed the completed questionnaires. Questions were initially written in English, then translated into Spanish, and finally back translated into English.

Independent Measures

Socio-demographic measures included age, family income, education, length of U.S. residence, and dental insurance coverage, including Medicaid (public assistance program). Acculturation was measured using the Marin short acculturation scale, a widely used 13-item Hispanic acculturation index. The Marin scale focuses on language proficiency, preference, and the ethnicities of friends in their social network (Marin, Sabogal, Marin, & Ostro-Sabogal, 1987). In this study, the Marine scale had adequate reliability (Cronbach's alpha, $r=0.80$).

The mother's health beliefs were measured with these items: 1) regular dentist's visits to keep the child from getting cavities; 2) perceived seriousness of cavities in the child's baby teeth and permanent teeth; and 3) importance of dental visits during child's preschool years. Financial barriers were assessed with the following

items, all of which concerned the burden of dental costs: (1) dental costs preventing the mothers from taking the child to dentist; (2) having trouble paying for child's dental care in the past year; (3) obtaining reimbursement from a dental insurance program; and (4) without insurance, costs which prevented the parents from taking the child to dentist. Provider characteristics included availability of extended clinic hours, sending a reminder and a confirming call for next appointment, and pediatrician's referrals to see a dentist.

Outcome Measures

The outcome variables were the services utilization measures most likely to affect health outcome. Starfield (1995) identified critical attributes of primary care that positively affect health outcomes: early initiation of first contact, continuity of care and regular planned visits. We measured early initiation of first contact as the age of first visit; regular planned visits as the number of planned dental visits a year; and continuing of care as return to the same dentist.

Data Analysis

Data were analyzed using the SPSS version 11.0.

Table 1. Study Sample Characteristics

Characteristics	Ethnic Subgroup			Total Sample n = 320
	Mexican n = 221 (69%)	Puerto Rican n = 69 (22%)	Other Hispanic n = 30 (9%)	
Mother's age (mean)	32.2 years	33.1 years	32.7 years	32.5 years
Mother's Education (mean)*	8.6 years	12 years	11 years	9.5 years
Less than high school	70.3%	29.0%	41.4%	58.7%
High school or equivalent	17.8%	23.2%	34.5%	20.5%
More than high school	11.9%	47.8%	24.1%	20.8%
Length of Residency in the U. S. (mean)**	11.3 years	18.7 years	12.1 years	12.4 years
Acculturation (mean)**	1.91	2.89	2.54	2.18
Household Annual Income				
Less than \$ 4,999	6%	13.4%	3.6%	7.4%
\$ 5,000 –\$ 9,999	16.7%	20.9%	14.3%	17.0%
\$10,000 –\$ 14,999	26.0%	22.4%	17.9%	
\$ 15,000 –\$ 24,999	31.2%	25.4%	35.7%	30.3%
\$ 25,000 –\$ 34,999	13.5%	11.9%	17.9%	13.5%
More than \$ 35,000	5.6%	6.0%	10.7%	6.4%
^a Annual Income below Poverty Level	65.2%	60.9%	46.4%	62.6%
Participating in free or reduced-price meal programs at schools	92.9%	90.3%	100%	87.2%
Dental insurance (including Medicaid) in past the 12 months*				
Never	36.2%	14.5%	20.0%	30.0%
Few months	5.5%	1.4%	0%	4.1%
Most/ All months	58.3%	82.1%	82.4%	65.9%

* $p < 0.05$, ** $p < 0.01$

^a Poverty level is defined as below annual income of \$15,000 for a family of four in 1998.

Descriptive statistics were used to identify socio-demographic characteristics, access to oral health care, and provider characteristics within the study sample using ANOVA and Chi-square tests. We estimated linear regression and logistic regression models to identify the factors that were associated significantly with the type of health service use among the children in this study.

RESULTS

Socio-demographic characteristics of the sample are

shown in Table 1. Of the 320 respondents, 69 (22%) identified their family of origin as Puerto Rican, 221 (69%) as Mexican, and 30 (9%) said they had some other Latino/Hispanic background (Central or South America). Puerto Rican mothers had significantly more schooling and were more acculturated than other Hispanic mothers. The overall household annual income was low in the study sample. The majority of respondents (80%) reported an annual household income of less than \$25,000, and approximately 87% of the children participated in free or reduced-price meal programs

Table 2. Access to Oral Health Care, Provider, Cost, and Beliefs

Characteristics	Ethnic Subgroup			Total Sample
	Mexican	Puerto Rican	Other Hispanic	
Initiation of care (months)	35.4	31.5	30	34.1
Frequency of planned visits				
Not at all	0.5%	0%	0%	0.4%
One time a year	31.9%	15.3%	40.7%	29.2%
Two or more than two times a year	67.6%	84.7%	59.3%	70.4%
Continuity of care	75.7%	75.8%	76.7%	75.8%
Having trouble paying for dental care				
A lot of or some trouble	25.1%	23.4%	16.7%	23.9%
A little/ No trouble at all	74.9%	76.6%	83.3%	76.1%
Cost preventing from taking child to dentist				
Always/ Often	27.0%	21%	19.2%	25.5%
Rarely/ Never	63%	79%	80.8%	75.5%
Dentist office open on weekends **				
Always/ Often	67.6%	89.6%	61.9%	64.4%
Rarely/ Never	32.4%	10.4%	38.1%	35.6%
Dentist office open in weekday evenings (after 5 PM) *				
Always/ Often	43%	68.8%	40.7%	48.8%
Rarely/ Never	57%	31.8%	59.3%	51.2%
Referrals to a dentist from pediatrician				
Yes	23.1%	18.2%	23.3%	22.1%
No	79.9%	81.8%	76.7%	77.9%
Provider sending a reminder for next appointment**				
Yes	44%	61.7%	67.9%	49.8%
No	56%	38.3%	32.1%	50.2%
Dentist call to confirm next appointment				
Yes	32.7%	33.3%	9.6%	33.1%
No	67.3%	66.7%	90.4%	66.9%
Importance of dental visits during child's preschool years*				
Very or somewhat important	99.5%	94.3%	100%	98.5%
Not too/ Not at all important	0.5%	5.7%	0%	1.5%
Importance of taking child to dentist regularly				
Very or somewhat important	98.2%	95.5%	100%	98.4%
Not too/not at all important	1.8%	4.5%	0%	1.6%
Seriousness of a cavity in a baby tooth*				
Very or somewhat serious	77.7%	79.7%	83.3%	88.6%
Not too/not at all serious	22.3%	20.3%	16.7%	21.4%
Seriousness of a cavity in a permanent tooth				
Very or somewhat serious	98.6%	96.7%	100%	98.1%
Not too/not at all serious	1.4%	3.3%	0%	1.9%

*p<0.05, **p<0.01

at schools.

The differences in use of oral health care across the three ethnic groups were not significant. The mean age at first visit was 34 months of age. Approximately 70 percent of the mothers planned to take their child to the dentist twice a year. The majority of the mothers perceived the seriousness of a cavity in either a baby tooth or a permanent tooth. Approximately 26% of the mothers said that dental costs prevented from taking the child to a dentist. Twenty-two percent of the mothers received a referral to a dentist from the child's pediatrician (Table 2).

Bivariate Analysis Results

Provider availability in convenient clinic hours affected all outcome measures of access to care. Having dental insurance coverage was related to more frequent planned dentist visits. The mothers with lower family income were more likely to plan dental visits for their children. Since a higher percentage of mothers with lower household income had Medicaid (public insurance program) for dental care, the mothers of the children with Medicaid could plan dental visits more frequently. While the variables of cost burden for child's dental care as perceived by the mother and her beliefs in the importance

of preventive care were not related to the frequency of planned visits, those variables were included as important correlates of the outcomes of age at first visit and continuity of care. Mother's perceived value of a visit to the dentist during the child's preschool years and sending a reminder for the next visit affected the mother's decision to return to the same dentist for care (continuity of care).

The age at first visit was significantly correlated with acculturation, length of residence in the U.S., and education level. Mothers who had resided in the U. S. longer and had higher levels of acculturation took their children for the first dental visit at younger ages than mothers who were less acculturated or who had resided in the U. S. for fewer years. Higher cost burden was related to taking the child to the dentist at an older, rather than, younger age, so children without dental insurance did not see a dentist until they were older. Referrals to a dentist from a pediatrician and the mother's belief in the importance of dentist visits during the child's preschool years were significantly correlated with seeing a dentist at a younger age.

Multivariate Analysis Results

Multiple regression analyses were performed to identify

Table 3. Bivariate Results for Access to Oral Health Care

Factors	Outcome Measures		
	Frequency of Planned Visits β Coefficient	Initiation Dental care β Coefficient	Continuity of Care Odds ratios (95% CI)
Length of residence in the U.S.	-0.01	-0.29*	1.02 (0.98-1.06)
Acculturation	0.03	-3.71*	0.98 (0.69-1.39)
Education	0.01	-0.60*	0.95 (0.88-1.03)
Importance of dental visits during child's preschool years	-0.15	-9.66**	2.16 (1.15-4.07)*
Importance of regular dentist visits (preventive dental care)	0.14	-3.78	3.84 (1.71-8.63)**
Seriousness of cavities in a baby tooth	0.07	-0.87	1.19 (0.87-1.63)
Seriousness of cavities in permanent tooth	-0.14	-1.08	1.47 (0.81-2.70)
Dental insurance coverage	0.08*	-1.80*	1.16 (0.96-1.40)
Family income	-0.06*	-0.56	0.82 (0.67-1.01)
Dental cost preventing from taking child to dentist	-0.01	2.02*	0.75 (0.58-.97)*
Having trouble in paying costs in the past year	-0.01	-	0.94 (0.73-1.22)
Getting money back from insurance company	0.10	-	0.01 (0.01-1.01)
Without insurance, cost prevent from taking child to dentist	0.02	1.32	0.75 (0.56-1.01)
Dentist office open in weekday evenings (after 5 PM)	0.03	0.37	1.34 (1.07-1.67)**
Dentist office open on weekends	0.09**	-1.92*	1.09 (0.86-1.37)
Referrals to a dentist from pediatrician	0.08	-7.79**	1.62 (0.81-3.22)
Sending a reminder for next appointment	0.06	-	1.77 (1.02-3.09)*
Dentist call to confirm next appointment	0.03	-	1.84 (1.05-3.23)*

* $p < .05$, ** $p < 0.01$

fy significant factors for each outcome measure when the independent variables were adjusted. Having dental insurance (beta coefficient=0.07, $p=0.03$), lower family income (beta coefficient=-0.06, $p=0.04$), and provider availability on weekends (beta coefficient=0.07, $p=0.04$) were among important predictors of more planned dentist visits for the mothers (Table 4). Receiving referrals to a dentist from a pediatrician was the only significant predictor of initiating child's dental care (beta coefficient = -6.96, $p=0.01$). The likelihood of continuing care was significantly increased when clinic hours were available in the evenings (OR=1.38, 95% CI=1.08 to 1.77). The mothers who perceived a cost burden for the child's dental care were also less likely to return to the dentist (OR=0.73, 95% CI=0.55 to 0.99). The mothers who perceived the importance of preventive care were approximately 3.5 times more likely to return to the dentist (OR=3.45, 95% CI=1.42 to 8.36) (Table 5).

Discussion and Conclusions

Previous studies indicated that socio-demographic characteristics of poor immigrant populations prevent them from seeking care (Edelstein, 2002; Garcia & Juarez, 1978; Aday & Forthofer, 1992). They were more likely to lack in education, speak a language other than English, have a low family income, or a low level of acculturation. However, the socio-demographic differences

obscure the process within the care delivery system, the provider characteristics and individual health beliefs may prevent parents in this population from seeking dental care for their children. This study used a social ecological model within that social stratification of immigrant families to identify the factors that affected low socioeconomic and less acculturated population. In this urban, immigrant, low-income sample, socioeconomic status and acculturation were not predictive of dental service use.

Each type of health service use was predicted by different factors. Great emphasis was placed on health beliefs in preventive oral health and the care delivery system in this study. As shown in the study findings, the convenient clinic hours had an impact on the access to oral healthcare. Yet only half of the mothers could access their providers at convenient clinic hours, such as weekday evenings or on weekends. In addition, an active role by dental care provider in ensuring access care and coordinated care between pediatrician and dentist were not present for most of the families in this study. Less than half of the mothers reported receiving a reminder or a call confirming next visits and only 22% of the mothers reported receiving a referral from the child's pediatrician. When controlling for education, acculturation, and length of residence in the U.S., it was maternal beliefs in preventive care that served as a motivation for continu-

Table 4. Multivariate Results for Access to Oral Health Care

Factors	Outcome Measures		
	Frequency of Planned Visits ^a β Coefficient (p value)	Initiation of Dental Care ^b β Coefficient (p value)	Continuity of Dental Care ^c Odds ratio (95% CI)
Length of residence in the U.S.		-0.22 (p = 0.18)	
Acculturation		-0.06 (p = 0.98)	
Education		-0.40 (p = 0.25)	
Importance of dental visits during child's preschool years		-7.30 (p = 0.06)	1.26 (0.53–3.04)
Importance of regular dentist visits			3.45 (1.42–8.36)**
Family income	-0.06 (p = 0.04)*		
Dental insurance (Including Medicaid)	0.07 (p = 0.03)*	-1.41 (p = 0.11)	
Cost of dental care has prevented from taking child to dentist		1.35 (p = 0.26)	0.73 (0.55–0.99)*
Dentist office open in weekday evenings (after 5 PM)			1.38 (1.08–1.77)*
Dentist office open on weekends	0.07 (p = 0.04)*	-0.22 (p = 0.81)	
Sending a reminder card for next appointment			0.91 (0.45–1.82)
Referrals to a dentist from pediatrician		-6.96 (p = 0.01)**	
Dentist call on to confirm next appointment			1.48 (0.74–2.95)

^a Multiple Regression Model: $F = 5.775$ ($p = 0.001$) Adjusted $R^2 = 0.067$

^b Multiple Regression Model: $F = 1.947$ ($p = 0.05$) Adjusted $R^2 = 0.043$

^c -2 log likelihood = 214.237, Cox & Snell R square = 0.155, Nagelkerke R square = 0.239

* $p < 0.05$, ** $p < 0.01$

ing care. The Academy of Pediatric Dentistry (2003) in their recommendations emphasized the education of parents as one of the strategies to improve child's oral health status.

Lack of adequate health insurance has been identified as the most important barrier to health care services for these children (Vazquez & Swan, 2003). Approximately 66% of the children in this sample had dental insurance for all of the past 12 months, and of those with insurance, 68% had coverage from the public assistance program of Medicaid. While private insurance is obtained as a benefit of employment on an ability-to-pay-basis, the acquisition of publicly funded insurance is governed by specific regulations establishing terms of eligibility such as income ceilings and residency requirement (Vitullo & Taylor, 2000). Since most of the mothers (89%) were "working poor" with annual household income less than \$25,000 per year, the availability of Medicaid had a significant impact on access to dental care in this sample. The study findings suggested that an available, affordable, and care coordination between dentists and pediatricians is essential to make possible access to care in these communities.

Early childhood caries (ECC) has become a major health problem among children in Korea. Jin et al. (2003) indicated that for children aged 6 to 59 months in Seoul, Korea, the prevalence of ECC and severe ECC were 56.5 percent and 47 percent, respectively. In the study of Ma, Park, Park, & Horowitz conducted in a Korean community, the children who had regular dental visits and started dental hygiene early showed a low risk for ECC development. Early preventive dental care has played an important role in reducing caries in the study conducted among Korean children. These study findings would be helpful in designing interventions for oral health promotion for children and their mothers in Korean communities. Kaste, et al. (1992) also pointed out that children, particularly those from high-risk populations, need to be seen by the dentist before the decay process begins. Therefore, increasing the number of children who see dentists at an early age is critical for better health outcomes in the populations at high risk for early childhood caries.

These factors used in this study need to be examined in other communities with different socioeconomic status and cultural background. Additional variables related to community resources (e.g., dentist-to-population ratio; availability of dentist accepting Medicaid) should be

also explored in future research. Children of immigrant, low-income families are understudied and underserved in health services in the United States. In order to reduce the disparity in health outcomes among these underserved populations, and to improve access to care, culturally appropriate and acceptable intervention is needed.

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