

*Original Research***Factors associated with the utilization of community dental services among newly incarcerated adults**

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ABSTRACT

Background: Given the high rates of risky behaviors and health conditions among incarcerated individuals and the relationship between oral and general health, receipt of quality dental care is essential to the overall health and well-being of this population. However, few recent studies have focused on access to care and the state of oral health among incarcerated populations in the U.S. For the current study, a secondary data analysis was conducted to: 1) assess factors associated with the use of dental services among a newly incarcerated prison population in Georgia and 2) consider barriers related to utilization of dental services pre- to post-release.

Methods: Descriptive statistics were calculated, and bivariate and logistic regression analyses were conducted utilizing SAS 9.2 software.

Results: Thirty-one percent (n=250) of survey respondents reported having a dental visit within the past year. Survey respondents who had a regular dentist (OR: 1.9; 95% CI: 1.325, 2.697), private dental insurance (OR: 1.5; 95% CI: 1.022, 2.245), or who reported pain as the reason for their last dental visit (OR: 2.2; 95% CI: 1.556, 3.130) were more likely to have utilized dental services within the past year.

Conclusions: The findings highlight the role of social and economic resources and oral health needs on utilization of dental services. Additional practice and policy efforts are needed to address gaps in the dental care continuum that affect currently and formerly incarcerated adults in Georgia.

Key words: Dental services utilization, oral health access, incarcerated populations

<https://doi.org/10.21633/jgpha.6.302>

INTRODUCTION

Despite the advancement of oral health practices, prevention efforts, and policies, various determinants have impeded the achievement of oral health equity among all demographic groups (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2016). Limited economic resources contribute to this problem, as low-income populations are less likely to have dental insurance and are more likely to have untreated oral health conditions than the remainder of the population (Dye, Li, Beltran-Aguilar, 2012). There are similar oral health disparities among Black and Hispanic adults, who comprise 57% of the nation's sentenced prison population, compared to their White counterparts (Dye et al., 2012; Haley, Kenney, & Pelletier, 2008; Carson & Anderson, 2016).

Even with recent decreases in the U.S. prison population, more than 1.5 million prisoners remain within the correctional system and 87% (1.3 million) are supervised in state prison facilities (Carson & Anderson, 2016). Previous

research has demonstrated a deficiency in the quality of healthcare provided in correctional institutions (Kulkarni, Baldwin, Lightstone, Gelberg, & Diamant, 2010). Consequently, there is an increased prevalence of chronic diseases and mental conditions among prisoners compared to the general U.S. population (Williams, Goodwin, Baillargeon, Ahalt, & Walter, 2012; Wilper et al., 2009). However, few studies have focused on access to care or the state of oral health among incarcerated populations in the U.S., which is an apparent limitation in view of the relationship between oral and general health (Treadwell & Formicola, 2008; Licata & Paradise, 2012).

With the high prevalence of tobacco use, substance abuse, and other health conditions linked to the oral health of incarcerated populations, the absence of comprehensive oral treatment may enhance the risk of severe dental outcomes (Wilper et al., 2009; Cropsey, Crew & Silberman, 2006; Heng, Badner, & Freeman, 2006). Incarcerated individuals who have previously engaged in at-risk health behaviors have exhibited higher rates of decayed, missing, and filled

teeth and poor oral health outcomes in general (Cropsey et al., 2006; Heng et al., 2006). In addition, a previous study revealed that individuals recently admitted to a state prison system had approximately eight times as many untreated dental caries as a comparable, general U.S. population (Boyer, Nielsen-Thompson, & Hill, 2002).

Moreover, although there have been positive experiences with dental care services upon entry into the correctional system, a recent qualitative study conducted among male parolees in the southeastern U.S. revealed concerning accounts of the provision of dental care throughout their incarceration. Continuation of adequate, long-term dental care was found to be hindered by financial barriers, delayed appointment availability, and opting to self-treat or medicate because of poor service conditions (Douds, Ahlin, Kavanaugh, & Olaghere, 2016). These barriers are similar to those that have often prevented access and utilization of oral health services in the general population. Understanding the impact of various determinants on the previous use of community dental services among incarcerated populations may help to address oral health needs both within and outside the correctional system.

Andersen's Behavioral Model of Health Services Use ascertains the influence of factors on the utilization of health services among disparate populations (Andersen, 1995; Pereyra et al., 2011). The three factor classifications associated with this model include: (1) predisposing factors (demographics, social structure, and health beliefs); (2) enabling factors (economic and social resources); and (3) need-for-care factors (self-perceived and clinically evaluated health needs and risk behaviors) (Pereyra et al., 2011; Babitsch, Gohl, & von Lengerke, 2012). Studies that have employed this model, and targeted utilization of dental services among U.S. adults, revealed that enabling factors were significantly associated with dental services use (Pereyra et al., 2011; Alzarhani & Neff, 2010). However, this trend is inconsistent with studies that have targeted the use of medical services, as some have found significant associations with predisposing and need factors (Babitsch et al., 2012).

Within the correctional system of Georgia, there are more than 52,000 prisoners, accounting for the fifth largest state prison population in the U.S. (Carson & Anderson, 2016). Even with this large population, there is limited public information on the quality of oral health and access to care issues impacting these individuals. Exploring previous use of community dental services among this population may establish a greater understanding of service needs upon entry into the correctional system. This may also aid in addressing practice and policy gaps within the prison care continuum and identifying unresolved access to care issues that may hinder continued use of services upon reentry into the community. The aims of the current study were to: 1) assess factors associated with the use of community dental services among a newly incarcerated prison

population in Georgia and 2) consider barriers preventing utilization of dental services pre- to post-release.

METHODS

The current study was determined to be exempt by an academic institutional review board, as no participants were directly involved. De-identified data from the 2012 Oral Health Access Survey were assessed for this secondary analysis. This survey was developed by a division of a southeastern academic institution and a state department of corrections to identify unmet oral health needs among prisoners upon their entry into the correctional system. The sample population included individuals who were >18 years of age and who were processed at two state intake facilities during a specified time period. The Oral Health Access Survey consisted of 21 questions that measured the ability of the cohort to access dental services, knowledge of increased oral health risks, and the presence of self-reported oral health outcomes. Additional information on the 2012 Oral Health Access Survey and method of survey administration are found elsewhere (Ditslear & Treadwell, 2012; Treadwell, Blanks, Mahaffey & Graves, 2016).

The dataset used for the current study included 1,501 men and women who completed the survey. Inclusionary criteria limited the sample to male and female respondents who participated in the survey and reported a current zip code of residence within the state of Georgia (n=1314). Survey respondents who did not report a zip code of residence in Georgia (n=41) or did not provide a zip code (n=146) were excluded. In addition, respondents who did not report the time since their last dental visit or had missing information for one or more independent variables (i.e., selected predisposing, enabling, and need factors) were excluded (n=518). This resulted in a total sample size of N=796.

Nine survey items from the 2012 Oral Health Access Survey, categorized according to Andersen's Behavioral Model of Health Services Use, served as the exposure variables of interest. Predisposing factors included gender (male; female), race/ethnicity (Black; White; Hispanic/Other), ease of finding a dentist (easy; somewhat easy; somewhat difficult; very difficult), and state geographical location of residence (Northern Region; Central Region; Southern Region). State geographical location of residence was derived by linking each respondent's reported residential "zip code at time of arrest" to a respective state county and health district. Final geographic classifications were based upon the location of the coded health districts of residence. Enabling factors included having a regular dentist (yes; no) and health insurance status (private through work; Medicaid; no insurance). Need factors included the reason for one's last dental visit (to have teeth cleaned; oral lump or sore; pain), number of previous tooth extractions (none; 1-3; 4-7; more than 7), and current/previous smoking history (yes/no). Utilization of dental services within the past year, the outcome variable, used the survey item, "Last oral health/dental visit?". A dichotomous variable (yes; no)

was created from this question to define dental services use within the past year and use of dental services more than a year ago.

Descriptive statistics were calculated on the selected predisposing, enabling, and need factors and the utilization of dental services. Chi-square analyses were conducted to assess potential associations between the exposures and the outcome of interest. Odds ratios and 95% confidence intervals were also calculated. Multiple logistic regression analyses were conducted utilizing a step-wise approach to determine the association between the exposure and outcome variables of interest. The first logistic regression included selected predisposing, enabling, and need factors that expressed a p -value < 0.2 in the conducted bivariate analyses. Factors that displayed significance in the first model (p -values < 0.05) were then included in the second

model with identified demographic factors (gender, race/ethnicity and state geographical location of residence) to control for the covariates (Pereyra et al., 2011).

RESULTS

Most of the survey respondents were Black (57.2%), male (87.4%), and residents of northern Georgia (69.2%) (Table 1). With respect to utilization of dental services, 31.4% ($n=250$) reported using dental services within the past year. In the preliminary bivariate analyses, race/ethnicity, state region of residence, having a regular dentist, dental insurance status, the reason for one's last dental visit, and smoking status displayed potential associations with the utilization of dental services (p -value < 0.2).

Table 1. Distribution of Sample Characteristics by Dental Services Utilization

	Total Population (%) N=796	Dental Services Utilization (%)		<i>p</i> -value
		Yes N= 250	No N=546	
Gender				
Male	87.4	31.6	68.4	0.75
Female	12.6	30.0	70.0	
Race/Ethnicity				
Black	57.2	35.4	64.6	<0.05
White	38.2	26.0	74.0	
Hispanic/Other	4.7	27.0	73.0	
State Region of Residence				
Northern Region	69.2	32.7	67.3	0.19
Central Region	15.5	24.4	75.6	
Southern Region	15.3	32.8	67.2	
Insurance Status				
Private through Work	20.9	39.2	60.8	<0.05
Medicaid	17.6	34.3	65.7	
No Insurance	61.6	28.0	72.0	
Have a Regular Dentist				
Yes	31.5	38.7	28.1	<0.05
No	68.5	61.3	71.9	
Perceived Ease of Finding a Dentist				
Easy	60.1	33.7	66.3	0.36
Somewhat Easy	18.2	29.7	70.3	
Somewhat Difficult	16.8	26.9	73.1	
Very Difficult	4.9	25.6	74.4	
Reason for Last Dental Visit				
To Have Teeth Cleaned	42.6	26.2	73.8	<0.05
Oral Lump or Sore	2.6	19.0	81.0	
(Dental) Pain	54.8	36.0	64.0	
Previous Number of Tooth Extractions				
None	32.3	29.6	70.4	0.74
1-3	41.7	33.1	66.9	
4-7	15.8	29.4	70.6	
More than 7	10.2	33.3	66.7	

	Total Population (%) N=796	Dental Services Utilization (%)		p-value
		Yes N= 250	No N=546	
Previous/Current Smoker				0.05
Yes	70.6	29.4	70.6	
No	29.4	36.3	63.7	

In the logistic regression analyses, having a regular dentist (enabling factor), dental insurance status (enabling factor), and the reason for one's last dental visit (need factor) were significantly associated with the utilization of dental services (p-values <0.05). With respect to enabling factors, survey respondents who had a regular dentist were 1.9 times as likely as those who did not to utilize dental services within the past year (95% CI: 1.325, 2.697). Respondents

who had private insurance through work to pay for dental services were 1.5 times as likely to have utilized dental services within the past year as respondents with no insurance (95% CI: 1.022, 2.245). Regarding need factors, respondents who reported pain as the reason for their last dental visit were 2.2 times as likely to utilize dental services within the past year as those who went to have their teeth cleaned (95% CI: 1.556, 3.130) (Table 2).

Table 2. Factors Associated to Dental Services Utilization: Final Regression Model

Variables	Utilization of Dental Services	
	Odds Ratio	95% CI
Gender		
Male vs. Female	0.935	(0.578, 1.512)
Race/Ethnicity		
Black vs. Hispanic/Other	1.539	(0.702, 3.372)
White vs. Hispanic/Other	0.928	(0.416, 2.072)
Location of Residence (Region)		
Northern vs. Southern	1.141	(0.735, 1.771)
Central vs. Southern	0.702	(0.394, 1.253)
Having a Regular Dentist		
Yes vs. No	1.890	(1.325, 2.697)
Insurance Status		
Private vs. no insurance	1.515	(1.022, 2.245)
Medicaid vs. no insurance	1.129	(0.730, 1.748)
Reason for last dental visit		
Oral lump/sore vs. to have teeth cleaned	0.808	(0.256, 2.550)
Pain vs. to have teeth cleaned	2.207	(1.556, 3.130)

DISCUSSION

The findings from this study highlight the role of social and economic resources and oral health needs on utilization of dental services. As demonstrated in previous studies employing Andersen's Behavioral Model of Health Services Use, enabling factors significantly influenced utilization in the current study (Pereyra et al., 2011; Alzarhani & Neff, 2010). The influence of having a regular dentist may be explained by the importance of the provider-patient relationship. An individual who has an established oral health home and a trusting relationship with an oral health provider may be more likely to seek care and use preventive dental services as recommended. With the common experiences of fear, anxiety, and stigma associated with the use of dental services (Tellez, Kinner, Heimberg, Lim & Ismail, 2015), fostering meaningful provider-patient relationships is essential to maintain patient follow-up and retention.

Having adequate insurance to cover dental treatment, another enabling factor, was also a significant determinant of utilization. The difference in utilization between privately insured and uninsured survey respondents may be explained by the expenses associated with dental care. Despite decreased reports of cost as a barrier to dental services use among a nationally representative sample, a study by Nasseh & Vujicic (2013) found that dental expenses were higher than other selected health services. The consequences of costly dental care may correlate with the lower rate of utilization of dental services among those in economically disadvantaged populations, who are often uninsured or underinsured (Nasseh & Vujicic, 2014). Given the lower reimbursement rates of insurance programs for dental services, there is a need to explore how to reduce the cost of care for maintenance and routine treatments through examination of the current workforce and overhead expenses (Blanks, Treadwell, Catalanotto, Warren & Behar-Horenstein, 2016).

The present study also demonstrated the influence of need on use of dental services, as respondents who reported utilization of dental services associated with pain were twice as likely to have utilized dental services within the past year as those who needed preventive care (i.e., routine teeth cleaning). This finding causes concern, as the presence of dental pain is a warning sign for serious oral health conditions, such as rampant decay or head and neck cancers, which may be mitigated by early identification. The ability of a dental provider to identify and treat an oral health condition that can be detected only by a thorough clinical examination is hindered when preventive visits are not maintained. In addition, despite an individual's desire to seek appropriate care, timely treatment may still be impeded by the social and economic challenges of not having a primary dental provider, lack of adequate insurance coverage, and other financial restrictions (Kulkarni et al., 2010; Nasseh & Vujcic, 2014).

Due to the nature of the current study, there are several limitations. There is the potential for recall bias due to the self-reported information provided by the survey respondents. This information could not be confirmed through further evaluation (e.g., reviewing dental records) as a de-identified dataset was used. This self-reported information may have resulted in the misclassification of the outcome of interest (dental services utilization). However, individuals who reported being unable to recall the time since their last dental visit were excluded from the sample population. The use of self-reported information also contributed to the large amount of missing data, which may have limited the ability to generalize the study findings to the entire prison population of Georgia. Moreover, the dataset did not provide information on all covariates related to utilization of dental services (e.g., age, educational attainment, income, marital status, and substance abuse), which limited the ability to explore other potential associations to use of dental services among the target population and control for potential confounders.

Nonetheless, this study exhibits several strengths. It adds to the inadequate body of literature on oral health access to care issues among prisoners, specifically in the southeastern U.S. Also, the use of a dataset based upon survey administration at intake provided the opportunity to examine, simultaneously, predictors of previous use of dental services and to assess the burden of expected needs for quality dental care during incarceration. With most prisoners returning to the same communities upon release, the analysis of factors associated to use of dental services prior to incarceration also helped to forecast potential barriers that could prevent the continuation of dental care upon reentry. Lastly, employing a theoretical framework to guide the analysis strengthened the conceptualization of constructs related to use of dental services among the newly incarcerated population.

Public Health Implications

Not having access to a regular dental provider and cost of care are barriers that should be eliminated within and

outside of the correctional setting. However, previous research, as well as the current study, has demonstrated that these barriers remain (Kulkarni, et al., 2010; Douds et al., 2016). This calls for a collaborative effort engaging correctional and community stakeholders to bridge access and service gaps along the current dental care continuum for those incarcerated in Georgia. Within this prison system, current workforce challenges may limit the provision of adequate services to its incarcerated population. Of Georgia's 38 state prison facilities, 10 currently have designations as dental health professional shortage areas (U.S. Department of Health and Human Services, Health Resources and Services Administration, 2016). Having an insufficient dental workforce available to meet the extensive oral health needs of this population reduces the likelihood that prisoners receive quality care (Mack & Collins, 2013). With a limited workforce, the dental services that are provided within these correctional settings may focus primarily on episodic emergency care rather than on routine preventive services. This points to the need for policy makers and administrators to examine approaches to increase the patient-provider ratio and access to adequate care within the correctional system.

Policies and programs should be developed to increase the number of oral health providers who are willing to serve incarcerated populations in Georgia. Previous research has emphasized the need to expose dental students and residents to high-risk populations during their clinical rotations, as this may increase their comfort and willingness to serve similar populations upon graduation (Treadwell & Formicola, 2008; Behar-Horenstein, Feng, Roberts, Gibbs, Catalanotto, & Hudson-Vassell, 2015; McQuistan, Kuthy, Qian, Riniker-Pins, & Heller, 2010). However, a study that explored student perceptions of serving underserved populations, after completing related clinical practical experiences, found students to be less comfortable with treating incarcerated populations compared to other high-risk populations (McQuistan et al., 2010). Additional education opportunities may be needed to introduce students to the structure of various correctional health systems, associated practice challenges, and the burden of health issues prominent among the incarcerated. Increasing the number of educational incentives, such as loan repayment programs or service fellowships, may also be beneficial in increasing the number of providers within the correctional system (Treadwell & Formicola, 2008).

In addition to examining correctional workforce opportunities, there is also a need to improve access to adequate dental coverage for incarcerated individuals upon their reentry into the community. Unless eligible for dental insurance through a spouse, released men and women will probably have difficulty in obtaining private insurance through an employer due to the challenges they often face when seeking employment (The Pew Charitable Trusts, 2016; Treadwell, Ortiz, & McCoy, 2014). Moreover, the enactment of healthcare reform in the U.S. only mandated coverage of dental care for children. Under the Affordable Care Act, states that chose to expand their Medicaid

eligibility requirements now provide coverage to all non-elderly adults with incomes at or below 138% of the federal poverty level, which includes currently and formerly incarcerated individuals (The Pew Charitable Trusts, 2016; National Conference of State Legislatures, 2016). However, the perceived benefits of Medicaid for returning citizens are limited by the lack of willingness to broaden eligibility requirements across all states (Yarbrough, Vujicic, & Nasseh, 2014).

Three of the five states with the largest correctional populations, including Georgia, have not expanded Medicaid (National Conference of State Legislatures, 2016; Carson & Anderson, 2016). As of March 2016, Wisconsin was the only state that chose not to expand Medicaid through the Affordable Care Act but alternatively implemented a policy to provide full Medicaid coverage to childless adults below 100% of the federal poverty level (The Henry J. Kaiser Foundation, 2016). This is an alternative solution that should be considered by states with non-expanded Medicaid to increase access to dental coverage. Continued inaction on policies may undermine efforts to promote utilization among returning citizens if sufficient coverage is not available to offset the high costs of care.

To enhance the continuum of dental health care pre- to post-release, state correctional departments may partner with local prison reentry programs and other community service providers to encourage the inclusion of oral health components in their interventions. Oral health information relating to prevention should be provided, and these programs should also enhance the development of partnerships with community dental providers. Fostering these partnerships can aid returning citizens in establishing an oral health home to maintain recommended preventive care. With the influence of provider-patient relationships and access to adequate dental coverage on utilization, this effort may help increase use of dental services and improve oral health outcomes among this high-risk population.

CONCLUSIONS

Every individual should have the right to basic dental health education and services, regardless of their age, race, ethnicity, gender, socioeconomic background, mental state, or incarceration status. To reduce the burden of unmet oral health needs among the prison population of Georgia, correctional and community stakeholders should establish an improved dental continuum of care model in the state. With the limited amount of research addressing oral health among prison populations, future studies should be conducted to evaluate the oral health of prisoners, the utilization of dental services, the quality of care received while incarcerated, and the ability to establish an oral health home upon reentry into the community. Moreover, full adoption of the Affordable Care Act, including its Medicaid provisions, or alternative Medicaid eligibility requirements, should be considered to assist with the cost and delivery of services to prisoners while incarcerated, and thereafter (The

Pew Charitable Trusts, 2016). From these efforts, new or enhanced programs may be implemented to support the attainment of oral health equity among currently and previously incarcerated citizens in Georgia.

Acknowledgements

The authors would like to thank the staff of the Georgia Department of Corrections and the faculty and staff of the Morehouse School of Medicine Master of Public Health Program.

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