

# Dental Caries Experience and Associated Factors Among Brazilian Homeless Persons: A Cross-Sectional Study

Experiencia de Caries Dental y Factores Asociados entre  
Personas sin Hogar Brasileñas: Un Estudio Transversal

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**ABSTRACT:** The objective of this study was to evaluate the dental caries experience and its associated factors in homeless persons. A non-probabilistic sample of 176 participants (mean age 37.8 years) was included in this cross-sectional study. Interviews and clinical examinations were performed. Dental caries experience was recorded based on the decayed, missing and filled teeth-index (DMFT). The dental caries experience was observed among 98.9 % of participants (mean DMFT  $11.0 \pm 6.95$ ). Individuals in the "Over 44 years" age groups (PR = 1.4; 95 % CI = 1.1-1.6) and "30 to 36 years" (PR = 1.2; 95 % CI = 1.0 -1.4) had significantly higher caries experience. Individuals who do not brush or brush only 1x/day have 40 % and 20 % higher caries experience, respectively. Homeless persons had a high experience of dental caries, with significant tooth loss. Individuals in the advanced age groups, lack of income and non-achievement or low frequency of tooth brushing are factors associated with a greater experience of the disease in these individuals.

**KEY WORDS:** homeless persons, dental caries, epidemiology, associated factors.

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## INTRODUCTION

The development of capitalism, the international expansion of the economy and the predominance of urbanization are characteristics of the present world (de Paiva *et al.*, 2016). In consequence, segregation and social exclusion become evident. Over time there has been an exponential increase in the number of individuals without basic social rights, such as access to education, health, work, housing, culture, sports, leisure, just to name a few (Martinez-Parra *et al.*, 2019). Moreover, these socioeconomically disadvantaged population groups are often denied basic human rights, and are marginalized and invisible to society. Among these groups are the homeless persons (Nilsson *et al.*, 2017).

Several factors can lead to homeless situation. Disruption of family ties, mental disorders, alcoholism, drugs, absence of a family nucleus, violence, economic situation and/or even difficulty in insertion the labor market (Aguiar & Iriart, 2012). In Brazil, although there

are no conclusive studies, it is estimated that over 100,000 people live in homeless situations. Of this universe, more than 70 % is concentrated in large cities, that is, with more than one hundred thousand inhabitants (Natalino, 2016).

The social exclusion of these individuals is characterized by the lack of access to health services and programs (Aguiar & Iriart). In addition, the social vulnerability of these individuals is reflected in the lack of income, malnutrition and neglected hygiene habits, favoring the occurrence of health disorders (Walsh *et al.*, 2019).

Although dental caries prevalence has been reduced in recent years, this remains one of the ten most common chronic conditions (Peres *et al.*, 2019). Biological, environmental, social and behavioral factors are involved in the etiology of this disease, which

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presents clear, objective and measurable signs and is indicative of dental caries experience in the population (Álvarez *et al.*, 2015). Dental caries is the leading cause of dental pain and, when left untreated, can progress to tooth loss (Silva Junior *et al.*, 2019). In addition, caries negatively impacts people's quality of life and represents a high economic cost for individuals and society, factors that contribute to consider this an important public health problem (Haag *et al.*, 2017).

The most recent studies suggest a polarization of dental caries. Poverty, low education and socioeconomic levels and deleterious habits, are factors associated with dental caries (Petersen & Yamamoto, 2005). In addition to exposure to factors common to the occurrence of dental caries, homeless individuals tend not to have permanent and steady living arrangements, and have adverse physical and psychic conditions, contributing to not being common targets for health investigations and actions (Lawder *et al.*, 2019).

Moreover, studies on oral health conditions and its associated factors in these individuals are scarce. The scarcity of information, the basis for action planning, is directly proportional to the importance of developing inclusive policies for these population groups. Thus, the objective of this study was to investigate dental caries experience and its associated factors in Brazilian homeless persons.

## MATERIAL AND METHOD

**Ethical aspects.** This study was performed following the ethical recommendations of the Declaration of Helsinki. Was submitted and approved by the Ethics Committee of the Federal University of Piauí (Protocol number 2,100,121). The manuscript was written according to the recommendations of the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology).

**Study design and participants.** This cross-sectional study was conducted with a homeless population of Teresina, capital of the state of Piauí, northeastern Brazil. The data collect was performed between January and October 2018. The study participants are linked to Reference Center for Homeless People (Centro POP).

**Sample.** A survey performed by the Teresina City Specialized Social Approach Service found that in 2013

there were 247 homeless people in the city (Secretaria Municipal de Assistência Social e Cidadania, 2013). From this result, sample calculation was performed (<http://www.openepi.com>) considering a 95 % confidence interval and 80 % test power.

Was observed that 151 participants would be required for a representative sample. Estimating that 10 % of the study population would not meet the inclusion criteria and assuming a 25 % loss rate and refusals to participate in the study, a non-probabilistic sample of 220 participants were selected following the population frequency stream at the study site.

**Inclusion criteria.** Individuals older than 18 years old and linked to study site were included. Individuals with hearing impairment and/or speech disabilities and those who presented psychological conditions that made the clinical examination unfeasible and/or compromised the researchers' safety were not included (n = 44).

**Calibration and Pilot Study.** The calibration exercise was performed in two phases. The theoretical and practical phases involved the discussion of diagnostic criteria for dental caries evaluation, based on photographs of teeth with or without caries obtained from participants of a previous study of the research group. A pediatric dentist with experience in conducting cross-sectional studies to evaluate dental caries experience (gold standard) was responsible for conducting the theoretical-practical phase of calibration. When the single-examiner and the gold standard agreed on 80 % of the assessments, the practical phase was initiated. Twenty participants were evaluated at this stage, with fifteen-day intervals between clinical examinations. The intra and inter-examiner Kappa values observed were higher than 0.8.

A pilot study was performed with 10 % of the final sample (20 participants) for possible adjustments to the research methodology. Changes to the initial design were not required, and the pilot study participants were included in the final sample.

**Data collect.** Participants were interviewed individually to obtain socioeconomic data, habits, and lifestyle.

Clinical examination for dental caries evaluation was performed by a single examiner previously trained and calibrated. The examination was performed in a meeting room and an artificial light was used (Pelican® model - Startec with 127V, São Paulo, Brazil).

Participants sat in a chair and the examiner positioned himself in front of the participant for evaluation. Sterile gauze was used to dry the teeth and the clinical examination was performed with a flat buccal mirror (Duflex, SS White, Rio de Janeiro, RJ, Brazil) and an exploratory probe recommended by WHO (WHO-621, Trinity, Campo Mourão, PR, Brazil). The clinical examination for the diagnosis of dental caries was performed using the DMFT index (Klein *et al.*, 1938), which includes the sum of the number of decayed, missing and filled permanent teeth.

The main outcome of the study was dental caries experience, to be quantified by total and component scores of the adopted index. Independent study variables included socioeconomic issues (sex, age, ethnicity, marital status, source of income, education, government cash transfer aid), habits (drug use, oral hygiene), and living conditions (place of stay), length of stay in referral center).

**Data analysis.** Initially, a descriptive analysis of the data was performed, presenting the values in absolute and relative frequencies. Data were analyzed with Statistical Package for the Social Sciences (SPSS, Chicago, IL, USA, Version 21.0). Non-normal distribution was observed (Kolmogorov-Smirnov test,  $p$ -value  $<0.001$ ) and Mann-Whitney, Kruskal-Wallis, and Games-Howell tests were applied to analyze dental caries experience between different categories of socioeconomic variables and related to the habits and living conditions.

Association between dental caries experience and independent variables was determined by Poisson regression. The magnitude of association was presented by adjusted and crude prevalence ratio (PR), confidence intervals (95 % CI), and probability values. Variables with  $p < 0.20$  values in the bivariate analysis were included in the adjusted model. In this final model, only those variables at 5 % significance level remained, which was adopted for all analyses of the study.

## RESULTS

Socioeconomic data and habits of the study participants are presented in Table I, which shows that most homeless individuals are men (86.4 %), single (71.6 %), self-described as brown (60.2 %), use drugs (66.5 %) and report a maximum of two or fewer brushings/day (82.4 %).

Was observed an average DMFT-11.0 ( $\pm 6.9$ ), with a predominance for the “missing” component (52.9 %), which differs significantly ( $p < 0.001$ ) from the “decayed” and “filled” (29.8 % and 17.3 %, respectively), as shown in Figure 1.

Table I. Socioeconomic data and habits of homeless persons.

Variable	(n)	(%)
<i>Sex</i>		
Male	152	86.4
Female	24	13.6
<i>Age group</i>		
Over 44 years	40	22.8
37 - 43 years	46	26.1
30 - 36 years	46	26.1
Up to 29 years	44	25.0
<i>Ethnic group</i>		
White	22	12.5
Black	37	21.0
Brown	114	64.7
Indigenous	3	1.7
<i>Marital status</i>		
Married or cohabiting	11	6.3
Single	126	71.6
Divorced or separated	31	17.6
Widowed	8	4.5
<i>Income source</i>		
Freelancer	65	36.9
No income	87	49.4
Donations	24	13.6
<i>Schooling years</i>		
Up to 4 years	53	30.1
5 - 7 years	54	30.7
Over 8 years	69	39.2
<i>Drug user</i>		
Yes	117	66.5
No	59	33.5
<i>Length stay on referral center (years)</i>		
$\leq 5$	154	87.5
6 - 10	17	9.7
11 - 15	2	1.1
$> 15$	3	1.7
<i>Government financial-aid</i>		
No	114	64.8
Yes	62	35.2
<i>Oral Care items</i>		
None	57	32.3
Only toothbrush	7	4.0
Only dentifrice	1	0.6
Toothbrush + dentifrice	94	53.4
Toothbrush + dentifrice + floss	17	9.7
<i>Toothbrushings/day</i>		
None	57	32.4
1	30	17.0
2	58	33.0
3 or more	31	17.6
<i>Dental caries experience</i>		
Absent (DMFT = 0)	2	1.1
Present (DMFT $\geq 1$ )	174	98.9

Dental caries experience according to socioeconomic characteristics and habits of

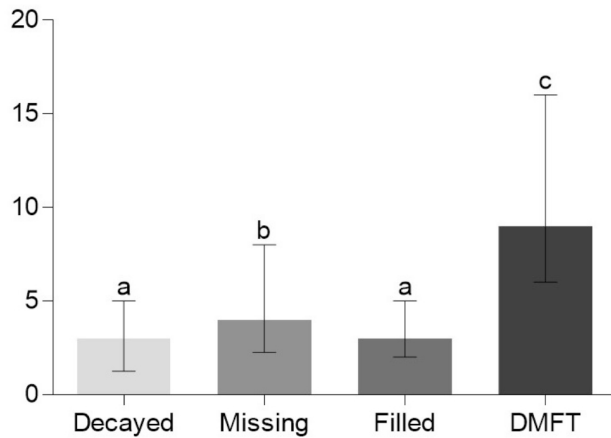


Fig. 1. Dental caries experience (Median - IIQ) in homeless persons. Different letters represent statistical significance (p-value ≤ .028)

homeless adults is shown in Table II. Those in the “37 to 43 years old” and “Over 44 years old” age groups present similar caries experience, but greater than the other age groups, both in the total DMFT and for the “missing” component. Likewise, participants who do not receive government income support have greater caries experience (Total DMFT and “missing”).

Table III shows the associations between participants' socioeconomic and habits variables and dental caries experience, by total DMFT and components. After this analysis, variables with a probability of less than 20 % were included in an adjusted model, with the prevalence ratios presented in Table IV.

Table II. Dental caries experience (median - IIQ) by socioeconomic characteristics and habits of homeless persons.

	Decayed	Missing	Filled	DMFT
<i>Sex</i> <sup>1</sup>				
Male	3.0 (1.0-4.0) <sup>a</sup>	4.0 (1.0-8.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	9.0 (6.0-17.0) <sup>a</sup>
Female	2.0 (1.0-5.0) <sup>a</sup>	4.0 (2.0-6.0) <sup>a</sup>	0.0 (0.0-3.0) <sup>a</sup>	9.0 (6.0-11.0) <sup>a</sup>
<i>Age group</i> <sup>2</sup>				
Over 44 years	2.0 (1.0-5.0) <sup>a</sup>	8.5 (5.0-18.0) <sup>c</sup>	0.0 (0.0-3.0) <sup>a</sup>	17.0 (12.0-22.0) <sup>c</sup>
37 - 43 years	3.0 (1.0-4.5) <sup>a</sup>	6.0 (3.0-10.0) <sup>bc</sup>	1.0 (0.0-4.0) <sup>a</sup>	11.0 (7.0-18.0) <sup>bc</sup>
30 - 36 years	2.0 (1.0-4.0) <sup>a</sup>	3.0 (1.0-5.5) <sup>b</sup>	0.0 (0.0-2.0) <sup>a</sup>	8.0 (6.0-12.0) <sup>ab</sup>
Up to 29 years	2.5 (1.0-4.0) <sup>a</sup>	1.5 (0.0-3.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	5.5 (3.5-9.0) <sup>a</sup>
<i>Ethnic group</i> <sup>2</sup>				
White	3.0 (1.7-4.0) <sup>a</sup>	4.0 (2.0-12.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	11.0 (7.0-18.0) <sup>a</sup>
Black	2.0 (1.0-4.0) <sup>a</sup>	4.0 (2.0-7.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	11.0 (6.0-13.0) <sup>a</sup>
Brown	2.0 (1.0-4.0) <sup>a</sup>	4.0 (1.0-7.0) <sup>a</sup>	0.0 (0.0-3.0) <sup>a</sup>	9.0 (6.0-16.0) <sup>a</sup>
Indigenous <sup>3</sup>	1.0 <sup>a</sup>	1.0 <sup>a</sup>	0.0 <sup>a</sup>	7.0 <sup>a</sup>
<i>Marital status</i> <sup>2</sup>				
Married or cohabiting	2.0 (1.0-4.0) <sup>a</sup>	4.0 (2.0-7.0) <sup>a</sup>	0.0 (0.0-2.0) <sup>a</sup>	8.0 (5.0-11.0) <sup>a</sup>
Single	3.0 (1.0-4.0) <sup>a</sup>	4.0 (1.0-7.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	9.0 (6.0-14.0) <sup>a</sup>
Divorced or separated	2.0 (1.0-5.0) <sup>a</sup>	5.0 (2.0-10.0) <sup>a</sup>	2.0 (0.0-5.0) <sup>a</sup>	12.0 (8.0-19.0) <sup>a</sup>
Widowed	3.0 (2.0-6.0) <sup>a</sup>	7.0 (2.0-18.0) <sup>a</sup>	0.0 (0.0-3.0) <sup>a</sup>	13.0 (5.0-26.0) <sup>a</sup>
<i>Income source</i> <sup>2</sup>				
Freelancer	2.0 (1.0-4.0) <sup>a</sup>	3.0 (1.0-7.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	9.0 (5.0-13.0) <sup>a</sup>
No income	3.0 (1.0-4.0) <sup>a</sup>	4.0 (1.0-8.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	10.0 (6.0-17.0) <sup>a</sup>
Donations	3.0 (1.0-4.0) <sup>a</sup>	5.0 (2.0-9.0) <sup>a</sup>	0.0 (0.0-4.0) <sup>a</sup>	9.0 (6.0-16.0) <sup>a</sup>
<i>Schooling years</i> <sup>2</sup>				
Up to 4 years	2.0 (1.0-4.0) <sup>a</sup>	4.0 (1.5-7.0) <sup>a</sup>	0.0 (0.0-3.0) <sup>a</sup>	9.0 (5.0-16.0) <sup>a</sup>
5 - 7 years	2.5 (1.0-5.0) <sup>a</sup>	4.0 (1.0-7.0) <sup>a</sup>	0.0 (0.0-2.5) <sup>a</sup>	9.0 (5.7-12.5) <sup>a</sup>
Over 8 years	3.0 (1.0-4.0) <sup>a</sup>	4.0 (2.0-8.0) <sup>a</sup>	1.0 (0.0-3.5) <sup>a</sup>	9.0 (7.0-17.5) <sup>a</sup>
<i>Drug user</i> <sup>1</sup>				
Yes	2.0 (1.0-4.0) <sup>a</sup>	3.0 (1.0-7.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	9.0 (5.0-13.0) <sup>a</sup>
No	3.0 (1.0-4.0) <sup>a</sup>	4.0 (2.0-10.0) <sup>a</sup>	1.0 (0.0-4.0) <sup>a</sup>	11.0 (7.0-18.0) <sup>a</sup>
<i>Length stay on referral center (years)</i> <sup>2</sup>				
≤ 5	2.0 (1.0-4.0) <sup>a</sup>	4.0 (2.0-7.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	9.0 (6.0-16.0) <sup>a</sup>
6 - 10	3.0 (1.0-5.0) <sup>a</sup>	4.0 (0.0-7.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	11.0 (5.0-15.0) <sup>a</sup>
11 - 15	4.0 <sup>a</sup>	3.0 <sup>a</sup>	4.0 <sup>a</sup>	11.0 <sup>a</sup>
> 15	3.0 <sup>a</sup>	3.0 <sup>a</sup>	0.0 <sup>a</sup>	9.0 <sup>a</sup>
<i>Government financial-aid</i> <sup>1</sup>				
No	2.0 (1.0-4.0) <sup>a</sup>	6.0 (3.0-9.0) <sup>b</sup>	1.0 (0.0-4.0) <sup>a</sup>	12.0 (7.0-18.0) <sup>b</sup>
Yes	3.0 (1.0-5.0) <sup>a</sup>	3.0 (1.0-6.0) <sup>a</sup>	1.0 (0.0-3.0) <sup>a</sup>	9.0 (5.0-13.0) <sup>a</sup>
<i>Toothbrushings/day</i> <sup>2</sup>				
None	3.0 (1.0-5.0) <sup>a</sup>	6.0 (3.0-12.0) <sup>a</sup>	0.0 (0.0-1.0) <sup>a</sup>	11.0 (8.0-21.0) <sup>a</sup>
1	3.0 (1.0-6.0) <sup>a</sup>	4.0 (2.0-6.0) <sup>ab</sup>	0.0 (0.0-2.0) <sup>a</sup>	9.0 (6.0-16.0) <sup>a</sup>
2	2.0 (1.0-4.0) <sup>a</sup>	3.0 (1.0-6.0) <sup>b</sup>	2.0 (0.0-4.0) <sup>bc</sup>	9.0 (5.0-16.0) <sup>a</sup>
3 or more	2.0 (1.0-4.0) <sup>a</sup>	3.0 (1.0-5.0) <sup>b</sup>	1.0 (0.0-3.0) <sup>ac</sup>	8.0 (6.0-12.0) <sup>a</sup>

<sup>1</sup>Mann-Whitney Test; <sup>2</sup>Games-Howell Test; <sup>3</sup> n < 4 in the category. Within a variable, equal letters in the same column denote absence of statistical significance (p≥0.05)

Table III. Bivariate analysis of the association between socioeconomic characteristics and habits with caries experience in homeless persons.

Variables	PR <sub>Crude</sub> (95 % CI 95)			
	Decayed	Missing	Filled	DMFT
<i>Sex</i>				
Male	0.6 (0.2-2.1)	2.1 (0.5-4.8)*	0.6 (0.2-1.8)	2.9 (0.1-5.9)*
Female	1	1	1	1
<i>Age group</i>				
Over 44 years	1.1 (0.7-1.7)	1.8 (1.4-2.2)*	1.4 (0.7-2.4)	2.7 (2.1-3.3)*
37 - 43 years	1.3 (0.9-1.9)*	1.3 (0.9-1.7)*	1.1 (0.7-1.9)	1.9 (1.5-2.4)*
30 - 36 years	1.2 (0.8-1.8)	0.8 (0.4-1.3)*	0.8 (0.5-1.4)	1.4 (1.1-1.8)*
Up to 29 years	1	1	1	1
<i>Ethnic group</i>				
White	1.2 (0.3-7.2)	5.8 (2.8-8.8)*	1.3 (0.1-26.8)	4.9 (0.7-10.1)*
Black	3.0 (1.7-7.6)	4.7 (2.2-7.3)*	1.4 (0.1-22.1)	3.3 (1.4-8.1)*
Brown	3.1 (1.2-4.6)	3.8 (2.2-5.3)*	1.1 (0.1-17.7)	2.7 (1.2-7.1)
Indigenous	1	1	1	1
<i>Marital status</i>				
Married or cohabiting	0.3 (0.1-4.9)	0.9 (0.2-12.3)	0.6 (0.1-3.7)	5.7 (1.8-13.3)*
Single	0.5 (0.1-6.8)	0.5 (0.1-6.6)*	1.1 (0.2-4.7)	4.6 (1.9-11.2)*
Divorced or separated	0.3 (0.1-5.3)	0.8 (0.1-6.2)	4.5 (0.6-32.3)*	5.2 (1.6-8.7)
Widowed	1	1	1	1
<i>Income source</i>				
Freelancer	0.9 (0.2-3.4)	1.8 (0.2-16.7)	1.1 (0.3-4.1)	1.5 (0.1-25.8)
No income	1.2 (0.3-5.6)	0.4 (0.1-3.3)	0.7 (0.2-2.7)	0.4 (0.1-5.9)
Donations	1	1	1	1
<i>Schooling years</i>				
Up to 4 years	1.3 (0.5-3.4)	2.1 (0.3-14.3)	0.5 (0.2-1.3)	1.4 (0.2-12.4)
5 - 7 years	1	1	1	1
Over 8 years				
<i>Drug user</i>				
Yes	1.1 (0.4-2.9)	0.3 (0.1-2.0)*	0.5 (0.2-1.1)*	0.2 (0.1-1.1)*
No	1	1	1	1
<i>Length stay on referral center (years)</i>				
≤ 5	0.7 (0.1-11.5)	0.7 (0.1-3.3)	1.8 (0.2-5.9)	0.8 (0.1-2.6)
6 – 10	0.9 (0.1-22.6)	0.3 (0.1-2.2)	1.4 (0.1-4.3)	0.7 (0.4-2.2)
11 – 15	1.4 (0.1-32.4)	0.1 (0.0-1.7)	8.7 (0.9-12.2)	0.4 (0.1-1.8)
> 15	1	1	1	1
<i>Government financial-aid</i>				
No	1.5 (0.5-3.9)*	0.9 (0.7-1.4)*	0.8 (0.3-1.8)	0.8 (0.1-1.9)*
Yes	1	1	1	1
<i>Toothbrushings/day</i>				
None	2.8 (0.8-9.7)*	3.6 (1.4-6.9)*	0.3 (0.1-0.9)*	7.8 (2.2-9.6)*
1	3.9 (0.7-10.9)*	5.1 (0.4-10.7)	0.4 (0.1-1.3)*	0.7 (0.4-1.1)*
2	1.1 (0.3-3.3)	2.5 (0.4-6.8)	1.7 (0.4-6.9)	4.7 (0.5-9.8)*
3 or more	1	1	1	1

PR<sub>Crude</sub> = Prevalence ratio crude; 95 % CI = 95 % Confidence Interval; \* p-values < 0.20.

Low toothbrushing frequencies were associated with higher caries experience. For the DMFT it was observed that those who do not brush or brush only 1x/day have a prevalence ratio dental caries experience 40 and 20 % higher, respectively, compared to individuals who brush 3 times or more per day. Age groups “Over 44 years” (PR = 1.4; 95 % CI = 1.1-1.6) and “30 to 36 years old” (PR = 1, 2; 95 % CI = 1.0-1.4) were associated with the higher total DMFT. In addition, homeless adults who do not receive assistance through the government's cash transfer program were more expressive of the “decayed” component (PR = 1.2; 95 % CI = 1.1-1.5).

## DISCUSSION

In this study, dental caries experience in a sample of the homeless population in a northeastern Brazilian capital was investigated. Almost the entire sample (98.9 %) had caries experience (DMFT ≥ 1) and the most severe disease experience was associated with the absence or low frequency of brushing, older age groups, and no income.

The mean DMFT of the sample (11.0 ± 6.95) was lower than dental caries experience in the adult

Table IV. Multivariate analysis of the association between socioeconomic characteristics and habits with caries experience in homeless persons.

Variables	PR <sub>adjust</sub> (95 % CI 95)			
	Decayed	Missing	Filled	DMFT
<i>Sex</i>				
Male	-	-	-	-
Female	-	-	-	-
<i>Age group</i>				
Over 44 years	-	1,8 (1,5-2,1) <sup>3</sup>	-	1,4 (1,1-1,6) <sup>3</sup>
37 - 43 years	-	1,2 (0,9-1,5) <sup>3</sup>	-	1,1 (0,9-1,4)
30 - 36 years	-	0,9 (0,6-1,2) <sup>3</sup>	-	1,2 (1,0-1,4) <sup>1</sup>
Up to 29 years	-	1	-	1
<i>Ethnic group</i>				
White	-	4,8 (1,8-12,6) <sup>2</sup>	-	-
Black	-	4,0 (1,5-10,5) <sup>2</sup>	-	-
Brown	-	3,4 (1,3-8,8) <sup>2</sup>	-	-
Indigenous	-	1	-	-
<i>Marital status</i>				
Married or cohabiting	-	-	-	-
Single	-	-	-	-
Divorced or separated	-	-	-	-
Widowed	-	-	-	-
<i>Drug user</i>				
Yes	-	-	-	-
No	-	-	-	-
<i>Government financial-aid</i>				
No	1,2 (1,1-1,5) <sup>1</sup>	0,7 (0,6-0,9) <sup>3</sup>	-	0,9 (0,8-1,1) <sup>1</sup>
Yes	1	1	-	1
<i>Toothbrushings/day</i>				
None	1,4 (1,0-1,8) <sup>2</sup>	1,9 (1,6-2,4) <sup>3</sup>	0,4 (0,3-0,6) <sup>3</sup>	1,4 (1,1-1,6) <sup>3</sup>
1	1,5 (1,2-2,1) <sup>2</sup>	1,3 (1,0-1,7) <sup>1</sup>	0,6 (0,4-0,9) <sup>1</sup>	1,2 (0,9-1,4) <sup>1</sup>
2	1,0 (0,7-1,3)	1,3 (1,1-1,7) <sup>2</sup>	1,1 (0,9-1,6)	1,2 (1,0-1,4) <sup>1</sup>
3 or more	1	1	1	1

Model adjusted for "Income source", "Length stay on referral center" and "Schooling years"; PR<sub>adjust</sub> = Adjusted Prevalence Ratio; 95 % CI = 95 % confidence interval; P Values 1 <0.05, 2 <0.01 and 3 <0.001

population in Teresina (15.72) and Brazil (16.75) observed in the latest national epidemiological survey (Brazil, 2010). Despite the lower mean DMFT, the epidemiology of dental caries in homeless adults is different. The most significant components for the total DMFT score of this study sample were missing and decayed teeth, respectively. This result highlights the difficulty of access of this population, to health services and programs and when this occurs, they are more commonly performed in emergency services rather than models based on health care and promotion (Daly *et al.*, 2010).

High tooth loss reported in this study is justified by the social vulnerability in which these individuals live (Silva Junior *et al.*). There is strong evidence of an association between high tooth loss and lower-income and schooling, two predominant factors in the study population (Chalub *et al.*, 2014; Kim *et al.*, 2018). In addition, inadequate dental biofilm control is a predictor of dental caries (Zhang *et al.*, 2019). Corroborating this report, it was also observed in this study that those individuals who reported not brushing

their teeth, had significantly greater dental caries experience.

Better schooling is commonly associated with better hygiene practices and health conditions (de Sousa *et al.*, 2019). However, this association was not observed in our study. This fact may be justified by the fact that, better schooling alone does not represent guaranteed access to health services or programs, thus losing the protective power. Although 39.2 % of participants reported having 8 or more years of formal education and 36.9 % had some professional activity, this is usually represented by informal and unstable employment, which does not account for any significant or stable income.

Dental caries experience of participants with greater time in the referral center did not differ significantly from the experience of those with shorter length of stay. These results were already expected, because unfortunately the referral center does not have staffed health professionals, and the referral of individuals to health services and programs is not performed effectively. With this, even those individuals with a longer

stay in the center remain without adequate access to health services and, consequently, suffering health problems, such as the clinical features of untreated dental caries.

The effect of illicit drugs use on the dental caries experience was not significant in the present study. This result is opposite from several studies that report the deleterious effects of drug abuse on oral health conditions (White *et al.*, 1997; De Palma *et al.*, 2005; Teoh *et al.*, 2019). However, a positive correlation between drug use and worse oral health conditions is associated to deleterious habits commonly observed in drug users, that favor the development of oral diseases. Unbalanced nutritional habits and negligent oral hygiene practices are commonly observed in drug users, risk factors proven to lead to poor oral health condition (Demenech *et al.*, 2019). The condition of high social vulnerability observed in the participants of this study justified that the use or not, of illicit drugs probably represented little impact on the development of dental caries.

This study presented limitations inherent to the cross-sectional observational approach, such as the impossibility of establishing a cause and effect relationship. In addition, health research with hard-to-reach populations, such as homeless people, poses significant methodological challenges to the sampling strategies traditionally employed in epidemiological studies. However, a proportionally large sample was obtained, and data were obtained by a trained and calibrated examiner, factors that increased the methodological rigor of the study, and reduced possible detection bias.

Our study corroborates the highly described dental caries experience in homeless people, especially in the form of tooth loss. As highlights, it was observed that no income and low frequency in the toothbrushing were factors associated with the experience of the disease in these individuals, especially in older age groups. Further studies are needed to confirm these findings in homeless people in other geographical conditions and to analyze their impact on the quality of life in order to support the development of public policies for social inclusion and health promotion.

## CONCLUSION

This study showed high dental caries experience among homeless persons with a significant occurrence

of tooth loss. Advanced age groups, lack of income, and non-achievement or low frequency of tooth brushing are factors associated with a greater dental caries experience. Our findings suggest that homeless persons represent a group with much needed dental care and inclusion in public politics.

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**BERNARDINO, R. M. P.; SILVA, A. M.; COSTA, J. F.; DOS SANTOS, I. T.; PRADO JÚNIOR, R. R. & MENDES, R. F.** Experiencia de caries dental y factores asociados entre personas sin hogar brasileñas: un estudio transversal. *Int. J. Odontostomat.*, 14(4):564-571, 2020.

**RESUMEN:** El objetivo de este estudio fue evaluar la experiencia de caries dental y sus factores asociados en personas sin hogar. En este estudio transversal se incluyó una muestra no probabilística de 176 participantes (edad media 37,8 años). Se realizaron entrevistas y exámenes clínicos. La experiencia de caries dental se registró en función del índice de dientes cariados, perdidos y obturados (DMFT). Se observó una experiencia positiva de caries dental entre el 98,9 % de los participantes (DMFT promedio  $11,0 \pm 6,95$ ). Las personas en los grupos de edad "Mayores de 44 años" (PR = 1,4; IC del 95 % = 1,1-1,6) y "30 a 36 años" (PR = 1,2; IC del 95 % = 1,0 -1,4) tuvieron una experiencia de caries significativamente mayor. Las personas que no se cepillan, o se cepillan solamente 1x / día tienen una tasa mayor de caries, de 40 % y 20 % más, respectivamente. En las personas en situación de calle se observó una alta tasa de caries dental, con una pérdida dentaria significativa. Los factores asociados a una mayor tasa de la enfermedad, fueron personas de edad avanzada, la falta de ingreso, no lograr el cepillado, o tener una menor frecuencia de cepillado.

**PALABRAS CLAVE:** personas sin hogar, caries dental, epidemiología, factores asociados.

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