Oral Health and Access to Dental Care among Older Homeless Adults: Results from the HOPE HOME Study

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Abstract

Objectives: To describe the prevalence of and factors associated with oral health measures in a sample of older homeless adults in Oakland, California.

Methods: We conducted a cross-sectional analysis of data from a population-based study of 350 homeless adults aged   50 in which trained researchers conducted structured interviews using validated questions regarding sociodemographics, health-related behaviors, healthcare utilization and health status. We assessed self-reported tooth loss, oral pain, and unmet need for dental care. We used multivariable logistic regression to examine factors associated with missing half or more teeth.

Results: Over half 201/350 (57.4%) of participants were missing at least half of their teeth. Half 191/350 (54.6%) reported oral pain in the past 6 months; 101/350 (28.9%) reported that oral pain prevented them from eating and 73/350 (20.9%) reported that pain prevented sleeping. Almost half, 141/350 (40.3%), had not seen a dentist in over 5 years, and over half 190/350 (54.3%) reported being unable to obtain needed dental care. In multivariate models, increased age (AOR = 1.09, 95% CI 1.04–1.14), moderate-to-high risk alcohol use (AOR = 2.17, CI = 1.23–3.84), moderate-to-high risk cocaine use (AOR = 1.72, CI = 1.03–2.88), and ever smoking (AOR = 2.87, CI = 1.59–5.18) were associated with an increased odds of having lost half or more teeth.

Conclusions: Tooth loss and oral pain are highly prevalent in older homeless adults. Increasing age, alcohol, drug and tobacco use are associated with tooth loss.

Keywords

Homeless persons; Dental care; Oral health; Aging

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Introduction

In 2000, the Surgeon General identified oral disease as a "silent epidemic (1)." Despite the availability of effective prevention and treatment methods, oral health has improved little over the past two decades (1). In the United States, nearly a quarter of adults aged 20–64 have untreated dental caries and more than half have lost a permanent tooth (2). People living in poverty have more caries, untreated tooth decay, and tooth loss than the general population. (3). Oral pain and tooth loss have a significant negative impact on quality of life and employment by affecting the ability to eat, speak, and smile (4).

People experiencing homelessness have inadequate resources for regular dental hygiene and a higher prevalence of risk for tooth loss, including smoking and substance use (5, 6). Tooth loss, or edentulism, is a key indicator of oral health; it is affected by both access to dental care and risk factors for poor oral health (37). Edentulism is a risk factor for coronary artery plaque formation, diabetes, and certain cancers (7). A small convenience sample of homeless adults found a higher prevalence of poor oral health than the general population, with high prevalence of tooth loss and untreated dental decay (5). In a national study of homeless adults utilizing Health Care for the Homeless services, approximately half of homeless adults had an unmet need for dental care as assessed by tooth or gum problems in the past year (8).

An increased proportion of homeless adults are aged 50 and older (9). Among homeless adults, individuals in their 50s and 60s have health problems worse than those in the general population in their 70s and 80s (10) and are considered to be "older" by the age of 50 (9). Older adults have worse oral health than younger adults due to shared risk factors, such as age-related physiological changes and a higher prevalence of chronic conditions (11–13). Despite their heightened need for dental care, older adults lack access to such care (14). Existing studies of oral health in homeless populations focused on populations younger than age 50 (5, 8). Little is known about oral health in older homeless adults. Therefore, we examined the prevalence of tooth loss, oral pain, denture fit, and factors associated with poor oral health, in a population-based cohort of older homeless adults in Oakland, CA.

Methods

Study participants, sampling, and enrollment

The HOPE HOME (Health Outcomes of People Experiencing Homeless in Older Middle Age) Study, is a longitudinal study of life course events, geriatric conditions, and their associations with health-related outcomes among older homeless adults. From July 2013 to June 2014, we enrolled a population-based sample of 350 homeless adults aged 50 years and older from all 5 overnight homeless shelters in Oakland that served single adults over age 25, all 5 low-cost meal programs that served homeless individuals at least 3 meals per week, a recycling center, and homeless encampments. We recruited participants using a purposive sampling frame created to best represent the source population. Study visits took place at St Mary's Center, a non-profit that serves indigent older adults. Participants did not have to receive services at St Mary's to be eligible.

To be eligible, participants had to be English-speaking, aged 50 years and older, defined as homeless as outlined in the Homeless Emergency Assistance and Rapid Transition to Housing Act (15), and able to provide informed consent. After determining eligibility, study staff administered structured interviews and collected extensive contact information from participants. Staff entered data in real time using direct data entry software. We gave participants a $25 gift card to a major retailer for their participation in the screening and enrollment interview. The University of California, San Francisco Institutional Review Board reviewed and approved all study protocols (approval number 215831). This study uses data from the baseline interview.

Participant sociodemographic characteristics and health related behaviors

Participants self-reported age, sex, race/ethnicity, and highest level of education. We categorized race/ethnicity as African American, White, or Other. We categorized highest level of education as less than high school versus high school graduate/General Educational Development (GED) or greater. Participants reported their total lifetime years of homelessness after the age of 18.

Using a shortened timeframe of the previous 6 months to correspond to study time intervals, we administered the World Health Organization's (WHO) Alcohol Use Disorders Identification Test (AUDIT) (8 = moderate-to-high risk alcohol use) (16). To assess illicit drug use, we administered the WHO's Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) to assess for amphetamines, cocaine, opioids and cannabis, using a lengthened timeframe of the previous 6 months. We dichotomized substance use risk for each substance as low (score <4) vs. moderate-to-high risk use (4) (17). We used the California Tobacco Survey to assess tobacco use. We classified smokers who had smoked at least 100 cigarettes in their lifetime as "ever smokers" (18).

Oral health variables

We asked participants about tooth loss (no missing teeth, missing one or two teeth, missing less than half of teeth, missing half, missing more than half, or missing all teeth). For our primary dependent variable, we dichotomized responses as missing less than half versus missing half or more. We asked participants who reported having any teeth if they were able to eat with their teeth. For participants who reported missing all of their teeth, we asked if they had dentures, and if so, whether they fit (denture fit). To assess oral pain and difficulties eating and sleeping due to oral pain, we adapted oral health questions from the Oral Health Impact Profile – 14 (OHIP – 14) (19). We asked participants how often they had oral pain in the last six months (ever versus never). If participants noted oral pain, we asked if the pain kept them from eating or sleeping (impairment due to oral pain).

To assess access to dental care, we asked participants about how long it had been since they last visited a dentist: <6 months, 6 months to 1 year, >1 year to <5 years, or 5 years. To assess unmet dental need, we asked participants if, during the past 6 months, there was a time when they needed dental care but could not obtain it.

Statistical analysis

We described sample characteristics and reported oral health variables using medians (due to skewed data) for continuous variables and proportions for categorical variables. We examined oral health status by evaluating bivariate associations between independent variables and our primary dependent variable (having lost less than half versus half or more of teeth) using Wilcoxon rank sum tests for continuous variables and chi-squared tests for categorical variables. Using multivariate logistic regression, we examined factors associated with participants having lost half or more of their teeth. We included all covariates in the model initially; through stepwise removal, we eliminated variables which didn't achieve a significance of less than 0.2. We completed analyses using Stata version 14 (Cary, NC).

Results

Participant characteristics

We enrolled 350 participants with a median age of 58 years (range 50–80). Three quarters (77.1%; 270/350) were men, 79.7% (279/350) were African American, and 74.0% (259/350) had graduated high school or obtained a GED. Participants spent a median of 2.5 years (interquartile range 0.7, 8) homeless as an adult. More than a quarter of our sample (26.0%; 91/350) reported moderate-to-high risk alcohol use. Participants reported moderate-to-high-risk cocaine (43.1%; 151/350), cannabis (39.1%; 137/350), opioids (12.9%; 45/350), and methamphetamine use (8.0%; 28/350). More than three quarters (77.7%; 272/350) reported that they had ever smoked. (Table 1)

Oral health indicators

Most participants (93.1%; 326/350) were missing at least one tooth. (Table 2) Over half (57.4%; 201/350) were missing half or more of their teeth; (19.4%; 68/350) were missing all of their teeth. One quarter of participants 89/350 (25.4%) reported being unable to eat, due to issues with their teeth. Of those that were missing all their teeth, 32.4% (22/68) did not have dentures. Among those that were missing all their teeth and had dentures (n=46), 19.5% (9/46) had dentures that did not fit. A majority of participants 191/350 (54.6%) reported experiencing oral pain in the last 6 months. Over a quarter 101 (28.9%) reported that pain prevented them from eating and one fifth reported that pain prevented them from sleeping 73/350 (20.9%). Almost half 141/350 (40.3%) had not seen a dentist in more than 5 years. Of those that attempted to obtain dental care in the past 6 months, 190/350 (54.3%) of participants were unable to obtain it. (Table 2)

Multivariate analysis

In multivariate models examining factors associated with missing at least half of one's teeth, increased age (AOR = 1.09, CI = 1.04–1.14; p-value = <0.001), moderate-to-high risk alcohol use (AOR = 2.17, CI = 1.23–3.84; p-value = 0.008), moderate-to-high risk cocaine use (AOR = 1.72, CI = 1.03–2.88; p-value = 0.038), and ever smoking (AOR = 2.87, CI = 1.59–5.18' p-value = <.001) were associated with an increased odds of having lost half or more teeth. (Table 3) Moderate-to-high risk cannabis risk was associated with an increased odds of missing at least half or more teeth, although this did not reach statistical significance

(AOR = 1.56, CI = 0.94–2.59; p-value = 0.085). Several factors were associated with a decreased odds of having lost half or more teeth, including moderate-to-high risk methamphetamine use (AOR = 0.30, CI = 0.11–0.79; p-value = 0.015) and identifying as other race/ethnicity (AOR = 0.30, CI = 0.01–0.91; p-value = 0.034) as compared to being white. Moderate-to-severe risk opioid use was associated with increased odds of missing half or more teeth in bivariate, but not multivariate models (OR = 2.24, CI = 1.12–4.51; p-value = 0.252).

Discussion

In a population-based sample of older homeless adults with a median age of 58, we found evidence of poor oral health and poor access to dental care. Over half of participants reported oral pain, which is over three times greater than the prevalence of oral pain in the general population over age 65 and more than twice that of the general poverty population over age 65 (20). Despite oral health needs, older homeless adults had poor access to dental care. Only a quarter reported visiting a dentist in the prior year, compared with 62% of adults in the general population (11). We found that over half of older homeless adults had been unable to get dental care in the prior year, compared with fewer than ten percent of adults aged 65 and older in the general population (14). Whereas approximately 10% of edentulous adults in the general population lack dentures, we found that almost half of edentulous participants either lacked dentures or had ones that couldn't be used due to poor fit (21). Over a quarter of our participants reported that mouth pain prevented them from eating. Tooth loss and oral pain may limit homeless individuals' ability to eat, worsening food insecurity (7).

Dental care is ranked as one of the leading unmet needs among the homeless population (8). Many of our participants lacked health insurance; in addition, prior to Medicaid expansion (which occurred during the study period), Med-Cal (dental coverage under Medicaid in California) did not include access to dental care. Enactment of the Affordable Care Act (ACA) in 2014, half way through the study enrollment period, expanded Med-Cal medical insurance coverage to 3.8 million people in California, and restored basic adult dental coverage (22, 23). California changed their policy at this time to allow adults with Medi-Cal to be eligible for basic dental services, including basic preventive and restorative treatments, complete dentures, and complete denture reline/repair services (23). California extended adult dental benefits in 2018 to include partial dentures, relines, laboratory processed crowns, periodontal services and posterior root canal therapy (23). This recent expansion may have improved oral health in this population. Yet, only 1 in 4 dentists provide services to Medi-Cal beneficiaries and many dentists who accept Medi-Cal limit the number of Medi-Cal patients they serve (24).

Having lost half or more of teeth was strongly associated with increased age, consistent with previous studies in both the general and homeless populations (3, 11, 13). This could reflect the increased adoption of preventive measures such as improved fluoridation and dental sealants with later birth cohorts (3). We did not find an association with length of time spent homeless as an adult. These findings suggest participants may have had an increased risk for poor oral health status prior to becoming homeless.

Consistent with prior research we found strong associations between having lost half or more of teeth and evidence of problem drinking, cocaine use, or having ever smoked (25–28). Alcohol may impair oral health through diminished salivary flow and altered salivary composition, which can exacerbate upper respiratory irritation, including gastric acid regurgitation, further worsening oral health (25). Cigarette smoking is an independent risk factor for chronic periodontal disease leading to tooth loss (7). Cigarette smoke contains toxins that locally alter salivary flow and systemically lead to destruction of tooth-supporting tissue (26). Cocaine use can increase the risk of tooth loss due to bruxism and a decrease in salivary pH (29).

We found a non-statistically significant elevated odds of tooth loss with moderate to severe cannabis use, consistent with prior research (30). Cannabis use is thought to be related to tooth loss via an association with infrequent dental visits and high cariogenic diets after cannabis use. (30). We found an inverse association between moderate-to-high risk methamphetamine use and tooth loss. Other studies have found a positive association between methamphetamine use and better self-reported oral health among homeless populations or have not identified a significant association between methamphetamine use and oral health need (6, 31).

Our study has several limitations. As our analysis relies on cross-sectional data, we cannot establish causality. We used self-reports of tooth loss, rather than clinical dental exams. This left the potential for over or under-estimation of missing teeth and made it more difficult to make direct comparisons to other studies. This descriptive study is part of a large ongoing study, and thus we did not power the sample size for tooth loss. In order to minimize misclassification, we used a broad measure of tooth loss that participants were more likely to understand. The study recruitment period occurred during a period of expansion of services, which could have increased access to dental care in those who were recruited later in the recruitment year. Access to dental care may have improved with the expansion of Medi-Cal during the study period, or with recent increases in covered services (23).

In one of the first studies of oral health in a population-sampled cohort of older homeless adults, we found evidence for poor oral health and limited access to dental care. There is an urgent need to increase the access to and provision of both preventive and restorative dental care to older homeless adults in order to decrease morbidity and improve quality of life.

Acknowledgments

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Table 1.

Sample Characteristics at Enrollment by Tooth Loss Category (N=350)

	Total N=350 N(%)*	Lost < Half of Teeth N=149 N(%)*	Lost Half or More of Teeth N=201 N(%)*	P-Value
Age, Median (IQR)	58 (54 – 61)	56 (53 – 60)	59 (55 – 62)	**<0.001**
Sex				0.60
Male	270 (77.1)	117 (78.5)	153 (76.1)	
Race/Ethnicity				0.08
African American	279 (79.7)	115 (77.2)	164 (81.6)	
White	38 (10.9)	14 (9.4)	24 (11.9)	
Other	33 (9.4)	20 (13.4)	13 (6.5)	
Highest Education Completed				**0.03**
< High School	91 (26.0)	30 (20.1)	61 (30.4)	
Homelessness				0.06
Years Homeless as an adult, median (IQR)	2.5 (0.67 – 8)	2 (0.58 – 7)	3.3 (0.92 – 9)	
Alcohol Use Disorders				**0.01**
Moderate-to-High Risk Use	91 (26.0)	28 (18.8)	63 (31.3)	
Illicit Substance Use				
Cocaine, Moderate-to-High Risk Use	151 (43.1)	53 (35.6)	98 (48.8)	**0.01**
Cannabis, Moderate-to-High Risk Use	137 (39.1)	50 (33.6)	87 (43.3)	0.07
Opioid, Moderate to High Risk	45 (12.9)	12 (8.1)	33 (16.4)	**0.02**
Methamphetamine, Moderate-to-High Risk Use	28 (8.0)	16 (10.7)	12 (6.0)	0.10
Smoking Status				**<0.001**
Ever Smoker	272 (77.7)	98 (65.8)	174 (86.6)	

*
Percentages are column percentages, unless otherwise stated.

Table 2.

Self-Reported Oral Health Indicators (N=350)

Characteristics	N (%)
Number Missing Teeth	
Missing at Least 1 Tooth	326 (93.1)
Missing 1 or 2 teeth	32 (9.1)
Missing more than 1–2, but <half of teeth	93 (26.6)
~ Missing half of teeth	58 (16.6)
Missing more than half but fewer than all teeth	75 (21.4)
Missing all teeth	68 (19.4)
Unable to Eat	89 (25.4)
Mouth Pain	
Mouth Pain in Last 6 Months	191 (54.6)
Prevented From Eating	101 (28.9)
Prevented From Sleeping	73 (20.9)
Last Dental Visit	
< 6 months ago	52 (14.9)
6–12 months ago	44 (12.6)
>1 and <5 years ago	110 (31.4)
5+ years ago	141 (40.3)
Unmet Need (last 6 months)	
Sought dental care, but could not obtain	190 (54.3)

Table 3.

Factors Associated with Missing Half or More of Teeth (N=350)

Characteristics	Unadjusted OR	Adjusted OR
Age	1.09 (1.04 – 1.14)[*]	1.09 (1.04, 1.14)[*]
Sex		
Female	1.14 (0.69, 1.90)	
Male	Ref	
Race/Ethnicity		
White	Ref	ref
African American	1.31 (0.78, 2.21)	0.48 (0.21, 1.11)
Hispanic/Mixed/Other	0.44 (0.21, 0.92)[ǂ]	0.30 (0.01, 0.91)[ǂ]
Highest Education		
High school or greater	Ref	ref
Less than High School	1.72 (1.04, 2.85)[ǂ]	1.68 (0.96, 2.94)
Homelessness		
Years Homeless as an adult	1.02 (0.99, 1.05)	
Alcohol Use Disorders		
Less than Moderate Severity Use	Ref	ref
Moderate to High Severity Use[t]	1.97 (1.19, 3.28)[ǂ]	2.17 (1.23, 3.84)[ǂ]
Illicit Substance Use[$]		
Methamphetamines, Moderate to High Risk	0.53 (0.24, 1.15)	0.30 (0.11, 0.79)[ǂ]
Cocaine, Moderate to High Risk	1.72 (1.12, 2.66)[ǂ]	1.72 (1.03, 2.88)[ǂ]
Opioids, Moderate to High Risk	2.24 (1.12, 4.51)[ǂ]	
Cannabis, Moderate to High Risk	1.51 (0.97, 2.35)	1.56 (0.94, 2.59)
Smoking Status		
Never Smoker	Ref	ref
Ever Smoker[8]	3.35 (1.98, 5.69)[*]	2.87 (1.59, 5.18)[ǂ]
	Ref	
	1.00 (0.65, 1.53)	

[*] p .001

[ǂ] p .05

[ǂ] p .005

[¶] We adjusted for all variables for which we present an adjusted odds ratio.