Dentistry 3000
Vol 10 No 1 (2022) DOI 10.5195/d3000.2022.155

Prevalence of Malocclusion in Brazilian Quilombola Adolescents

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Abstract

Purpose: To evaluate the prevalence of malocclusion in Quilombola adolescents living in rural area in Northeastern Brazil.

Materials and Methods: This is a cross-sectional study in which 36 Quilombola adolescents aged 12-19 years were evaluated. Data collection was performed at home between January and April 2020 by a trained researcher using the Dental Aesthetic Index (DAI). Data were analyzed using the IBM SPSS software and presented using descriptive statistics.

Results: More than two thirds of adolescents had already visited the dentist at least once in life (72.2%), with the last dental visit having occurred less than a year ago (57.7%), with predominance of public dental service (84.6%). There was higher frequency of lower anterior misalignment (86.1%) and dental crowding (83.4%) in two segments (55.6%). Almost all adolescents presented dental malocclusion (97.2%), with very severe or disabling severity (44.4%).

Conclusions: The prevalence of very severe malocclusion was high in Quilombola adolescents, expressing the need for treatment of this population.

Keywords: Adolescent; Epidemiology; Ethnic Groups; Malocclusion.

Citation: de Brito. G, et al. (2022) Prevalence of Malocclusion in Brazilian Quilombola Adolescents Dentistry 3000. 1:a001 doi:10.5195/d3000.2022.155
Received: February 26, 2021
Accepted: April 05, 2021
Published: June 13, 2022

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Introduction

Malocclusion is a condition referred to abnormal occlusion and irregular bone and muscle growth and development, which interferes both in functional aspects of the oral cavity and in the psychosocial aspect of individuals [1-3]. It is considered a public health problem, affecting mainly children [4, 5] and adolescents [6, 7], impacting their quality of life [6, 8, 9].

Hereditary, environmental factors or their association are attributed to the etiology of malocclusion and the presence of other dental problems is shown to complicate the maintenance of satisfactory occlusion [1]. Malocclusion in adolescents is associated with disadvantageous social position, deleterious habits, poor housing conditions and low family income and schooling levels, in addition to higher occurrence in non-white (those who self-reported as black, pardo, yellow or indigenous) individuals [2, 7, 8, 10, 11]. Problems involving chewing, speech and premature tooth loss can be a consequence of malocclusion [12].

Quilombolas are ethnic-racial groups with a historical trajectory, with own territorial relations and proud of their black ancestry, who resisted oppression suffered during history [13]. These individuals are on the margins of society, since they make up the

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group of Brazilians composed of blacks or browns with lack of access to sanitation services, inadequate housing conditions and few goods [14].

In this context, the remaining Quilombola populations are vulnerable due to their precarious living conditions, as they belong to rural communities with low quality of life and unaware of essential health-related information [15] and little knowledge about oral health [16]. Low access to water supply and dental services is also reported [17, 18]. Regarding malocclusion, a study carried out at Kalunka Quilombola community in Goiás, revealed high prevalence of malocclusions in children, with those in the mixed dentition stage having fewer malocclusions when compared to children with primary dentition [19].

Studies enabling early diagnosis of malocclusion, in the early stages of the transition from deciduous to permanent dentition, have been shown to be essential in order to prevent the need for orthodontic treatment during adolescence and adulthood, and consequent negative impacts on quality of life [20]. In addition, identifying vulnerable groups and the influence of sociodemographic aspects on this condition will enable better planning of necessary preventive and therapeutic measures.

Considering the small number of studies in this minority population group and the importance of carrying out epidemiological studies, this study aimed to assess the prevalence of malocclusion in Quilombola adolescents.

Methods

Study Design and Location

It was a cross-sectional study carried out at the Caiana dos Crioulos community, recognized by the Palmares Cultural Foundation as a remaining Quilombola area, located in the municipality of Alagoa Grande, Paraíba, Brazil. The community has population of 1,500 inhabitants, distributed in 405 families [21].

Sample

The sample was non-probabilistic and comprised adolescents aged 12 and 15-19 years, age groups based on the Brazilian National Oral Health Survey [22]. Adolescents of both sexes, self-declared black or Afro-descendants, and registered with e-SUS AB – software to operationalize the Information System for Health for Primary Care (SISAB) [23] – were included. Individuals with inadequate cognitive ability were excluded.

Data Collection

Data collection was carried out between January and April 2020, at home, being performed by a calibrated postgraduate examiner (Kappa = 0.90). Theoretical and practical training was performed by gold standard researcher with previous experiences in epidemiological investigations. Information regarding demographics factors (sex and age group), oral health habits (visit to the dentist, visit frequency and type of health service used) was collected.

For the diagnosis of malocclusion, the Dental Aesthetic Index (DAI) [24] was used. DAI score was calculated using the regression equation of ten measured components of occlusal morphology, multiplied by the regression coefficients (weights) and added the products plus a constant: (absent teeth × 6) + (crowding) + (spacing) + (midline diastema × 3) + (upper anterior misalignment) + (lower anterior misalignment) + (maxillary overjet × 2) + (mandibular overjet × 4) + (anterior open bite × 4) + (molar relationship × 3) + 13 (constant) [24]. Those with DAI score less than or equal to 25 were

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considered to have normal occlusion [8]. Malocclusion severity was classified as absence of abnormality or mild malocclusion, whose orthodontic treatment is unnecessary (DAI ≤ 25); defined malocclusion, whose treatment is elective (DAI = 26 to 30); severe malocclusion, whose treatment is highly desirable (DAI = 31 to 35) and very severe or disabling malocclusion, whose orthodontic treatment is essential (DAI ≥ 36) [24].

Statistical Analysis

Data were analyzed using the IBM SPSS software, version 22.0 for Windows (IBM Corp., Armonk, NY, USA) and presented using descriptive statistics (absolute and percentage distributions). For statistical analysis, variables upper anterior misalignment <2 mm and ≥ 2 mm, lower anterior misalignment <2 mm and ≥ 2 mm, maxillary overjet <4 mm and ≥ 4 mm, mandibular overjet <4 mm and ≥ 4 mm and anterior open bite <2 mm and ≥ 2 mm [25] were dichotomized.

Ethical Aspects

This study followed guidelines and a rule established in Resolution Nº 466/12 of the National Health Council and the Declaration of Helsinki (1964) and its subsequent amendments and was approved by the Ethics Committee on Research with Human Beings of the State of Paraíba University, under protocol number 3.272.910. Informed consent was obtained from all guardians and individuals included in the study.

Table 1. Distribution of sociodemographic variables of *Quilombola* adolescents

Variables	N	%
Sex		
Female	24	66.7
Male	12	33.3
Age Group		
12	12	33.3
15-19	24	66.7
Visit to the Dentist at Least Once in Life		
No	10	27.8
Yes	26	72.2
Visit Frequency		
Less than 1 year	15	57.7
≥ 1 year	11	42.3
Type of Service		
Public Service	22	84.6
Others	4	15.4

Results

Regarding the sociodemographic profile, the majority were female (66.7%) aged 15- 19 years (66.7%), with mean age of 15.92 ± 3.0 years and median of 17 years. A percentage of 72.2% had visited the dentist at some time in their lives, with the last consultation having occurred less than 1 year ago (57.7%) with predominance of public dental services (84.6%) (Table 1).

Lower anterior misalignment was the most prevalent type of malocclusion in the sample (86.1%), followed by dental crowding (83.4%), with frequent

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presence of two crowded segments (55.6%), and upper anterior misalignment (83.3%).

Anterior spacing in two segments was found in 27.8% of Quilombola adolescents, while midline diastema was present in 50.0% of the sample and half cusp molar ratio in 58.3%. Low prevalence of adolescents with absent lower teeth was observed (8.3%), all of them were premolars, in individuals aged 17 and 19 years. The majority had malocclusion cases (97.2%), with very severe or disabling severity (44.4%) (Table 2).

Table 2. Prevalence of malocclusions and components assessed by the Dental Aesthetic Index (DAI) among *Quilombola* adolescents

Variables	N	%
Number of absent teeth in the upper arch		
None	36	100.0
One or more	0	0.0
Number of absent teeth in the lower arch		
None	33	91.7
One or more	3	8.3
Anterior segment crowding		
No crowding	6	16.7
One crowded segment	10	27.8
Two crowded segments	20	55.6
Anterior segment spacing		
No spacing	18	50.0
One segment with spacing	8	22.2
Two segments with spacing	10	27.8
Midline diastema		
No	18	50.0
Yes	18	50.0
Upper anterior misalignment		
< 2 mm	6	16.7
≥ 2 mm	30	83.3
Lower anterior misalignment		
< 2 mm	5	13.9
≥ 2 mm	31	86.1
Maxillary overjet		
< 4 mm	19	52.8
≥ 4 mm	17	47.2
Mandibular overjet		
< 4 mm	36	100.0
≥ 4 mm	0	0.0
Anterior open bite		
< 2 mm	30	83.3
≥ 2 mm	6	16.7
Molar relationship		
Normal	9	25.0
One-half cusp	21	58.3
Full cusp	6	16.7
Malocclusion		
Absent/Mild (DAI ≤ 25)	1	2.8
Present (DAI > 25)	35	97.2
Severity of malocclusion		
No abnormality or mild malocclusion/Without treatment need	1	2.8
Defined malocclusion/Elective treatment	11	30.6
Severe malocclusion/Highly desirable treatment	8	22.2
Very severe or disabling malocclusion/Mandatory treatment	16	44.4

Discussion

Most of the sample visited the dentist at least once and more than half had the last visit less than a year in public dental services. This finding may be related to the good coverage performance of the public system for this population. However, it is observed that Quilombola adolescents have low frequency of visits to the dentist when compared to other adolescents living in rural areas and with the aggravation of being a community with great social vulnerability [26].

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Tooth loss was very low, affecting only lower dental elements. A study by Silva et al. [17] associated this condition to the oral hygiene habits of this ethnic group, since most individuals brush their teeth three or more times a day and use dental floss, making it possible to establish a direct relationship between good oral hygiene habits and low occurrence of tooth loss. However, access to oral health services is limited for the Quilombolas [17], as already evidenced, as they belong to rural communities with low quality of life and unaware of essential health-related information [15] and little knowledge about oral health [16].

There was predominance of Quilombola adolescents with very severe or disabling malocclusion. Regarding DAI components, occurrence of dental crowding was high, involving at least one segment, with higher occurrence in two segments, and half of the sample presented spacing in one or two anterior segments and midline diastema. These results are in agreement with these obtained by Neto et al. [11], who found high occurrence of crowding in non-white Brazilian adolescents and data revealed association of types of spacing with skin color. In addition, previous research observed higher likelihood of ethnic groups formed by blacks/browns of having severe and very severe malocclusion [2] which may be due to the racial factor [27].

Other factors such as upper and lower anterior misalignment also showed high frequency. However, in a previous study with Brazilian adolescents, this condition showed low occurrence [10]. Considering overjet, similar results were found [10], in which jaw and mandible, with spaces less than 4 mm were predominant. Overjet is considered one of the main characteristics that interfere in social relationships and in the search for orthodontic treatment and is highly prevalent in black adolescents [28].

It was also found that large part of the sample had anterior open bite. This condition was associated with malocclusion severity due to changes in lip tonus and contraction of the periorbicular muscle [29]. Considering the stage of life of the analyzed individuals, the presence of anterior open bite can be associated with the occurrence of bullying, generating negative impact on the quality of life and mental health of adolescents [30].

These occlusal characteristics were related with socially vulnerable adolescents, and as already mentioned, to difficult social interaction, which can affect psychological well-being, whereas aesthetic appearance within social standards represents great impact on the interaction among individuals, mainly in this age group [8]. Some types of malocclusion promote greater influence on the perception of individuals about their dental aesthetics, as reported in a study that found association between dissatisfaction of adolescents with tooth positioning, with midline diastema being one of the main DAI components that increased dissatisfaction [31]. This can probably be explained by the fact that, as it is located in a region of greater disclosure, which is the anterior region, midline diastema draws more attention, and should cause greater aesthetic dissatisfaction for affected individuals.

Abnormal molar relationship was found in a significant portion of Quilombola adolescents in the present study. This dental condition together with jaw irregularity has been associated with increase in the probability of up to 30% of dental caries in adolescents and it is assumed that

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malocclusion, or specific types of it, are predisposing factors for the development of dental caries [32], due to the difficulty for patients to maintain good oral hygiene which results in the increases of biofilm accumulation on the teeth surfaces [33]. Although, other studies report that dental caries and its complications leads to alterations in mastication [34], tendency to dental migrate and loss of arch length, may lead to compromised facial growth and development, resulting in malocclusion [1].

Almost all Quilombola adolescents presented malocclusion in need of treatment. Thus, the high prevalence of malocclusion is considered a public health problem and further studies aimed at investigating minority populations and rural areas should be carried out to better understand their characteristics, evaluate possible deleterious habits, since previous researchers have found an association between sleep bruxism [35, 36], tongue thrusting, nail-biting, thumb sucking and mouth breathing [36] and malocclusion and, consequently, to understand the oral health needs of these individuals.

Cross-sectional studies aimed at analyzing malocclusion conditions and its variables in certain populations help establishing relationships between data found and need for treatment. However, this type of study also has limitations, such as the impossibility of establishing causality. In addition to these factors, the sample size is another limitation, which despite containing expressive data, findings cannot be extrapolated to the entire Caiana dos Crioulos Quilombola population. The scarcity of studies with Quilombola adolescent populations was also a limiting factor to confront the findings of this study; however, it is necessary to highlight that despite these aspects, this research is one of the few studies developed in the country with this minority group regarding dental malocclusion.

Conclusion

The prevalence of very severe malocclusion was high in Quilombola adolescents, expressing the need for treatment in this population. Future studies should be carried out in this community and in other similar groups to establish a diagnosis of the main oral diseases that affect these populations.

Minority groups, including Quilombolas, are subject to greater social vulnerability and their investigation is essential to understand their particularities, needs and the results arising from their socio-cultural process. Thus, specialized policies and actions could adapt to the demands of these groups.

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