



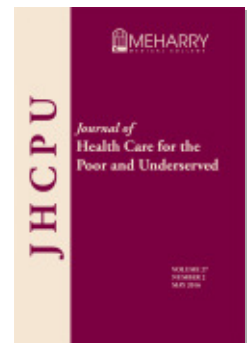
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Emergency Department Use for Dental Problems among Homeless Individuals: A Population-Based Cohort Study

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Abstract: Objectives. To evaluate emergency department (ED) visits for dental problems among Toronto's homeless population (Ontario, Canada). **Methods.** A random sample of 1,189 homeless was recruited from shelters and meal programs. Emergency department visits for non-traumatic dental problems (ICD-10-CA codes K00-K14) were identified using participants' health insurance number, during 2005–2009. Age- and sex-matched controls were selected from low-income neighborhoods. **Results.** Homeless and matched controls had 182 and 10 ED visits for dental problems, respectively. Homeless people were more significantly more likely (OR=2.27, p=.007) to make ED visit for dental problems compared with controls. Over 80% of the ED visits by homeless people were for odontogenic infections, and 46% of homeless people had more than one such visit. **Conclusion.** The high rate of ED visits for dental problems by people who are homeless suggests that access to dental care is inadequate. The large number of repeat visits indicates that ED settings are ineffective for treatment of dental problems.

Key words: Dental problems, emergency department, homeless, ICD-10-CA.

In North America, access to health care has been recognized as one of the fundamental challenges faced by homeless populations.¹ Homeless people often lack a regular source of health care and have inadequately treated physical and mental health conditions, which in turn can lead to potentially avoidable use of hospital emergency departments (EDs).² Some have claimed that ED visits for health problems that could have been treated in an ambulatory setting contribute substantially to high health care costs and represent an inefficient use of health care resources.^{2–5} However, for marginalized and socioeconomically disadvantaged individuals, EDs often represent the most accessible source of health care.^{1,6,7}

Emergency department visits for non-traumatic dental problems are of particular

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interest, because almost all non-traumatic dental problems are more appropriately addressed in a dental office rather than the ED.⁸ In 2009, Quiñonez et al. observed that dental problems not associated with trauma were a common reason for ED visits in Ontario and were more frequent than ED visits for diabetes and hypertensive diseases.⁹ These potentially avoidable ED visits for dental problems occurred more frequently among adults and low-income groups, specifically those without private or public dental insurance.^{8,9} While EDs can provide temporary measures such as pain relief or treatment of infection, they do not provide definitive dental care, so fail to resolve underlying dental problems.

Canada has a universal system of publicly funded insurance for physician and hospital care but not dental care, so the oral health needs of socio-economically disadvantaged populations often go unmet.⁹⁻¹¹ While Canadian provinces have limited programs for dental care, they mainly address the needs of children in low-income families with acute dental problems. Thus, homeless people face barriers to accessing dental care that reflect the general scarcity of dental care resources for low-income individuals across the country.^{9,12}

In Toronto, Canada's most populous municipality, the adult homeless population has a higher prevalence rate of acute and chronic oral health problems compared with the general population.^{10,11} In 2013, Figueiredo et al. reported that the oral health status of homeless adults in Toronto was precarious: 40% required urgent dental treatment, 88% restorative treatment, and 71% periodontal treatment.¹⁰ Due to limited access to dental care and the high prevalence of dental diseases in this population,^{8,9,13} homeless individuals would be expected to have a high rate of ED use for dental problems. Again, these visits may represent potentially avoidable ED visits.

In light of the above, the main objective of this study is to determine the frequency of ED visits for dental problems not associated with trauma among a population-based sample of homeless adults, compared with a control group of low-income non-homeless adults. A secondary objective is to identify characteristics of homeless adults that are associated with an increased likelihood of ED visits for dental problems. These findings will provide insights into the impact of dental diseases on a marginalized population and on the acute care system.

Methods

The cohort of homeless individuals examined in this study has been described previously.^{14,15} In brief, a representative sample of 1,189 homeless individuals was recruited at shelters and meal programs in Toronto, Ontario, Canada, from December 2004 to December 2005.^{14,15} The study defined a homeless person as an individual 18 years old who self-reported being homeless for a minimum of seven days preceding the survey. Study participants were required to have a provincial health insurance number, a unique 10-digit number that is assigned to every insured individual in the province of Ontario and does not change over an individual's lifetime. Health insurance numbers were used to link to administrative health care databases at the Institute for Clinical and Evaluative Sciences (ICES). A total of 1,165 homeless participants (98%) were successfully linked. All homeless participants gave written informed consent to perform this linkage.

Low-income controls were selected from the Registered Persons Database (RPDB), a registry of all insured individuals in Ontario that includes the vast majority of residents of the province. Each homeless participant was assigned one age- and sex-matched control who lived in Toronto during the study recruitment period and was residing in a neighborhood in the lowest income quintile based on the 2006 Canadian Census. This study was approved by the Research Ethics Board of St. Michael's Hospital in Toronto.

Data on ED visits by homeless participants and matched controls were obtained from the National Ambulatory Care Reporting System (NACRS) database, which captures information on almost all ED visits in the province of Ontario. Each ED visit is assigned a main diagnosis using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10-CA). Dental problems not related to trauma were identified using ICD-10-CA codes K00 through K14 (diseases of the oral cavity, salivary glands and jaws).

Data analysis. Descriptive statistics for all potential predictor variables among homeless participants, which described their demographic characteristics, were performed. All variables were dichotomized and chi-square statistics were run to calculate odds ratios (ORs \pm 95% confidence intervals (CI)). As the outcome variable was categorical in nature, logistic regression was performed. To adjust for other confounder variables, multivariable modeling was performed to determine which specific characteristics of homeless individuals were associated with increased likelihood of using EDs for dental problems. Stepwise regression using backward elimination (using retention of p -value $< .01$) was used to include predictor variables in the final model. Analyses were performed using SAS Version 9.2 (SAS Inc., Cary, NC).

Results

During the follow-up period (December 2004 to December 2008), 1,165 homeless participants had 182 ED visits for dental problems not associated with trauma, representing 2.1% of all their ED visits. The 182 ED visits for dental problems were made by 94 homeless individuals, with 46% visiting the ED at least two times for their dental problems during the study period. The data available did not provide enough information to determine if any of the repeated ED visits were for the same dental problem. Table 1 shows the distribution of the ED visits. In contrast, during the same time period, the controls had 10 ED visits for dental problems, which represented 0.9% of their total ED visits.

Homeless individuals had 8.0 times as many total ED visits as controls, and 18.2 times as many ED visits for dental problems as controls. Homeless individuals were significantly more likely to have at least one ED visit for dental problems than controls (OR = 2.27; 95% CI, 1.16–4.57).

Table 2 shows the frequency of ED visits for dental problems by the homeless sample based on ICD-10-CA codes. Three dental problems—Toothache NOS (K0887), Periapical abscess without sinus (K047) and Dental caries (K029)—accounted for 72% of the total number of ED visits for dental problems. The remaining 28% of the dental problems were related to conditions that occurred much less frequently, including

Table 1.

FREQUENCY OF ED VISITS BY HOMELESS INDIVIDUALS AND CONTROLS PER YEAR

	2004 ^a	2005	2006	2007	2008	Total (%)
Homeless Individuals						
Number of ED visits for dental problems	3	34	47	55	43	182 (2.1)
Number of ED visits for all other conditions	199	2095	2227	2075	1898	8494 (97.9)
Total number of ED visits	202	2129	2274	2130	1941	8676 (100.0)
Controls						
Number of ED visits for dental problems	0	2	2	3	3	10 (0.9)
Number of ED visits for all other conditions	18	197	282	294	269	1060 (99.1)
Total number of ED visits	18	199	284	297	272	1070 (100.0)

^aYear 2004 accounted for only one month

Table 2.

FREQUENCY OF ED VISITS BY DISCHARGE DIAGNOSIS

ICD-10-CA code	Description of the code	Frequency (%)
K0887	Toothache NOS	70 (38.46)
K047	Periapical abscess without sinus	40 (21.98)
K029	Dental caries, unspecified	21 (11.54)
K040	Pulpitis	5 (2.75)
K108	Other specified diseases of jaws	4 (2.20)
K122	Cellulitis and abscess of mouth	4 (2.20)
K130	Disease of lips	4 (2.20)
K137	Other and unspecified lesions of oral mucosa	4 (2.20)
K049	Other and unspecified diseases of pulp and periapical tissues	3 (1.65)
K051	Chronic gingivitis	3 (1.65)
K052	Acute periodontitis	3 (1.65)
K089	Disorder of teeth and supporting structures, unspecified	3 (1.65)
K069	Disorder of gingiva and edentulous alveolar ridge, unspecified	2 (1.10)
K120	Recurrent oral aphthae	2 (1.10)
K121	Other forms of stomatitis	2 (1.10)
various	Other dental problems with only one visit	12 (6.6)

Table 3.**DEMOGRAPHIC CHARACTERISTICS OF HOMELESS INDIVIDUALS WHO HAD AT LEAST ONE ED VISIT FOR DENTAL PROBLEMS NOT ASSOCIATED WITH TRAUMA**

n = 1165		Visited ED Freq. (%)	Not Visited ED Freq. (%)	p-value
Demographic group:	Single Males	58 (61.7)	529 (49.4)	Ref.
	Single females	24 (25.5)	272 (25.4)	0.017
	Adults with Families	12 (12.8)	270 (25.2)	
Age:	24 years or less	27 (28.7)	254 (28.7)	0.336
	25 years or more	67 (71.3)	871 (76.3)	
Immigration status:	Canadian born	79 (84.0)	717 (66.9)	0.001
	Immigrant	15 (15.9)	354 (33.0)	
Level of education:	High school or less	49 (52.1)	538 (50.4)	0.827
	High school diploma or more	45 (47.9)	530 (49.6)	
Lifetime duration of homelessness:	2 years or less	32 (34.0)	552 (51.6)	0.002
	More than 2 years	62 (65.9)	519 (48.5)	
Problematic alcohol use:	No	59 (62.8)	767 (71.6)	0.090
	Yes	35 (37.2)	304 (28.3)	
Problematic drug use:	No	42 (44.7)	665 (62.0)	0.001
	Yes	52 (55.3)	406 (37.9)	
Smoke:	No	10 (10.6)	328 (30.6)	<0.001
	Yes	84 (89.4)	742 (69.3)	
Chronic health condition:	No	28 (29.8)	442 (41.3)	0.038
	Yes	66 (70.2)	628 (58.7)	

those of non-odontogenic etiology such as disorders of the temporomandibular joint and lesions of the oral mucosa.

Socio-economic and demographic characteristics of homeless individuals who visited the ED for dental problems are presented in Table 3. Among the characteristics of homeless individuals analyzed, older males born in Canada who were homeless for longer than two years, had some chronic health condition and were smokers visited EDs for dental problems more frequently than their counterparts.

Table 4 presents some of the demographic characteristics of homeless individuals who had least one ED visit for dental problems. The unadjusted model shows six characteristics significantly associated with ED visits for dental problems. However, in the adjusted model, after controlling for the influence of all the variables simultaneously, smoking was the only characteristic significantly associated with an increased likelihood of visiting an ED for dental problems.

Table 4.

THE ODDS OF VISITING ED FOR DENTAL PROBLEMS NOT ASSOCIATED WITH TRAUMA AMONG HOMELESS INDIVIDUALS

N = 1165	Unadjusted		Adjusted	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Demographic group:				
Single Males	Ref.		Ref.	
Single females	.81 (.49–1.32)	.382	.91 (0.55–1.51)	.412
Adults with Families	.41 (.21–.77)	.013	.63 (0.32–1.25)	
Age:				
24 years or less	Ref.		Ref.	
25 years or more	.99 (.98–1.02)	.779	.99 (.98–1.01)	.414
Immigration status:				
Canadian born	Ref.		Ref.	
Immigrant	.39 (.22–.68)	.001	.57 (.32–1.03)	.063
Lifetime duration of homelessness:				
2 years or less	Ref.		Ref.	
More than 2 years	2.06 (1.32–3.21)	.001	1.51 (.94–2.42)	.087
Smoke:				
No	Ref.		Ref.	
Yes	3.71 (1.90–7.25)	<.001	2.61 (1.30–5.24)	.007
Problematic drug use:				
No	Ref.			
Yes	2.03 (1.33–3.10)	.001	—	—
Chronic health condition:				
No	Ref.			
Yes	1.66 (1.05–2.62)	.031	—	—

Discussion

This study examined the use of EDs for dental problems not associated with trauma by homeless individuals. Our findings demonstrate that use of EDs for dental problems is significantly higher among homeless individuals compared with a low-income control group. The number of ED visits for dental problems showed little variation during the four-year time period. The dental problems observed suggest significant impact on individual well-being and quality of life. Over 80% of the ED visits were caused by odontogenic infections associated with pain. Furthermore, 46% of homeless individuals who visited the ED for dental problems had more than one such visit during the observation period. These repeat ED visits suggest that dental problems had a significant impact on these homeless individuals, and that they had difficulty accessing

appropriate dental care in the community. In Toronto, the adult population—which is the group with the most frequent users of EDs for dental problems—has very limited access to free dental care services, even for urgent care.¹⁰ Nevertheless, the extent to which economic and other personal barriers contribute to individuals choosing the ED as a source of dental care in Toronto is still a subject of investigation and cannot be determined by this analysis.

The health care system as it relates to dentistry and medicine is distinctive as the fields are completely independent of each other. For dentistry, the professional training and work settings are exclusive to oral health care. However, these differences are not always recognized by the general population. Even though most hospitals are not structured for dental treatment, dental problems are still a part of the health services sought in hospitals.^{9,16} Definitive treatment for most non-traumatic dental emergencies involves procedures that are only performed by dentists in a properly equipped dental care setting. Emergency department settings are meant to provide health care for acute illness and injuries which may be life threatening and need immediate attention. Dental problems at this degree of severity are not very common.^{9,17} Nonetheless, although the level of morbidity caused by odontogenic infections is generally non-life threatening, untreated dental conditions do not resolve spontaneously and grow progressively worse without appropriate care. The inappropriateness of ED settings to treat dental problems limits physician procedures to only pharmacotherapy in the majority of cases, which in turn leads to treatment postponement, which then ends up being more extensive and costly. This incoherent behavior pattern of palliative dental care in EDs also affects the important concept of preventive care and dental rehabilitation, factors that greatly influence the oral health status of individuals in both the short- and long-term.¹⁸

Limitations. Our analysis included only ED visits that had a dental problem as a main diagnosis, so the number of dental problems seen in EDs may be underestimated. The sampling strategy excluded homeless individuals who do not use either shelters or meal programs. However, prior research suggests that the unsheltered homeless population in Toronto is very small.¹⁹ Another limitation is that although all study participants were homeless at the time of enrollment, their housing status is expected to have fluctuated over the course of the four-year observation period. Furthermore, health care use was assessed using administrative data that are provincial in scope; so, ED encounters that occurred outside the province of Ontario would have been missed. Homeless participants were required to have a valid provincial health number in order to be eligible for this study, which may have also biased our sample towards individuals who have better health care access.

Conclusion. This study provides evidence that the use of EDs for dental problems is common among homeless individuals in Toronto.^{8,9,13,17} Emergency department visits for dental problems represent an inefficient and potentially avoidable use of health care system resources.^{16–18} The ED should not be used as a routine source of dental care, just as it should not serve as a substitute for primary medical care.^{17,18,20} Planning and implementing a dental program for the homeless population will, however, require significant political will.⁶ The development of new public health policy initiatives that provide more comprehensive dental care services to the population is necessary. The proposition does not require universal dental care benefits; however, the provision of

public dental care services to attend to in-need populations for urgent dental problems should be part of an immediate public health action. Urgent intervention is required for the improvement of well-being and quality of life of disadvantage minorities concerning their oral health, as well as to more wisely use public health resources. The findings of this study reinforce previous evidence representing strong arguments that advocate for homeless populations concerning the lack of dental public health services in Canada. This information has the potential to guide health authorities and policymakers to structure a more effective dental care delivery system for vulnerable populations.

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