

## ORIGINAL ARTICLE

# Subjective oral symptoms associated with self-rated oral health among Indigenous groups in Central-West Brazil

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National Council of Technological and Scientific Development (CNPq), Grant/Award Number: 473116/2010-3; CNPq, Grant/Award Number: 303681/2016-0

**Abstract**

**Objectives:** To determine whether subjective oral symptoms were associated with self-rated oral health after controlling for sociodemographic characteristics and dentition status in 4 different Indigenous peoples from Central-West Brazil.

**Methods:** A population-based cross-sectional study of oral health was conducted between 2012 and 2014. The randomly selected sample was stratified according to 4 ethnic groups (Kaiwoá, Kadiwéu, Terena and Guarani) and 2 age groups (15-19 and 35-44 years). The outcome was poor self-rated oral health. Independent variables obtained by interviews were age, sex, ethnicity, schooling, family income, self-reported toothache, difficulty chewing and difficulty speaking due to dental problems. Dentition status, oral morbidity and normative treatment needs were obtained through oral examinations. Unadjusted and adjusted prevalence ratios (PR) and respective 95% confidence intervals (CI) were estimated using Poisson regression modelling with robust variance estimation.

**Results:** Poor self-rated oral health was more common in the older age group and in Guarani peoples than their counterparts (PR = 1.06 [1.00-1.12]; PR = 1.09 [1.02-1.16], respectively). After adjusting for sociodemographic characteristics, fewer functional teeth (PR = 1.11 [1.02-1.20]), 2 or more untreated decayed teeth (PR = 1.15 [1.07-1.23]), normative need for extraction (PR = 1.15 [1.05-1.25]) and normative need for restoration of one or more surfaces (PR = 1.16 [1.05-1.27]) were positively associated with self-rated oral health. Toothache and difficulty speaking remained positively associated with the outcome after controlling for all previous variables (PR = 1.10 [1.05-1.18]; PR = 1.20 [1.09-1.32]).

**Conclusions:** Oral symptoms such as toothache and difficulty speaking due to dental problems play an important role in oral health self-rating. Self-rated oral health is an appropriate indicator for use in diverse sociocultural contexts.

**KEYWORDS**

indigenous population, oral health, oral symptoms, self-rated health

## 1 | INTRODUCTION

How someone rates his/her own health is an indicator that has been increasingly used in epidemiological studies. It is considered a legitimate measure of general health status as well as a valid, reliable and cost-effective health-assessment tool for use with population

groups.<sup>1</sup> Although an extensive body of evidence points to associations between this indicator and other health measures, as well as demographic, socioeconomic and psychological characteristics,<sup>1</sup> few studies have been conducted among minority populations, specific ethnic groups or Indigenous peoples.<sup>2</sup> Minority and Indigenous groups generally evaluate their health less favourably than their

respective majority/dominant population groups. Beyond unfavourable living conditions, socioeconomic disadvantage and social exclusion—which may lead to chronic stress and negatively affect health in these populations—a variety of culturally specific determinants have been identified.<sup>2</sup>

Oral health self-evaluation can be captured with a single-item measure by which individuals rate the condition of their teeth and mouth or their overall oral health using a 3-5 item ordinal response scale, ranging from excellent to very poor.<sup>3</sup> Self-rated oral health reflects the subjective experience of individuals based on their perceptions of physical and mental well-being, treatment needs, functionality, and clinical signs and symptoms of adverse conditions. Individuals' perceptions of oral health vary among different population groups. They might comprise since biomedical-based referents until most holistic and inclusive concepts.<sup>4,5</sup>

Diverse reference frameworks and explanatory models have been employed to evaluate relationships among contextual, demographic, and socioeconomic characteristics and health behaviours, dental problems and oral symptoms, as well as functional and psychological impacts.<sup>4,6,7</sup> Age, gender, ethnicity, socioeconomic status, dentition status and oral symptoms have been commonly shown to be associated with self-rated oral health.<sup>4,7-10</sup> More than being a proxy for clinical conditions, self-rated oral health is a summary measure encompassing multiple dimensions related to oral health and its determinants.<sup>8-10</sup>

Because few studies have investigated self-rated oral health as a primary outcome in Indigenous populations, information on factors associated with self-rated oral health remains scarce for such peoples.<sup>8,11-14</sup> A recent literature review showed that oral epidemiological profiles among 15- to 19-year-old Indigenous peoples in Brazil vary broadly. While some Indigenous groups had higher DMFT scores than the non-Indigenous Brazilian population, others had lower scores.<sup>15</sup> The DMFT represents lifetime accumulated dental caries experience. On the one hand, these variations have been attributed to the sociocultural diversity of these indigenous groups, and on the other hand to dissimilar historical processes of contact and interaction with the surrounding dominant non-Indigenous society. Differences in caries experience and access to health services have been described,<sup>15-17</sup> and it is reasonable to hypothesize that this picture may lead to discrepancies in oral health self-assessment.

The aim of this study was to investigate whether subjective and clinical oral symptoms were associated with self-rated oral health in 4 different Indigenous peoples in Central-West Brazil.

## 2 | METHODS

A population-based cross-sectional study was conducted between 2012 and 2014 investigating the oral health of Indigenous peoples from 4 ethnic groups in the Brazilian state of Mato Grosso do Sul. This Midwestern state has the second largest Indigenous population in the country, of about 75 000 people. The study included the top 80% most populated villages for each of the 4 largest ethnic groups in the

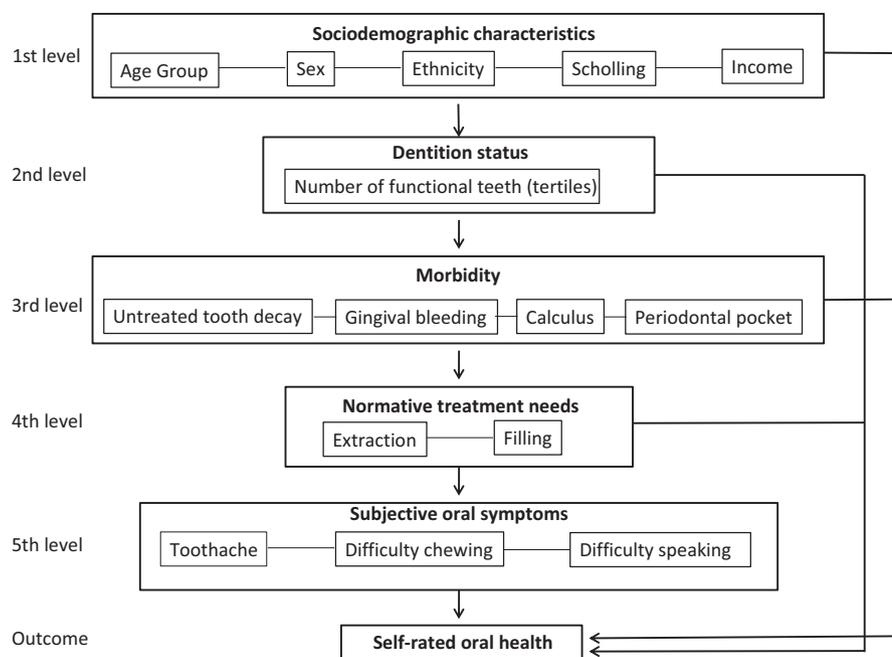
state; together, those accounted for 99% of its Indigenous population. A stratified sampling methodology was adopted to ensure that a minimum number of individuals from each of the 4 ethnic groups and 2 age groups (15-19 and 35-44 years) were selected. Within villages, a random sample was taken from each stratum, with probability proportional to village size. A total of 682 individuals in the age groups of interest were assessed. Oral health evaluation followed the protocol recommended by the World Health Organization.<sup>18</sup>

The dependent variable was poor self-rated oral health. Information on this and sociodemographic characteristics and subjective oral symptoms was collected using a questionnaire, administered by previously trained researchers during individual interviews with participants. Oral health examination data were collected by 24 dentists who had previously undergone a 40-hour training and calibration process. The minimum weighted kappa coefficient of 0.65 was required and achieved for assessing the intra- and interexaminer reliability for crown conditions and treatment needs. The sociodemographic variables used were age group, sex, ethnic group, schooling (elementary education incomplete or complete) and household income (categorized as  $\leq 1$  or  $> 1$  minimum monthly salary equivalent to R\$ 678 (US\$ 330) on 1 January 2013).

Dentition status was operationalized as the number of functional teeth (sum of sound and filled teeth without functional impairment; for example, the tooth was not recorded as "indicated for extraction" in the clinical judgement of the examiner), classified as upper, medium and lower tertiles. Four variables represented oral morbidity: untreated decayed teeth (none, 1, 2 or more); sextants with gingival bleeding (none, 1, 2 or more); sextants with calculus (none, 1, 2 or more); and the presence of at least 1 sextant with a shallow (4-5 mm) or deep (6 mm or more) periodontal pocket. The latter were combined due to the low prevalence of deep periodontal pockets. The light-weight ball-end probe recommended for the WHO Community Periodontal Index was used. Normative treatment needs were determined as the presence of at least 1 tooth indicated for extraction or at least 1 tooth needing a filling in at least 1 surface. These variables were categorized as no tooth, 1 tooth, or 2 or more teeth. Oral symptoms were recorded as yes/no answers to 3 questions: do you currently have a toothache; do you currently have difficulty chewing; and do you currently have difficulty speaking because of dental problems?

Self-rated oral health was captured with the question: How do you rate your oral health? Possible answers were "good", "neither good/nor poor" and "poor". Only 3 response categories were used, to reduce possible bias caused by challenges in communicating and interpreting the classification system. The outcome variable, poor self-rated oral health, was obtained by dichotomizing responses as good or neither good/nor poor vs poor. Differences in self-rated oral health for each independent variable were compared using Pearson's chi-squared test. Sex and independent variables with  $P$  values  $< .20$  were selected for simple and multiple analyses using Poisson regression modelling, with robust variance to estimate unadjusted and adjusted prevalence ratios (PR) and 95% confidence intervals (CI).

The independent variables were incorporated into the analytical model using a hierarchical approach<sup>19</sup> based on the principle that



**FIGURE 1** Theoretical model for the analysis of factors associated with oral health self-assessment among Indigenous Kaiwoá, Kadiwéu, Terena and Guarani peoples of Mato Grosso do Sul, Brazil

certain factors are not associated directly with the outcome but act as distal determinants of oral health self-perception through a number of other interrelated factors known as intermediary determinants. Figure 1 shows the relationships investigated among the distal and intermediate levels. The first level contained sociodemographic characteristics (sex, age group, ethnicity, schooling and income). Clinical oral conditions were organized in 3 levels: dentition status (second level), morbidity (third level) and normative treatment needs (fourth level). Dentition status was defined as the number of functional teeth. Morbidity included variables reflecting the presence of adverse oral conditions (untreated caries and sextants with bleeding, calculus and periodontal pockets). Normative treatment needs included indication for extraction or need for one or more fillings. The fifth level included subjective oral symptoms (toothache, difficulty chewing and difficulty speaking). The criterion for the incorporation of a variable into the final multiple modelling was a  $P$  value  $\leq .10$  in the analysis of each level.

The power of the study was calculated a posteriori considering the sample size ( $n = 518$ ), 80% power and 95% confidence level. The minimum PR for detection of differences was between 1.33 and 1.82 for exposure frequencies between 10% and 50%. Stata v.12.0 was used for all analyses.

The study protocol (Number 16 632) followed the standards established by the Brazilian National Ethics Research Council and was approved by that committee on 3 October 2011 (Decision 629/2011).

### 3 | RESULTS

The participant sample comprised 184 Kaiwoá (27.6%), 101 Kadiwéu (15.2%), 191 Terena (28.7%) and 190 Guarani (28.5%). Of the total sample, 34.1%, 43.7% and 22.2% self-rated oral health as good, neither good/nor poor and poor, respectively. Table 1 presents data on

self-rated oral health by sociodemographic characteristics and oral conditions. A higher proportion of adults reported having poor oral health than did adolescents (26.5% and 19.5%, respectively). Poor self-rated oral health was more frequent for individuals with lower number of functional teeth, for those with untreated decayed teeth and sextants with periodontal pocket. Individuals with no treatment needs (extraction or surface filling) rated their oral health better than those with normative treatment needs. Similarly, those reporting no subjective oral symptoms rated their oral health better than those reporting symptoms. No differences between the 2 outcome categories were observed by sex, ethnicity, schooling or income.

Table 2 presents unadjusted PRs for independent variables and adjusted PRs for each group of variables. Age group and Guarani ethnic affiliation were positively associated with the outcome in both unadjusted and adjusted analyses. Significant differences among the ethnic groups were observed only for the younger groups, in which Guarani had the highest rate of poor self-rated oral health, 26.3% vs 11.8% for Kaiwoá, 18.3% and 20.3% for Kadiwéu and Terena, respectively. Having fewer functional teeth (lower tertile) was also positively associated with the outcome (PR = 1.12 95% CI = 1.05-1.19). Two or more untreated decayed teeth remained associated with the outcome after controlling for other indicators of oral morbidity (PR = 1.14 95% CI = 1.08-1.21). Both normative treatment needs variables remained positively associated with the outcome after adjustment. Of the 3 subjective oral symptoms variables, reported toothache (PR = 1.15 95% CI = 1.07-1.23) and difficulty speaking due to dental problems (PR = 1.19 95% CI = 1.07-1.31) were positively associated with the outcome in both unadjusted and adjusted analyses.

Table 3 presents the outcome of the final hierarchical model. Poor self-rated oral health was higher for the older age group and for Guarani peoples than their counterparts (PR = 1.06 95% CI = 1.01-1.12 and PR = 1.09 95% CI = 1.02-1.17, respectively). The lower tertile of functional teeth was positively associated with

**TABLE 1** Absolute and relative distribution of oral health self-evaluation for indigenous population according to study variables

Variable	Oral health self-evaluation				Total	P value <sup>a</sup>
	Good		Neither good/nor poor			
	n	%	n	%		
<b>Sociodemographic characteristics</b>						
<b>Age group (y)</b>						
15-19	327	80.5	79	19.5	406	
35-44	191	73.5	69	26.5	260	.032
<b>Sex</b>						
Male	229	79.0	61	21.0	290	
Female	289	76.9	87	23.1	376	.517
<b>Ethnic group</b>						
Kaiwoá	152	82.6	32	17.4	184	
Kadiwéo	81	82.2	20	19.8	101	
Terena	147	77.0	44	23.0	191	
Guarani	138	72.6	52	27.4	190	.121
<b>Schooling</b>						
Fundamental education incomplete	331	77.3	97	22.7	428	
Fundamental education complete	187	78.6	51	21.4	238	.713
<b>Income<sup>b</sup></b>						
≤ 1 minimum monthly salary	357	76.9	107	23.1	464	
> 1 minimum monthly salary	161	79.7	41	23.3	202	.430
<b>Dentition status</b>						
<b>Number of functional teeth (tertiles)</b>						
Upper	168	85.3	29	14.7	197	
Medium	181	78.0	51	22.0	232	
Lower	169	71.3	68	28.7	237	.002
<b>Morbidity</b>						
<b>Untreated decayed teeth</b>						
0	209	86.4	33	13.6	242	
1	106	82.8	22	17.2	128	
≥ 2	203	68.6	93	31.4	296	<.001
<b>Sextants with gingival bleeding</b>						
0	178	83.2	36	16.8	214	
1	170	76.6	52	23.4	222	
≥ 2	170	73.9	60	26.1	230	.055
<b>Sextants with calculus</b>						
0	141	82.0	31	18.0	172	
1	189	78.8	51	21.2	240	
≥ 2	188	74.0	66	26.0	254	.138

(Continues)

**TABLE 1** (Continued)

Variable	Oral health self-evaluation				Total	P value <sup>a</sup>
	Good		Neither good/nor poor			
	n	%	n	%		
<b>Sextants with periodontal pockets</b>						
0	426	79.9	107	20.1	533	
≥ 1	92	69.2	41	30.8	133	.008
<b>Normative treatment needs</b>						
<b>Teeth requiring extraction</b>						
0	371	84.5	68	15.5	439	
1	72	70.6	30	29.4	102	
≥ 2	75	60.0	50	40.0	125	<.001
<b>Teeth requiring surface fillings</b>						
0	266	85.3	46	14.7	312	
1	97	72.4	37	27.6	134	
≥ 2	155	70.4	65	29.6	220	<.001
<b>Subjective oral symptoms</b>						
<b>Reported toothache</b>						
No	417	83.2	84	16.8	501	
Yes	101	61.2	64	38.8	165	<.001
<b>Reported difficulty chewing</b>						
No	423	82.1	92	17.9	515	
Yes	95	62.9	56	37.1	151	<.001
<b>Reported difficulty speaking</b>						
No	489	80.4	119	19.6	608	
Yes	28	50.0	28	50.0	56	<.001

<sup>a</sup>Pearson's chi-squared test.<sup>b</sup>One minimum monthly salary was R\$ 678 (approximately US\$ 330) on 1 January 2013.

the outcome (PR = 1.11 95% CI = 1.02-1.20) after adjustment by sociodemographic variables. Two or more untreated decayed teeth were positively associated with the outcome (PR = 1.15 95% CI = 1.07-1.23) after adjusting for sociodemographic characteristics and dentition status. After controlling for the previously mentioned variables, poor self-rated oral health was more common among those with greater needs for extractions or fillings. Reported toothache and difficulty speaking remained positively associated with the outcome after controlling for all previous variables (PR = 1.11 95% CI = 1.05-1.18; PR = 1.20 95% CI = 1.09-1.32, respectively).

## 4 | DISCUSSION

We assessed associations between poor self-rated oral health and subjective and clinical factors, dentition status and sociodemographic characteristics among the Indigenous Kaiwoá, Kadiwéo, Terena and Guarani peoples. Reporting toothache and reporting difficulty

**TABLE 2** Unadjusted and adjusted analyses for poor oral health self-evaluation according to groups of variables

Variable	Unadjusted analysis		Adjusted analysis <sup>c</sup>	
	PR <sup>a</sup> (95% CI)	P value <sup>b</sup>	PR <sup>a</sup> (95% CI)	P value <sup>b</sup>
<b>Sociodemographic characteristics</b>				
Sex (Male as reference)				
Female	1.02 (0.97, 1.07)	.516	1.02 (0.97, 1.07)	.476
Age group (15-19 y as reference)				
35-44 y	1.06 (1.00, 1.12)	.034	1.06 (1.01, 1.12)	.033
Ethnic group (Kaiwoá as reference)				
Kadiwéo	1.02 (0.94, 1.11)	.618	1.02 (0.94, 1.11)	.596
Terena	1.05 (0.98, 1.12)	.172	1.05 (0.98, 1.12)	.160
Guarani	1.08 (1.01, 1.16)	.019	1.09 (1.02, 1.17)	.014
<b>Dentition status</b>				
Number of functional teeth (upper tertile as reference)				
Medium tertile	1.06 (1.00, 1.13)	.050		
Lower tertile	1.12 (1.05, 1.19)	<.001		
<b>Morbidity</b>				
Untreated decayed teeth (0 as reference)				
1	1.03 (0.96, 1.10)	.372	1.02 (0.96, 1.10)	.505
≥ 2	1.16 (1.09, 1.22)	<.001	1.14 (1.08, 1.21)	<.001
Sextants with gingival bleeding (0 as reference)				
1	1.06 (0.99, 1.12)	.084	1.04 (0.97, 1.12)	.300
≥ 2	1.08 (1.12, 1.22)	.016	1.04 (0.95, 1.14)	.390
Sextants with calculus (0 as reference)				
1	1.03 (0.96, 1.10)	.414	0.98 (0.91, 1.05)	.583
≥ 2	1.07 (1.12, 1.24)	.049	0.99 (0.90, 1.08)	.794
Sextants with periodontal pockets (0 as reference)				
≥ 1	1.09 (1.02, 1.16)	.011	1.05 (0.97, 1.13)	.207
<b>Normative treatment needs</b>				
Teeth requiring extraction (0 as reference)				
1	1.12 (1.04, 1.21)	.003	1.11 (1.03, 1.19)	.008
≥ 2	1.21 (1.13, 1.30)	<.001	1.18 (1.11, 1.27)	<.001
Teeth requiring fillings (0 as reference)				
1	1.11 (1.04, 1.19)	.002	1.08 (1.01, 1.16)	.019
≥ 2	1.12 (1.06, 1.20)	<.001	1.09 (1.03, 1.16)	.003
<b>Subjective oral symptoms</b>				
Reported toothache (no as reference)				
Yes	1.19 (1.12, 1.26)	<.001	1.15 (1.07, 1.23)	<.001
Reported difficulty chewing (no as reference)				
Yes	1.16 (1.09, 1.24)	<.001	1.05 (0.97, 1.13)	.270
Reported difficulty speaking (no as reference)				
Yes	1.25 (1.15, 1.37)	<.001	1.19 (1.07, 1.31)	<.001

<sup>a</sup>Prevalence ratio.<sup>b</sup>Wald test.<sup>c</sup>Adjusted values within each variable groups.

speaking due to dental problems (subjective oral symptoms) were associated with the outcome. Few studies have addressed factors associated with the perception of oral health in any Indigenous population. One of the first such studies, conducted in the United

States, evaluated differences in self-rated oral health among whites, Hispanics, blacks and Indigenous peoples in different regions of the country. Consistent with the current study, the findings indicated that oral health perception may be a useful measure in public health

**TABLE 3** Final regression model for poor oral health self-evaluation according to hierarchical selection of variables

Variable	Adjusted Analysis	
	RP <sup>a</sup> (95% CI)	P value <sup>b</sup>
Sociodemographic characteristics		
Sex (male as reference)		
Female	1.02 (0.97, 1.07)	.476
Age group (15-19 y as reference)		
35-44 y	1.06 (1.01, 1.12)	.033
Ethnic group (Kaiwoá as reference)		
Kadiwéó	1.02 (0.94, 1.11)	.596
Terena	1.05 (0.98, 1.12)	.160
Guarani	1.09 (1.02, 1.17)	.014
Dentition status <sup>c</sup>		
Number of functional teeth (upper tertile as reference)		
Medium tertile	1.06 (1.00, 1.13)	.060
Lower tertile	1.11 (1.02, 1.20)	.013
Morbidity <sup>d</sup>		
Untreated decayed teeth (0 as reference)		
1	1.03 (0.95, 1.11)	.479
≥ 2	1.15 (1.07, 1.23)	<.001
Normative treatment needs <sup>e</sup>		
Teeth requiring extraction (0 as reference)		
1	1.15 (1.05, 1.25)	.002
≥ 2	1.21 (1.10, 1.33)	<.001
Teeth requiring fillings (0 as reference)		
1	1.16 (1.05, 1.27)	.002
≥ 2	1.15 (1.03, 1.30)	.016
Subjective oral symptoms <sup>f</sup>		
Reported toothache (no as reference)		
Yes	1.11 (1.05, 1.18)	.001
Reported difficulty speaking (no as reference)		
Yes	1.20 (1.09, 1.32)	<.001

<sup>a</sup>Prevalence ratio.<sup>b</sup>Wald test.<sup>c</sup>Adjusted for sociodemographic characteristics.<sup>d</sup>Adjusted for sociodemographic characteristics and dentition status.<sup>e</sup>Adjusted for sociodemographic characteristics, dentition status and oral morbidity.<sup>f</sup>Adjusted for all previous variables.

due to its relationship with health determinants and health services use.<sup>8</sup>

There were no differences observed between women and men, but adolescents rated their oral health better than adults. The evidence from the literature is not clear. Younger people do not always evaluate their oral health better than older individuals,<sup>20</sup> and factors such as educational level, income and access to health services maybe more important than age in oral health self-evaluation.<sup>1,4,21</sup> Examining possible interaction by age group, we did not observe differences in relation to independent variables except for the ethnic

group in the younger stratum. A slight reduction in the *P* values for ethnic and age group variables was observed in the multiple model (Table 2). These lower *P* values might be linked to the highest rate of poor self-rated oral health for 15- to 19-year-old Guarani people.

Guarani individuals evaluated their oral health more poorly than those in the other ethnic groups. Because self-rated oral health may differ according to socioeconomic status,<sup>4,22</sup> we evaluated potential differences in schooling and income between the 4 groups. The rate of “incomplete elementary education” was lowest among the Terena (49.7%) and highest among the Kaiwoá (78.8%). Lower income (“≤ 1 monthly minimum salary”) was least frequent among the Kadiwéó (54.5%) and most frequent among the Guarani (81.1%). However, the lack of any association between schooling/income and self-evaluation of oral health in any Indigenous group may be due to the lower power of the subgroup analyses, among other features. Health practices (including self-care), self-rated health and an understanding of the health/illness processes are specific to each culture. The very concept of health is a social construct. Beliefs and conceptions regarding what is normal and what is pathological are rooted in singular sociocultural contexts. They constitute dynamic aspects of cultural systems, resulting from historic cultural, and political processes.<sup>23,24</sup>

Dentition status, represented by the number of functional teeth, caries-related conditions and normative needs were associated with poor self-rated oral health, endorsing their importance in the frames of reference.<sup>5</sup> In fact, these conditions may have direct impacts on chewing function, speech and even personal appearance. The multiple analysis involving variables related to the block of subjective oral symptoms and the outcome variable (Table 2) showed that toothache and reported difficulty in speaking are more relevant than chewing for oral health self-rating within the sample. Toothache is an important source of human suffering with negative impacts on daily performance and quality of life.<sup>25</sup> As a distinctive point from the current study, the findings indicate the relevance of communication among functional issues for Indigenous peoples’ oral health self-assessment.

As well as the limitations inherent to cross-sectional studies, another restriction of this study was the analysis of age group as an independent variable in the final multiple model. On the one hand, this option led to the finding that adolescents rated their oral health better than adults and allowed assessment of possible associations adjusting for age group. However, on the other hand, potential association differences between adults and adolescents as specific strata could not be investigated. Another limitation refers to treatment needs, which were evaluated in a normative manner. Other types of queries, such as “do you have any oral health-related problem?” or “what type of dental treatment do you consider is necessary to solve this problem?” could be useful for understanding oral healthcare expectations of Indigenous individuals. Answers to these questions could offer important information related to culturally informed concepts of health-illness among the different Indigenous groups that participated in the present study. Medical anthropological studies have shown that perceptions of health, illness and treatment needs of healthcare professionals and members of Indigenous communities

often diverge.<sup>26</sup> Qualitative studies on health practices and representations in indigenous peoples are fundamental for understanding how different groups name, categorize and interpret symptoms and diseases. In this sense, anthropological approaches are essential for understanding similarities and divergences in self-rated oral health between populations. Despite these limitations, this is the first population-based study to compare the association of objective and subjective conditions with self-rated oral health among multiple Indigenous ethnic groups in Brazil.

Indigenous peoples throughout the world tend to have poorer health. Major problems of access to health services, social inequalities, marginalization and lower levels of schooling and economic status lead to greater social vulnerability, expressed in poorer health indicators than in non-Indigenous populations.<sup>27-29</sup> Improving oral health among Indigenous peoples requires health policies that reduce barriers and increase the availability of health promotion and disease prevention services. Ethnic and cultural patterns in oral health services use are associated with perceptions of treatment needs and self-rated oral health.<sup>30</sup> In Brazil, the structuring of primary care services directed towards the Indigenous population should follow the Brazilian National Healthcare Policy for Indigenous Peoples, which establishes policies and institutional mechanisms for providing differentiated health care. According to Menéndez (2003),<sup>31</sup> differentiated care does not presuppose mechanically incorporating traditional practices into health services, but rather favours strengthening links between primary care services and existing Indigenous self-care practices.

Further studies evaluating self-perceptions of oral health among Indigenous peoples are potentially important tools for understanding concepts, beliefs, values and knowledge among these culturally differentiated populations and may facilitate communication between Indigenous and non-Indigenous care systems.

In conclusion, oral symptoms—such as toothache and difficulty in speaking due to dental problems—play an important role in oral health self-evaluation. Our findings suggest that self-rated oral health may be an appropriate indicator for use in diverse sociocultural contexts.

## ACKNOWLEDGEMENTS

We wish to acknowledge the National Council of Technological and Scientific Development (CNPq) for financial support (Grant 473116/2010-3). Special thanks are given to all the dentists from the Indigenous healthcare district, who helped enormously with data collection, and Luciene Alle, coordinator of the oral health programme in the Mato Grosso do Sul Indigenous sanitary district. We are grateful to James R. Welch for proofreading. The second author is a research fellow with CNPq (Grant 303681/2016-0).

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**How to cite this article:** Arantes R, Frazão P. Subjective oral symptoms associated with self-rated oral health among Indigenous groups in Central-West Brazil. *Community Dent Oral Epidemiol.* 2018;46:352-359. <https://doi.org/10.1111/cdoe.12375>