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Oral health of riverine rural populations in a municipality of Amazonas: DMFT index and self-perception

Saúde bucal de populações rurais ribeirinhas no município do Amazonas, Brazil: índice CPO-D e autopercepção

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ABSTRACT
The present study aimed to understand the self-perception of oral health and evaluate the DMFT (Decayed, Missing, and Filled Teeth) index among riverside residents in the Careiro da Várzea municipality, state of Amazonas, accessed through voluntary health actions. Employing an exploratory and descriptive approach with non-probabilistic sampling, 84 participants were evaluated, predominantly female (57%) and aged between 12 and 80 years. Although most are engaged in oral health programs, approximately half encounter difficulties in accessing dental care. Nonetheless, a majority deem it essential to visit the dentist biannually, with toothache being the primary reason for such visits. Self-perception varied, with 35.7% rating their oral health as "mean" and 40.5% as "good". However, the high mean score (8.4) on the DMFT exam reveals a discrepancy in the oral health of riverside residents.

Keywords: CPO Index. Oral Health. Public health.

RESUMO
O presente estudo teve como objetivo conhecer a autopercepção em saúde bucal e avaliar o índice de CPO-D dos pacientes ribeirinhos localizados no município Careiro da Várzea no Estado do Amazonas atendidos em ação voluntária. Utilizando uma metodologia exploratória e descritiva, com amostragem não-probabilística, foram avaliados 84 participantes, predominantemente do sexo feminino (57%) e com idades entre 12 e 80 anos. Embora a maioria participe de programas de saúde bucal, cerca de metade enfrenta dificuldades de acesso. Ainda assim, a maioria considera essencial visitar o dentista duas vezes ao ano, sendo a dor de dente o motivo mais comum. A autopercepção variou, com 35,7% classificando como "regular" e 40,5% como "boa". Entretanto, a média elevada (8,4) no exame CPO-D revela uma discrepância na saúde bucal dos pacientes ribeirinhos.

Palavras-chave: Índice CPO. Saúde Bucal. Saúde Pública.

INTRODUCTION

The Global Burden of Disease highlights that oral diseases affect about 3.5 billion individuals, exerting a considerable impact on health systems globally. In developing countries, the scarcity of access to adequate oral care amplifies disparities, especially among riverside and disadvantaged communities. This reality is particularly tangible in the Aboriginal and Torres Strait Islander populations (respectfully referred to as indigenous) in Australia, where rates of oral diseases such as dental caries and periodontal disease surpass those of the non-indigenous population. The absence of universal health coverage and the high costs of basic care exacerbate this situation, emphasizing the urgency of prioritizing oral health as a public health issue[1,2].

The terms "ribeirinhos" and "caboclos ribeirinhos" portray a set of unique social groups (indigenous, migrants from other regions, and northeasterners) that inhabit the shores of lakes and rivers in the Amazon. Given that the riverside dwellers depend on the river for their subsistence, where they obtain their main food source (fishing), in addition to it being their means of transport and the basis of their housing, this lifestyle ultimately imposes certain multidimensional limits[3,4].

Many of these riverside populations live in relative exclusion and social isolation, conditions that, coupled with high illiteracy rates, can result in little or no political impact as well as difficulties in social organization with negative economic and sanitary consequences. From the same perspective, the frequency of preventable oral diseases is typically higher in socially and economically disadvantaged communities than in more developed areas[3–6].

Although in Brazil "universality of access" as a principle of the Unified Health System (SUS) is advocated by the national health policy, access to these services is still quite restricted since regional inequality is markedly evident in the North and Northeast regions compared to other regions of the country. Similarly, the lack of health professionals in rural areas is described, since there is difficulty in recruitment and retention, in addition to the high turnover of these professionals[3,7–10].

The subjective health of an individual can predict more accurate levels of quality of life and well-being and is considered an indicator of good health that reflects personal opinions about health that cannot be measured by medical methods. When individuals assess their general oral condition, this is referred to as self-perception of oral health and can indicate the current state of a person's oral health[11,12].

Self-perception of oral health summarizes multiple determinants related to oral health and has been suggested for use in clinical practice as a health assessment tool. It serves not only to evaluate and monitor improvements in oral health within society but also as an indicator of treatment needs or to estimate the functional, psychological, and social impacts of oral diseases and disorders on people's lives[7,8,13]this study proposed to understand the self-perception of oral health of this population group. This study aimed to verify the association of oral health's self-perceived impact on daily living with sociodemographic and oral health characteristics among indigenous people aged 10 to 14 years of the Xukuru do Ororubá ethnic group, in Pesqueira (PE.

Difficulties in providing oral health services are numerous: health teams' transportation is time-consuming and laborious; due to accumulated demand, it is difficult to obtain appointment slots and times; there is commonly a shortage of supplies and materials; there is almost always no service with specialists in endodontics, for example, leading to high numbers of emergency extractions in these communities[14–16]whether such a self-rating influenced by some potential risk factors, and whether both ratings (OH and GH.

Promoting oral health in rural communities is essential, going beyond treatment to encompass prevention and awareness. Health

education, easy access to preventive care, and awareness about proper habits are fundamental. A collaboration between governments, Non-Governmental Organizations (NGOs), and health professionals is crucial to ensure the sustainability of these initiatives. Therefore, these actions aim not only at individual well-being but also at the quality of life and livelihood of these populations[14–16]whether such a self-rating influenced by some potential risk factors, and whether both ratings (OH and GH.

Regarding oral health, the last two national epidemiological surveys on oral health were conducted in 2003 and 2010, named SB Brazil Project. An epidemiological survey defined by the knowledge of disease incidence patterns in a specific group of patients should be conducted to determine the oral health index. To evaluate and measure the level of oral health in a population of people, the World Health Organization (WHO) developed the index of decayed, missing, and filled permanent teeth (DMFT), widely used in Brazil since 1937[9,17].

From the DMFT index, various others have emerged using different units of measurement in the denominator of the calculation: the individual, the tooth, or the dental surfaces evaluated. In public health, the "tooth" unit may be the most used because it offers the greatest ease of obtaining results and a certain richness of data, with the DMFT being the main index recommended and used, as it considers the five surfaces of the tooth[18].

METHODOLOGY

This is a prevalence study of exploratory and descriptive type with a quantitative approach conducted in riverside communities, aiming to characterize the DMFT index (decayed, missing, and filled permanent teeth index; mean of decayed, missing, and filled permanent teeth) of this population.

The research was carried out through a volunteer action in the municipality of Careiro da Várzea and was planned to take place in two stages: one Fluvial Basic Health Unit (UBSF) and one Municipal School, both in the aforementioned municipality serving riverside communities. The actions were scheduled to be carried out from August to October 2023. The first action took place over a week at the UBSF, and there were unforeseen circumstances preventing the second action because of the drought issue and the smoke that enveloped the city of Manaus and various municipalities. As mentioned by Pinheiro[19], the drought or dry season, which occurs every year in the Amazon region, this time left an entire state in emergency, with 62 municipalities entering a state of emergency because of the drought, affecting 589,000 people. Moreover, since August, the city began to be covered by a dense smoke cloud, which intensified with the arrival of the dry season.

In a single volunteer action carried out at the UBSF, 84 eligible riverside patients participated in the study, which took place in the municipality of Careiro da Várzea-AM. It has an estimated population of 31,459 and is located 15 km in a straight line from the capital Manaus, where 96% of its population resides in rural areas along the riverbeds or close to roads. The municipality was established on December 30, 1987, through Law No. 1,828 (12.30.1987), which divided the old municipality of Careiro into two distinct municipalities: Careiro da Várzea and Careiro Castanho. The municipality of Careiro da Várzea has a territorial area of 2,627 km^2 and is politically divided into 10 districts[12].

It encompasses 90% of its territory covered by floodplains, hosting a significant ecosystem of high and low floodplains, lakes, paranás (side channels), floodplain forests, chavascais (areas of dense, scrubby vegetation), and igarapés (small streams). It is washed by the Solimões and Amazon rivers, in front of the meeting point of the Rio Negro and Rio Solimões, where the Amazon River is formed[12].

Currently, the municipality's Health Department offers the population services from doctors, dentists, oral health assistants (ASB), social workers, nurses, nursing technicians, and community health agents, who provide home and individual services, supported by units such as churches, schools, and Basic Health Units (UBS) to serve the population. The team faces numerous difficulties in delivering services to more remote areas, challenges of both mobility and access, a situation that worsens during the river flood season[24].

For inclusion criteria, patients who were part of the riverside communities of Careiro da Várzea, aged 12 to 80 years, of either gender, who were willing to participate in the research through voluntary action between August and November/23, and who signed the informed consent form (ICF) were accepted.

As exclusion criteria, patients who did not live on the riverbank of the municipality of Careiro da Várzea, who were not within the aforementioned age group, and who refused to sign the ICF were not accepted.

For the assessment and survey of dental condition, a questionnaire was first conducted to evaluate the self-perception of oral health with open and closed questions, followed by a clinical examination with a dentist, their team, and calibrated volunteers to carry out the research, using the oral health indices recommended by the World Health Organization for evaluating the DMFT index.

The variables from the dental examination and the oral health self-assessment questionnaire of the riverside patients from the communities of Careiro da Várzea were tabulated in Microsoft Excel 2013 and analyzed using the IBM SPSS Statistics software version 22.0, with the results presented through tables and graphs.

An initial descriptive and exploratory analysis was conducted, followed by an inferential analysis of the data. The individual DMFT index of the patients was calculated by adding up the decayed (D), missing (M), and filled (F) teeth, divided by the mean total number of services provided to riverside populations.

The frequencies of responses to the oral health self-perception questionnaire were described in three tables, grouped into the following themes: Oral Health Promotion Programs (questions 1 to 3); Oral Health Access (questions 4 to 8); and Self-Perception of Oral Health (questions 9 to 15).

The normality of the components of the dental examination, the DMFT and DMFT index were verified using the Shapiro-Wilk normality test, which showed a lack of normality in all amounts related to the verified components ($p<0.05$), thus determining the non-parametric analysis in the comparisons/relations between the variables. The relationships between the DMFT values and the DMFT Index with variables such as gender, age, age group, color, and questions related to selfperception of oral health were verified using the Mann-Whitney test and the Kruskal-Wallis ANOVA (analysis of variance). All decisions considered a 5% significance level.

To verify DMFT indices, the World Health Organization Classification – SB Brazil 2010 was used, which describes that a DMFT score from 0 to 1.1 indicates a very low prevalence of caries in the population, 1.2 to 2.6 low, 2.7 to 4.4 medium, 4.5 to 6.5 high, and 6.6 or higher is very high.

All procedures of this study followed the ethical principles established by the current legislation; the project was submitted to the Brazil Platform in Research Involving Human Beings (CEP), according to the CNS resolution 466/2012 and approved under CAAE No. 70390523.4.0000.8119 by the CEP of the Federal Institute of Education, Science, and Technology of Amazonas – IFAM.

RESULTS

SAMPLE PROFILE

This study involved the participation of 84 individuals residing in the riverside communities of the Careiro da Várzea municipality, with 57.1% female and 42.9% male. The majority of these patients are in the age group of 18 to 40 years, representing 45.2% of the sample, with 73.8% identifying as mixed race. The age of the patients ranged from 12 to 80 years, with mean and median ages of 33.9 ± 16.3 and 30.5, respectively.

SELF-PERCEPTION OF ORAL HEALTH AMONG RIVERSIDE PATIENTS RESIDING IN THE MUNICIPALITY OF CAREIRO DA VÁRZEA

The questionnaire applied to the 84 riverside residents was categorized into three domains: Participation/Knowledge of Oral Health Promotion Programs, Access to Oral Health in the Municipality, and Perception of Oral Health in the Municipality. In the Participation/Knowledge domain, 79.8% of patients have participated in a program, 71.4% are aware of the existence of programs, with the majority (61.7%) rated as "excellent", and 71.4% are currently participating, with 80.0% through the School Health Program (PSE). In the Access to Oral Health domain, 97.6% consider it a priority to visit the dentist periodically, with 45.2% preferring twice a year; 52.4% encounter difficulties owing to a shortage of slots at the local UBS; 53.6% seek the dentist primarily because of pain, and 86.9% access dental care at the local UBS through the SUS. Regarding the Perception of Oral Health, 40.5% consider it "good" and 35.7% "regular", totaling 76.2% of the sample.

Table 1. Frequency of Access to Oral Health in the Municipality according to Study Participants

ORAL HEALTH ACCESS	n (84)	%
Do you consider it a priority to visit the dentist periodically?		
Yes	82	97.6
No	2	2.4
What is the frequency of your dental visits?		
Once a year	21	25.0
Twice a year	38	45.2
Three times a year	16	19.0
Only when in pain	9	10.7
Do you find it difficult to visit the dentist?		
Yes	44	52.4
No	40	47.6
What are the difficulties?	**(n = 44)**	
No time	6	13.6
Not enough dentists	6	13.6
Not enough appointment slots	17	38.6
Due to transportation	15	34.1
What is the reason for the visit?		
Pain	45	53.6
Routine checkup/repairs/ maintenance	39	46.4
When you go to the dentist, is your consultation		
Private / Insurance Plans	11	13.1
Health Unit (SUS)	73	86.9

Regarding other questions related to the self-perception of oral health among the riverside patients residing in the mentioned municipality, it was observed that: 56.0% claim to have some problems with their teeth; only 9.5% report the presence of any gum problems; 92.9% have received instructions about oral hygiene, and 91.0% received such instructions through the PSE and at the local UBS. Concerning daily brushing, 69.0% do it 3 to 4 times a day, 46.4% use dental floss, and 21.4% use fluoridated products (Table 2).

Table 2. Frequency by Self-Perception of Oral Health in the Municipality, by Study Participants

ORAL HEALTH ACCESS	n (84)	%
How would you classify your oral health?		
I don't know	4	4.8
Poor / Terrible	6	7.1
Mean	30	35.7
Good	34	40.5
Excellent	10	11.9
Do you have any problems with your teeth?		
Yes	47	56.0
No (or I don't know)	37	44.0
Do you have any problems with your gums?		
Yes	8	9.5
No (or I don't know)	76	90.5
Have you received oral hygiene instructions?		0.0
Yes	78	92.9
No	6	7.1
Where did you receive instruction	**(n = 78)**	
PSE + UBS	71	91.0
School + UBS	7	9.0
How many times a day do you brush your teeth?		
1 to 2 times/day	23	27,4
3 to 4 times/day	58	69,0
5 times/day	3	3,6
Do you use dental floss?		
Yes	39	46,4
No	45	53,6
Do you use fluoridated products?		
Yes	18	21,4
No	66	78,6

DENTAL DIAGNOSIS OF RIVERSIDE PATIENTS RESIDING IN THE MUNICIPALITY OF CAREIRO DA VÁRZEA – STATE OF AMAZONAS

In the 84 patients, the number of sound teeth was 1,316, ranging from 0 (none) to 28, with mean and median quantities of 15.7 ± 8.7 and 17 teeth, respectively. In total, 255 decayed teeth were observed, with quantities ranging from 0 (none) to 15, and mean and median quantities of 3.7 ± 3.5 and 2 teeth, respectively. As for the total of filled teeth with decay, this was 84, varying from 0 (none) to 7 teeth, with mean and median quantities of 1.0 ± 1.6 and 0 (none) tooth, respectively. Regarding the filled teeth without decay, there were 314 teeth, ranging from 0 (none) to 28 teeth, with mean and median quantities of 3.7 ± 4.3 and 28 teeth, respectively.

The total number of teeth missing due to decay was 503, ranging from 0 (none) to 28 teeth, indicating that some patients had lost 28 teeth because of dental caries, with mean and median quantities of 6.0 ± 6.8 and 4 teeth, respectively. Concerning teeth missing for other reasons, 110 teeth were observed, varying from 0 (none) to 5 teeth, with mean and median quantities of 1.3 ± 1.8 and 0 (none) teeth, respectively. Only one patient with a sealant was verified, and 104 excluded teeth varied from 0 (none) to 5 teeth, with mean and median quantities of 1.7 ± 1.8 and 0 (none) teeth, respectively (Table 3).

Table 3. Descriptive Analysis and Normality Test of Dental Characteristics of Participants according to Dental Evaluation

CODE (Crown)	CHARACTERISTIC	n	DESCRIPTIVE MEASURES (Number of teeth)						p*
			Total of Teeth	Mean	SD	Minimum	Median	Maximum	
0	Sound	84	1,316	15.7	7.7	0	17	28	*0.010*
1	Decayed	84	255	3.0	3.5	0	2	15	*0.000*
2	Filled but with decay	84	84	1.0	1.6	0	0	7	*0.000*
3	Filled and without decay	84	314	3.7	4.3	0	3	28	*0.000*
4	Missing due to decay	84	503	6.0	6.8	0	4	28	*0.000*
5	Missing for other reasons	84	110	1.3	1.8	0	0	5	*0.000*
6	Has sealant	84	1	0.0	0.1	0	0	1	*0.000*
9	Tooth excluded	84	104	1.2	1.8	0	0	5	*0.000*

*Normality of the data is guaranteed for $p > 0.05$ (5%)
Shapiro-Wilks Test

It is noteworthy that in all the characteristics observed and required through the dental examination, there was high variability (evidenced by the standard deviation, confirmed by the normality test of the data) in the quantity observed in each characteristic, for each patient, indicating that the cases evaluated are very different from each other.

EVALUATION OF THE DMFT INDEX OF RIVERSIDE PATIENTS RESIDING IN THE MUNICIPALITY OF CAREIRO DA VÁRZEA – STATE OF AMAZONAS

The analysis showed 339 decayed teeth in the 84 riverside patients, with variations ranging from 0 (none) to 22 teeth, with mean and median quantities of 4.0 ± 4.2 and 3 teeth, respectively. As for the total number of missing teeth, this was 717 teeth, ranging from 0 (none) to 32 teeth, with mean and median quantities of 8.5 ± 6.6 and 5.5 teeth, respectively. Regarding filled (or restored) teeth, the total was 314 teeth, varying from 0 (none) to 28 teeth, with mean and median quantities of 3.7 ± 4.3 and 3 teeth, respectively. The overall DMFT of the patients was 1,370 teeth, with variations ranging from 4 to 32 teeth, with mean and median quantities of 4.0 ± 4.2 and 3 teeth, respectively.

According to the DMFT analysis, the DMFT index of each patient was obtained, resulting in mean and median DMFTs of 8.4 ± 4.0 and 7.7 teeth, respectively. The lowest index was 2.1, and the highest was 19.4.

When examining the relationship between characteristics related to DMFT / DMFT Index by gender, it was observed that no characteristic showed a statistically significant difference between genders, considering the 5% significance level, pointing out that the quantity of decayed ($p=0.648$), missing ($p=0.117$), and filled ($p=0.111$) teeth were not significantly different between genders. In this context, the quantity of DMFT, as well as the DMFT Index between genders, were not significantly different ($p=0.725$). This result indicates that the oral health of both men and women residing in riverside communities demands the same attention from public health.

When analyzing the relationship between DMFT / DMFT Index by age group, it is observed that the mean and median quantities of decayed teeth are higher in the age groups of 18 to 40 years (Mean: 4.2; Median: 3.0) and 41 to 60 years (Mean: 4.2; Median: 3.0), but they do not present statistical significance at the 5% level. This means that the quantity of decayed teeth is distributed evenly across age groups (Table 4).

Regarding missing teeth, a high prevalence in the age group of 18 to 40 years and in the age group of 41 to 60 years was observed. This shows that the age group of the riverside population evaluated is related to the quantity of missing teeth ($p<0.0001$) and that most of these patients lose teeth between the ages of 18 and 60, before old age (Table 4).

The same occurs in relation to filled (restored) teeth, which prevail in the age group of 18 to 60, again showing the age group of these patients is strongly related to the quantity of filled teeth ($p=0.023$). Before the results, there was strong evidence that age significantly influenced the DMFT Index in the riverside population of the referenced municipality (Table 4).

Table 4. Descriptive Analysis and Relationship between Characteristics to the DMFT / DMFT Index by Age Group of Riverside Patients from the Municipality of Careiro da Várzea Subjected to Dental Evaluation.

(Continued)

DENTAL ASSESSMENT	AGE GROUP	DESCRIPTIVE MEASURES							*p**
		n	Mean	SD	Qty. Teeth	Minimum	Median	Maximum	
Decayed	12 to 17	16	3.0	3.3	48	0	1.5	11	*0.538*
	18 to 40	38	4.2	4.9	159	0	3.0	22	
	41 to 60	24	4.5	3.5	108	0	3.5	12	
	61 and over	6	4.0	4.9	24	0	2.0	11	
Missing	12 to 17	16	4.3	1.2	68	2	4.0	8	*p<0.0001**
	18 to 40	38	6.2	3.9	237	0	5.0	20	
	41 to 60	24	12.3	7.3	295	0	13.0	32	
	61 and over	6	19.5	7.8	117	11	18.5	32	
Filled	18 to 40	16	2.0	2.6	32	0	1.5	10	*0.023**
	18 to 40	38	3.7	3.3	140	0	3.0	11	
	41 to 60	24	5.5	6.0	132	0	4.0	28	
	61 and over	6	1.7	2.4	10	0	0.5	6	
DMFT	41 to 60	16	9.3	4.8	148	4	8.0	21	*p<0.0001**
	18 to 40	38	14.1	5.9	536	5	14.0	31	
	41 to 60	24	22.3	5.7	535	11	22.0	32	
	61 and over	6	25.2	7.6	151	11	26.5	32	

(Conclusion)

DMFT Index	12 to 17	16	4.8	2.4	-	2.1	4.1	10.8	*p<0.0001**
	18 to 40	38	7.2	3.0	-	2.6	7.2	15.9	
	41 to 60	24	11.4	2.9	-	5.6	11.3	16.4	
	61 and over	6	12.9	3.9	-	5.6	13.6	16.4	

**The p-value is significant for p < 0.05 (5%) Kruskal-Wallis ANOVA*

Regarding the relationship between color and DMFT/DMFT Index, a prevalence of dental issues was observed in individuals identifying as mixed race, which corresponds to the majority of the study's population. However, when comparing the distribution of dental caries, missing, and filled teeth across different racial groups, no statistically significant differences were found (p=0.652 for decayed teeth, p=0.745 for missing teeth, and p=0.933 for filled teeth). This indicates that, within this riverside population, the occurrence of dental caries and the condition of missing and filled teeth do not significantly differ among racial groups.

As for oral health promotion programs (questions 2 and 3), significant differences were found in the DMFT values and DMFT Index. Patients unaware of the programs showed higher means and medians (19.3 ± 8.1 and 20.5) than those aware of the existence of programs, highlighting the positive influence of awareness on improving oral health (p=0.003). The same pattern was observed in participation in prevention programs, indicating that adherence to these programs is associated with lower rates of DMFT and DMFT Index (p=0.003). These results emphasize the importance of awareness and participation in oral health promotion programs for improving the dental status of riverside patients.

Table 5. Descriptive Analysis and Relationship Between DMFT / DMFT Index Values by Questions Related to Oral Health Promotion Programs, of Riverside Patients from the Municipality of Careiro da Várzea, Amazonas, Brazil.

(Continued)

QUESTION	DENTAL ASSESSMENT	RESPONSE (Question)	DESCRIPTIVE MEASURES				*p**
			n	Mean	SD	Qty. Teeth	
1. Have you ever participated in any oral health promotion program offered by the municipality?	DMFT	Yes	67	16.6	7.9	1.115	*0.394*
		No	17	15.0	7.0	255	
	DMFT Index	Yes	67	8.5	4.0	-	
		No	17	7.7	3.6	-	
2. Are you aware of any oral health promotion program offered by the municipality?	DMFT	Yes	60	15.1	7.3	907	*0.031**
		No	**24**	**19.3**	**8.1**	**463**	
	DMFT Index	Yes	60	7.8	3.7	-	
		No	**24**	**9.9**	**4.2**	**-**	

(Conclusion)

QUESTION	DENTAL ASSESSMENT	RESPONSE (Question)	DESCRIPTIVE MEASURES				p*
			n	Mean	SD	Qty. Teeth	
3. Are you currently participating in any prevention program?	DMFT	Yes	60	15.1	7.3	907	0.031*
		No	**24**	**19.3**	**8.1**	**463**	
	DMFT Index	Yes	60	7.8	3.7	-	
		No	**24**	**9.9**	**4.2**	**-**	

The data from Table 6 reveal significant differences in DMFT values and DMFT Index regarding access to oral health for riverside patients. In question 5, about the frequency of dental visits, patients who only seek the dentist in case of pain showed higher values, with means of 22.0 ± 7.1 for DMFT and 11.3 ± 3.7 for the DMFT Index. In question 6, on difficulties in seeking care, those who answered "yes" had means of 19.2 ± 7.5 for DMFT and 9.9 ± 3.8 for the DMFT Index. As for question 7, related to the reason for the consultation, patients who indicated "pain" had means of 19.0 ± 6.8 for DMFT and 9.7 ± 3.5 for the DMFT Index. All these results show the values are significantly higher ($p<0.0001$) in patients who seek dental care only when they feel pain.

Table 6. Descriptive Analysis and Relationship Between DMFT / DMFT Index Characteristics by Questions Related to Access to Oral Health of Participants in this Study, Residing in Riverside Communities in Careiro da Várzea, Amazonas, Brazil

(Continued)

QUESTION	DENTAL ASSESSMENT	RESPONSE (Question)	DESCRIPTIVE MEASURES				p*
			n	Mean	SD	Qty. Teeth	
4. Do you consider it a priority to visit the dentist periodically?	DMFT	Yes	82	16.5	7.7	1349	0.297
		No	2	10.5	5.0	21	
	DMFT Index	Yes	82	8.4	4.0	-	
		No	2	5.4	2.6	-	
5. What is the frequency of your dental visits?	DMFT	Once a year	21	17.2	7.0	362	0.001*
		Twice a year	38	17.0	7.9	646	
		Three times a year	16	10.3	4.9	164	
		Only when in pain	9	22.0	7.1	198	
	DMFT Index	Once a year	21	8.8	3.6	-	
		Twice a year	38	8.7	4.0	-	
		Three times a year	16	5.3	2.5	-	
		Only when in pain	9	11.3	3.7	-	

(Conclusion)

QUESTION	DENTAL ASSESSMENT	RESPONSE (Question)	DESCRIPTIVE MEASURES				p*
			n	Mean	SD	Qty. Teeth	
6. Do you find it difficult to go to the dentist?	DMFT	Yes	44	19.2	7.5	846	p<0.0001*
		No	40	13.1	6.7	524	
	DMFT Index	Yes	44	9.9	3.8	-	
		No	40	6.7	3.4	-	
7. What is the reason for the consultation?	DMFT	Pain	45	19.0	6.8	854	p<0.0001*
		Routine	39	13.2	7.6	516	
	DMFT Index	Pain	45	9.7	3.5	-	
		Routine	39	6.8	3.9	-	
8. When you go to the dentist, is your consultation	DMFT	Private	11	18.4	6.4	202	0.323
		SUS	73	16.0	7.9	1168	
	DMFT Index	Private	11	9.4	3.3	-	
		SUS	73	8.2	4.0	-	

*The p-value is significant for $p < 0.05$ (5%) Kruskal-Wallis ANOVA.

No significant differences were found in the values regarding these questions. However, when analyzing self-perception of oral health (questions 9 and 10), significant differences were observed, with higher DMFT and DMFT Index values in patients who could not classify their oral health or considered it poor/terrible. Even within the categories of self-classification, values remained high, being significantly lower only in those who classified their oral health as good.

Additional questions about gum problems, oral hygiene instructions, brushing frequency, use of dental floss, and fluoridated products did not show significant differences in the mean and median values of DMFT and DMFT Index. It is worth noting that, despite these results, factors such as embarrassment when reporting brushing frequency may influence responses, indicating the need to consider these aspects in the data interpretation.

DISCUSSION

The main objective of this study was to understand the self-perception of oral health and evaluate the DMFT (Decayed, Missing, and Filled Teeth) index among riverside residents in communities in the municipality of Careiro da Várzea, state of Amazonas. Participants were recruited during routine services of the Fluvial Basic Health Unit. The study involved the participation of 84 residents from various riverside communities within the aforementioned municipality.

As highlighted by Da-Glória e Piperata[20], riverside residents in the Amazon region are "a set of populations that, although undergoing transformation as a result of the expansion of Western culture and the global capitalist system, still maintain a traditional lifestyle based on fishing and slash-and-burn agriculture." The oral health of these populations is influenced by various factors, many still unknown, as each community has its own specificities that differentiate one from another. Moreover, riverside residents do not have proper coverage of health services, which should be mandatorily managed by the Unified Health System (SUS)[25] a right stipulated in the Federal Constitution of 1988 (Article 196) for every Brazilian citizen[23].

Of the 84 patients evaluated in our study, women represented 57.1% of the sample. Similarly, in a study conducted by Cohen-Carneiro21, whose goal was to describe the oral health conditions of riverside residents in the municipality of Coari, females were the most prevalent, corresponding to a mean proportion of 59.6% of women. A similar study by Gasque et al.23 found that females accounted for 80.0% of the adult population analyzed, significantly higher than what was found in our study. A potential explanation for this phenomenon may lie in the observed pattern of women seeking health care with greater regularity than men24.

According to Santos et al.25, age emerges as one of the main moderating factors in the self-perception of oral health, as individuals advanced in age often experience lower quality of life associated with oral health. As age increases, there is a growing perception of deterioration in quality of life influenced by systemic, psychological, and social factors.

Regarding the mean and median ages of the 84 analyzed patients, they were respectively 33.9±16.3 and 30.5 years. The high standard deviation of age (16.3 years) demonstrates the great variability among the ages of the patients who participated in the study. The ages of the patients ranged between 12 and 80 years, representing the groups of children, adolescents, adults, and older people from the riverside communities of Careiro da Várzea. It is noteworthy that our study was concerned with including a diverse age group to ensure the inclusion of everyone in dental care attention and to understand the dental specificities of each group. Differently, in a study conducted by Silva26 aimed at promoting oral health in the riverside population of Careiro da Várzea, the mean and median ages were respectively 16.51±1.19 and 16.5 years. In Silva's study26, the prioritized group was school-aged youths aged 16 to 19 years, also residing in the riverside communities of Careiro da Várzea.

In terms of self-reported color or ethnicity, 73.8% of the patients declared themselves as mixed race (pardos). Indeed, this is the most prevalent color of the population in the state of Amazonas, according to the Brazilian Institute of Geography and Statistics (IBGE)19. In the last quarter of 2022, this agency recorded, based on the National Household Sample Survey, that 77.7% of the population of the state of Amazonas is of mixed race.

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Regarding the perception of oral health, the questions addressed to the riverside residents were grouped into three categories:

Oral Health Promotion; Access to Oral Health; and Self-perception of Oral Health. Concerning health promotion, 79.8% responded that they had participated in some program offered by the municipality; 71.4% are aware of some program, so these 71.4% were the same who are participating in some oral health promotion program. Of these 71.4% (participants), 80.0% are in the School Health Program (PSE).

As for the questions that evoke access to oral health for the riverside population of Careiro da Várzea, 97.5% consider it a priority to go to the dentist periodically, with 45.2% preferring twice a year; 52.4% of the riverside residents reported having at least one difficulty going to the dentist, being 38.6% due to the few cards distributed at the local UBS and 34.1% due to transportation to the same. In this context, CohenCarneiro[21] emphasizes that access to oral health is still very restricted in riverside communities, mainly because of the distance to the municipal headquarters, which in turn affects the cost of patient transportation from these communities, which generally have low income.

The Careiro da Várzea municipality is in periodically floodable areas, meaning that during the rainy seasons, these areas are inundated by the rising river flows[26]. This is the main factor that interferes with the comings and goings of the inhabitants of these regions, which in turn encourages population evasion[26].

Another challenge reported by the riverside residents that warrants public health attention is the scarcity of dentists, as stated by the respondents. In this context, Ribeiro Costa and Barros[27] explain that despite the advancements in public health since the implementation of the Unified Health System (SUS), particularly in terms of expanding primary care coverage, especially in dental health, there are few public policies aimed at the riverside population. The local deficiencies related to logistics and hydrographic characteristics still impose numerous restrictions on access to and use of health services by this population.

It is important to clarify that currently, the Municipal Health Department of Careiro da Várzea provides medical and dental care with a multidisciplinary team to 120 riverside communities in this municipality, averaging 1,485 appointments per year. However, there are numerous challenges in delivering services to the most remote areas, both in terms of transportation and access, which are exacerbated during flood periods[27].

To ensure the resolution of the difficulties faced, considering the long distances between the UBS and the riverside communities, a Fluvial Basic Health Unit was implemented, which has stood out as a necessary and effective model of care. It expands the guarantee of access to health for the riverside population, upholding the right to health for each citizen of these areas[27].

In terms of the access to dental health care, concerning the reason for visiting the dentist, 53.6% of the riverside patients responded it was owing to tooth pain. In Silva's study[26], with the riverside inhabitants of Careiro da Várzea, this reason was cited by 29.1% of the patients. Meanwhile, in studies conducted by Gasque et al.[23] and Cohen-Carneiro[21] in riverside communities, the percentages were 33.0% and 61.7%, respectively. It is emphasized that the studies by Gasque et al.[23] e CohenCarneiro[21] were conducted in the riverside population, but in other municipalities of the state of Amazonas. This reason can be elucidated as highlighted by Araújo et al.[28], since the discomfort caused by toothache results in complications for eating, resting, and performing daily tasks. Therefore, it becomes understandable that individuals who have experienced such painful stimuli express the urgency to seek treatment.

Regarding the characteristics of self-perception to classify their oral health, 35.7% of the riverside residents classified it as "regular" and 40.5% classified it as "good," representing both concepts 76.2% of the evaluated patients. In a study conducted by Santos et al.[25], on self-perception in oral health among individuals aged 17 to 21 years,

74.7% classified it as "good," a proportion higher than found in our study. In the SB Brazil 2010 survey[29], the self-perception of patients from the Northern region was 15.9% for "regular" (neither satisfied nor dissatisfied) and 41.3% for "good" (satisfied), representing both concepts 57.2% of the sample of the said study, being lower than the percentage found in our study[29].

The self-perception regarding education about oral hygiene showed that 92.9% of the riverside residents of Careiro da Várzea stated they had received instructions aimed at prevention/education in oral health. In a study conducted by CohenCarneiro[21] in two riverside communities in the state of Amazonas, the percentage of patients who received preventive/educational instructions about oral health were 35.6% and 44.3%, both lower than what was found in our study. In a study by Gasque et al.[23], 67% of participants reported they had received guidance related to oral health, specifically about the importance of fluoridation performed by dentists.

Participants were asked about the use of fluoridated products, and a large majority indicated they do not use them (77.8%). This data possibly stems from a lack of familiarity with the term recommended in dentistry, since the concentration of this product is already present in toothpastes themselves[30].

Concerning the examination results of the 84 patients, the mean value of 15.7 sound teeth was observed, a percentage close to that found in the SB Brazil 2010 research for individuals residing in the city of Manaus, which was 15,4%[29]. As for decayed teeth, filled/restored but with decay, filled/restored without decay, and missing, in our study, we obtained mean values equal to 3.0 (Median = 2), 1.0 (Median = 0), 3.7 (Median = 3.0), and 8.5 (Median = 5.5), respectively. In the mentioned research, the mean values of these same components were: 1.6 (decayed); 0.2 (restored but with decay); 2.3 (restored but without decay); and 9.5 (missing). In this context, it is observed that most of the mean values of the DMFT components found in the riverside population of Careiro da Várzea were higher than the mean number of teeth of individuals who reside in the capital of Amazonas.

In our study, the DMFT and the DMFT Index of riverside patients in Careiro da Várzea presented mean (median) overall values of 16.3 (15.0) and 8.4 (7.7), respectively. The mean values of the DMFT Index by age group were: 4.8 (12 to 17 years); 7.2 (18 to 40 years); 11.4 (41 to 60 years); and 12.9 (61 and over). In the national SB Brazil 2010[29] survey, the indexes by age group were: 2.3 (12 years); 4.9 (15 to 19 years); 19.3 (35 to 44 years); and 27.9 (65 to 74 years). Considering the adolescent, adult, and older phases, it is observed that the indexes found in the riverside population of Careiro da Várzea were lower than those found in the mentioned research for individuals residing in the capital of Amazonas. It is noteworthy that the mean DMFT Index was strongly influenced by the age group of the riverside residents ($p<0.0001$).

It is essential to highlight some inherent limitations of the study: the adoption of a non-probabilistic sampling can significantly affect the generalization of the results; and the application of an exploratory and descriptive approach may restrict the depth of analysis. Additionally, the absence of data related to socioeconomic and behavioral determinants may lead to an incomplete understanding of the underlying factors of oral health in these riverside communities. However, these limitations emphasize the pressing need for future, more comprehensive and longitudinal research, aiming to provide complementary perspectives and base more effective intervention strategies.

CONCLUSION

It was concluded that the majority of riverside patients in the municipality of Careiro da Várzea, in the state of Amazonas, classified their selfperception of oral health as "good" or "regular," with a prevalence among adults and older people. However, when compared to the clinical DMFT

examination, the indexes showed high values (mean 8.4), diverging from the self-perception of oral health of these riverside patients. Besides realizing that the vast majority of these riverside residents have access to dental services, however, because of the scarcity of professionals and the lack of supplies, this access ends up being restricted. However, while this population is aware of the municipality's programs, people tend to seek dental care only when experiencing pain. Given this scenario, the implementation of preventive programs or partnerships with the capital for volunteer actions could represent an effective strategy to improve the oral health care of these riverside patients.

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