

Pediatric Oral Health Self-reported by Caregivers of Normal-Hearing and Hearing-Impaired Children

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ABSTRACT

Objective: To verify and compare the sociodemographic data and caregivers' self-perception of children's oral health condition, hygiene habits and seek for dental services among family units of deaf and normal-hearing children. **Material and Methods:** A comparative cross-sectional study was conducted with 64 parents/caregivers of 16 deaf and 48 normal-hearing children of 3-14 years old, belonging to reference centers in Belo Horizonte, southeastern Brazil. Deaf and hearing children were matched according to their sex and age. Sociodemographic characteristics of the family units and self-report of oral health conditions and care were assessed using a structured questionnaire, including information regarding seeking pediatric dental services. Descriptive analysis and chi-square test were performed ($p < 0.05$). **Results:** Most individuals in the sample were mothers (84.4%). Low family income ($p = 0.024$) and higher education level of guardians ($p = 0.018$) were associated with families of hearing children. The report of clinical treatment or toothache as the main reason for the children's last dental appointment was associated with families of deaf children ($p = 0.047$). **Conclusion:** Based on caregivers' reports, hearing-impaired children demonstrated greater vulnerability to present dental pain or clinical treatment as the main reasons for their last access to dental appointments.

Keywords: Child; Epidemiology; Oral Health; Deafness; Social Inclusion.

Introduction

According to the World Health Organization, disability is a global public health and human rights problem and a priority condition for development [1]. Throughout life, people with disabilities face barriers to accessibility and access to health services, resulting in worse clinical outcomes in this group [1,2]. The need to seek health professionals is a vast aspect of their approach, and it is often mentioned among people with hearing impairment since the full use of services encompasses their education and communication, commonly described as barriers to health promotion in the deaf community [2,3]. These difficulties with communication may also reflect the lack of knowledge of important concepts and care in the field of health, which can compromise health promotion.

Among children with hearing loss, those that show the greatest impact on their development have a severe and/or profound degree of the condition, to the extent that it affects their quality of life [4] and their family [5]. Studies have shown a high prevalence of caries and poor oral hygiene among children and adolescents with hearing impairment [4,6,7] and greater difficulties related to oral health care and access to dental services in this group when compared with hearing children [6]. These inequities in pediatric oral health care make it necessary to better understand the profile of deaf children's family units to achieve patient-centered health promotion strategies and better use of the system [3,8].

Family units composed of caregivers with normal hearing and deaf children have specific challenges that can induce difficulties compared with those of hearing children [9,10]. Since those responsible for the children play a fundamental role in a child's oral health care, the contextual stressors of these families must be considered by professionals during pediatric dental consultations [10]. These stressors include communication skills, educational concerns, safety and children's medical care [10]. In Brazil, the absence of interpreters or trained professionals to help with communication between professionals, parents/guardians and deaf children in the public health system sometimes places greater responsibility on caregivers with regard to the oral health education of these children [11]. Furthermore, there is a scarcity of knowledge available about children's oral health among members of the deaf community [6]. Therefore, this study aimed to verify and compare the sociodemographic data and caregivers' self-perception of children's oral health condition, hygiene habits, and seek for dental services among family units of deaf and normal-hearing children.

Material and Methods

Study Design and Sample Selection

A comparative cross-sectional epidemiological study was conducted among family units of deaf and normal-hearing children in the city of Belo Horizonte, located in the southeast region of Brazil. All the parents/caregivers had normal hearing and the children in both the study and hearing-impaired groups were in the age range from 3 to 14 years old. Those responsible for deaf children were contacted at the National Federation of Education and Integration of Deaf, a care referral center (<https://cultura-sorda.org/federacao-nacional-de-educacao-e-integracao-dos-surdos-feneis-minas-general-belo-horizonte-brasil/>). The hearing family unit was contacted through a project to monitor children born at the "Hospital das Clínicas" of the Federal University of Minas Gerais. Data was collected in the period between July 2018 and May 2019. Unfortunately, hearing impairment is a rare condition, making it difficult to invite participants to the research. Therefore, our sample was a convenience sample with a posteriori sampling power calculation.

Eligibility Criteria

Only non-syndromic healthy children without neurological or cognitive alterations were included in this investigation for both groups studied. The control group consisted of family units of children with normal hearing, approached in a project to monitor children born at the Hospital das Clínicas of the Federal University of Minas (<http://www.eeffto.ufmg.br/ideia/acriar/>). The project aims to accompany children born prematurely during their childhood with a multidisciplinary team, including pediatrics, dentists, and speech therapists, regardless of their absence of diseases. Thus, children with good general health are also assisted. Only healthy children were included. In total, 16 parents/caregivers of deaf children and 48 of hearing children were included, matched by sex and age, in a ratio of 1:3. Participants who reported that the children had changes in health conditions, were syndromic, or had neurological and/or cognitive alterations were excluded. Moreover, guardians who did not answer the entire questionnaire were excluded from this investigation.

Data Collection

Participants were asked to answer a structured questionnaire divided into four areas: sociodemographic data of the family unit, self-perception of oral health status, child oral health care and seek for dental services. Caregivers of the control group were approached in the waiting room of their child's health appointment, and parents of hearing-impaired children were approached in the reception room of the National Federation of Education and Integration of Deaf. All participants responded individually to the questionnaire, which was delivered in papers. Sociodemographic data collected were relative to the following information: sex and age of both the respondent and child, degree of relationship, self-reported race or ethnic origin, number of residents in the house, monthly family income, and guardian's level of education. Respondents' degree of relationship with children was categorized as "mother", "father", "grandmother/grandfather", and "others". Ethnic origin was self-reported by participants as "yellow", "indigenous", "black", "brown" or "white". For data analysis, the number of residents in the family unit was treated as a nominal categorical variable (< 3 children and $3 \geq$ children). Monthly family income was dichotomized according to the minimum wage in the country at the time of data collection (= U\$189.2), therefore evaluated as "up to 3 minimum wages" or "3 or more minimum wages". The education of the person responsible for the child/children was analyzed with a cut-off point related to the duration of elementary education in Brazil, dichotomized into "up to 8 years of formal study" and "more than 8 years of formal study" [12].

The oral health condition of parents/caregivers and their children was analyzed based on the respondents' self-perception to the question "How do you consider to be the quality of your/your child's oral health?", classified as "excellent/very good", "good" or "fair/poor". As regards child oral health care, questions required answers providing information such as the frequency of daily brushing and the type of toothpaste used were questioned. The seek for dental services was evaluated as: "How long ago did your child visit the dentist for the last time?" and "What was the main reason for seeking pediatric dental service?". The time related to the child's last consultation was categorized into "has never been", "more than 3 years ago", "between 1 and 3 years" and "less than 1 year ago". The reason for seeking dental care was evaluated in "prevention/maintenance" and "clinical treatment/dental pain". All respondents voluntarily agreed to participate in this study.

Pilot Study

To evaluate the proposed methods, a pilot study was previously conducted with ten parents/caregivers from the family units, five of whom were hearing and five deaf. Participants were randomly

selected for the pilot study and were not included in the main study. The pilot study revealed no difficulties in its conducting it and, therefore, no changes were made to the methodology.

Statistical Analysis

The information collected was digitized and organized into a database using the statistical software Statistical Package for the Social Sciences (version 21.0, SPSS Inc., Chicago, IL, USA). Descriptive analysis with a distribution of absolute and relative frequency was performed to characterize the sample of family units with deaf and hearing children concerning the independent sociodemographic variables, oral health condition, care, and seek for oral health services. The variable “degree of relationship” was dichotomously recategorized into “mother” and “others”. “Ethnic origin” has also been re-categorized into: “yellow/indigenous”, “black”, “brown” or “white”. Since all variables investigated were treated as categorical, Pearson's chi-square, Fisher's exact and linear-by-linear association tests were used to test differences between proportions. The level of statistical significance was set at $p < 0.05$.

Ethical Considerations

This study was conducted under the ethical precepts of the Declaration of Helsinki and was approved by the Research Ethics Committee of the Federal University of Minas Gerais, Brazil (protocol: 02371618.0.0000.5149). Therefore, only parents/caregivers who voluntarily agreed to participate and signed a Term of Free and Informed Consent were included in this investigation.

Results

The sample of this study consisted of 64 family units of hearing parents/caregivers, so 16 were composed of deaf children and 48 of children with normal hearing. The sampling power was 75% with 75% sampling power, which was very close to ideal. Most respondents were mothers (84.4%), with an average age of 25.9 years (± 17.6). Among the children studied, a higher percentage of boys was observed (56.3%) and the average age of children was 6.8 years (± 3.0).

Table 1 shows other descriptive sociodemographic data of the study and control groups. The bivariate analysis showed a higher frequency of low family income ($p = 0.024$) and a higher level of education in years of formal education of parents/caregivers ($p = 0.018$) in the family units with hearing children compared with deaf children.

Table 1. Descriptive sociodemographic data and bivariate analysis between the independent variables and the family nucleus of children with and without hearing impairment.

Variables	Families		p-value*
	With Children's Hearing Impairment N (%)	Without Children's Hearing Impairment N (%)	
Child Sex			
Male	11 (68.8)	25 (52.1)	0.244
Feme	5 (31.3)	23 (47.9)	
Parent's Marital Status			
Live together	9 (56.3)	35 (72.9)	0.213
Live apart	7 (43.8)	13 (27.1)	
Number of children			
1 or 2	13 (81.3)	37 (78.7)	1.000
≥ 3	3 (18.8)	10 (21.3)	

Residents in the same House			
Up to 4 people	13 (81.3)	38 (79.2)	1.000
5 or more people	3 (18.8)	10 (20.8)	
Self-reported Skin Color			
Yellow/Indigenous	1 (6.3)	3 (6.3)	0.895
Black	3 (18.8)	11 (22.9)	
Brown	10 (62.5)	25 (52.1)	
White	2 (12.5)	9 (18.8)	
Family Income			
Up to U\$568	10 (62.5)	42 (89.4)	0.024
U\$568 or more	6 (37.5)	5 (10.6)	
Education			
Up to 8 years of formal study	8 (50.0)	8 (17.4)	0.018
8 years or more of formal study	8 (50.0)	38 (82.6)	

P = probability value; *Chi-square test.

Regarding oral health care and the need to seek dental services, the report of clinical treatment or dental pain as the main reasons for the last child dental appointment was associated with families of deaf children ($p=0.047$) (Table 2).

Table 2. Descriptive data regarding the condition, care, and search for oral health services of the study population and bivariate analysis between the independent variables and the type of family nucleus with and without hearing impaired children.

Variables	Families		p-value*
	With Children's Hearing Impaired N (%)	Without Children's Hearing Impaired N (%)	
Condition			
Parent/caregiver oral health classification			
Excellent/very good	3 (20.0)	12 (25.0)	0.729
Good	8 (53.3)	17 (35.4)	
Regular/bad	4 (26.7)	19 (39.6)	
Children oral health classification			
Excellent/very good	5 (31.3)	21 (44.7)	0.513
Good	7 (43.8)	15 (31.9)	
Regular/bad	4 (25.0)	11 (23.4)	
Children's Care			
How often the children brush their teeth			
1 time	0 (0.0)	2 (4.8)	0.560
2 times	3 (21.4)	9 (21.4)	
3 or more times	11 (78.6)	31 (73.8)	
Swallow toothpaste			
Yes	4 (25.0)	18 (37.5)	0.591
No	11 (68.8)	26 (54.2)	
I do not know	1 (6.3)	4 (8.3)	
Use adult toothpaste			
Yes	13 (81.3)	28 (58.3)	0.098
No	3 (18.8)	20 (41.7)	
Use fluoridated toothpaste			
Yes	12 (75.0)	32 (66.7)	0.483
No	3 (18.8)	7 (14.6)	
I do not know	1 (6.3)	9 (18.8)	
Toothbrush at night			
Never	0 (0.0)	4 (8.3)	0.489
Sometimes	6 (37.5)	17 (35.4)	
Ever	10 (62.5)	27 (56.3)	
Search for dental services for children			
Last dental appointment			

Never was	2 (12.5)	16 (33.3)	0.214
More than 3 years ago	2 (12.5)	4 (8.3)	
Between 1 and 3 years	4 (25.0)	8 (16.7)	
Less than 1 year ago	8 (50.0)	20 (41.7)	
Reason for last appointment			
Prevention/Maintenance	8 (57.1)	28 (87,5)	0.047
Treatment/Pain	6 (42.9)	4 (12.5)	
Commonly seeks the dentist for			
Prevention/Maintenance	12 (75.0)	26 (59.1)	0.258
Clinical treatment/Dental pain	4 (25.0)	18 (40.9)	

P = probability value; *Chi-square test.

Discussion

This study aimed to verify and compare the conditions, care and need to seek oral health services between family units of deaf and hearing children. The main findings showed that low family income and a higher level of parental education were more prevalent in family units with children with normal hearing. Furthermore, a higher percentage of parents/caregivers of deaf children reported that clinical treatment or resolution of toothache were the main reasons for the last pediatric dental visit.

To the best of our knowledge, this is the first study to highlight the self-perception of caregivers of deaf children about the condition and care of children's oral health and their need to seek dental services. These findings could contribute to understanding the profile of these families, improve health promotion strategies and reduce inequalities in oral health in the country [11,13].

In our study, the majority of respondents in both groups were mothers. This result corroborated the findings of previous studies conducted with caregivers of children with hearing loss, in which the participation of mothers was outstandingly superior to that of paternal participation [5,8,9,14]. In addition, mothers of children with disabilities have been shown to spend more time in leisure or medical activities with their children, which may be related to a greater sense of responsibility, guilt and social value attributed to the figure of mothers [5,15,16]. Furthermore, the maternal role in children's health has also been highlighted in other family units, so it has assumed a role of greater responsibility when compared to the role of fathers [17].

Regarding the socioeconomic level, our study revealed that the family units of hearing children were associated with low monthly family income. Although the literature has indicated a higher level of social vulnerability in people with hearing impairment [5,6,10,13,15], our findings may be related to the profile of the population recruited for the control group. For example, in Brazil, the care provided by University Hospitals is performed by the public health system and guaranteed to be free of charge to the population, which is commonly derived from low-income communities [18]. Moreover, the National Federation of the Deaf, the agency at which the participants of the deaf family units were approached, is a philanthropic entity that aims to include the deaf community in society and defend their rights. Therefore, people with hearing impairment from all social levels receive its benefits [19], which may have contributed to our findings.

In contrast, our study also demonstrated a higher level of education in terms of years of formal education among parents/caregivers of hearing children. Hearing impairment has been extensively associated with low access to higher education for caregivers of deaf children [5,20] and lower educational level of the individuals [13], which may be related to educational and social barriers faced by the family units [6]. In a study conducted with deaf and hearing university students in Thailand, it was observed that the low level of parental education, especially maternal, increased the chance of developing tooth decay by 3.6 times among young people [20]. This fact, together with the scarcity of studies conducted in low- and middle-income

countries, such as Brazil, highlights the relevance of our findings for directing health promotion strategies directed toward the deaf community and their family context.

Furthermore, in our study, relative to the last dental consultation of deaf children, the reason for seeking dental services was associated with clinical treatment and/or resolution of pain of dental origin. This intriguing result and may be related to a faster or more unnoticed evolution of the clinical condition in deaf children, possibly derived from the poor communication between the child and their guardians [10,21-24]. When persons with normal hearing are caregivers of children with hearing impairment, they commonly report difficulties in accepting and adapting daily family activities to the condition of childhood deafness [22] to limit the child's access to contextual learning opportunities, such as health literacy [13,25].

For this reason, it is essential that the public health system reaches the complexity of the family units composed of hearing caregivers and deaf children to promote the need to seek more equitable services for individuals in this context [3,13,22,24]. For this purpose, improvement in clinicians' communication is fundamental, not only with those responsible for the children but also communication with the child patients. In Brazil, in the public health system, the care of people with hearing impairment by professionals trained in the interpretation or translation of Brazilian Sign Language (LIBRAS) is a legal right [26]. Despite this, a previous study showed that 56% of Brazilian dentists reported difficulty in communicating with deaf patients and 98% would like to have the presence of interpreters in primary care facilities [27].

It is important to point out that there are differences between patients and oral health professionals concerning the perception of what health is; so that among the population, the notion prevails that there is only a health problem when there is pain or physical and/or emotional impact [28]. Based on this perception, oral health care is sometimes ranked as being secondary and is even approached as being a luxury item [28,29]. This fact can cause deep impacts, especially on deaf individuals, who already have the obstacle to communication and who may choose to seek an oral health service only in urgent cases, consequently neglecting asymptomatic oral diseases [30].

This investigation may have implications for clinical practice, oral health education strategies, and future studies. As an important area, with a scarcity of information available in the scientific literature, especially in low- and middle-income countries [3,6], assessment of the perception of hearing parents/caregivers regarding health conditions and seeking dental services for their deaf children, is essential. This would contribute to the improvement of public policies with cultural competence to encourage [caregivers/parents/those responsible for deaf persons] to seek preventive health promotion among persons in the deaf community [3]. In this sense, our findings could contribute to the development of oral health promotion strategies of an inclusive nature for these children and their families.

Some limitations must be considered with regard to this investigation. The cross-sectional design did not make it possible to establish cause-and-effect relationships between the variables studied, and the convenience sample used did not allow the results obtained to be representative of the general population. As family units of normal-hearing children were approached in a hospital setting, the control group may not represent the general population. Furthermore, the incipient nature of the topic in the scientific literature made it a complex task to interpret the findings. Another limitation was the convenience sample, which may justify one of the associations being borderline and may also have overshadowed other possible associations. However, given the rare condition studied and the study's novelty, the sample power is very close to ideal; we consider the study to have good validity. As a strong point of the study, methodological care was taken to reduce the aforementioned limitations. The inclusion of exclusively non-syndromic children with good general health

status and no cognitive or neurological alterations for the control group may have avoided possible confounding factors and reduced the influence of selection bias. Also, the inclusion of non-syndromic deaf children from a reference entity allowed the exclusion of possible information bias related to the diagnosis of the condition and avoided the incorporation of confounding factors for the interpretation of the findings, thus contributing to the internal validity of this study. Moreover, there was no data loss among participants, possible selection bias was also avoided. Future epidemiological studies, with a qualitative and longitudinal design, which aim to verify sociodemographic aspects and attitudes regarding the care and need to seek health services for children with hearing impairment, should be encouraged to achieve more equitable measures for children's oral health.

Conclusion

Based on caregivers' reports, hearing-impaired children demonstrated greater vulnerability to present dental pain or clinical treatment as the main reasons for their last access to dental appointments.

Authors' Contributions

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All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.			

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None.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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