

Oral Health and related inequalities among visual impairment people in a Brazil municipality

Saúde bucal e desigualdades relacionadas entre pessoas com deficiência visual em um município brasileiro

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ABSTRACT

Objective: To evaluate the oral health and related factors among people with visual impairment in a municipality in southeastern Brazil. **Methods:** A cross-sectional and descriptive household study was carried out on a representative sample of people with visual impairments in a medium-sized city in Brazil. A clinical-dental examination was performed (evaluating tooth loss, caries, periodontal health, dental plaque use and need of prosthesis) and a semistructured questionnaire was applied, investigating the socioeconomic conditions (sex, age, marital status, skin color and income) and the use of dental services (reason, time since, and type of service used [private/public] in last dental visit). Descriptive and bivariate analysis were performed to assess the factors related to oral health.

Results: The mean age of participants was 65 years (± 15.05), with the majority women (70.9%). 53.1% of the interviewees were edentulous, but 58.2% had a good perception of oral health. The blind ones use less public services ($p=0.038$) and with a lower frequency ($p=0.014$) than subjects with low vision. Those with less schooling had higher tooth loss and lower periodontal problems ($p < 0.05$). There was a reduction of dental plaque six months after the educational action (30.7%; $p=0.01$), especially among the low vision participants ($p=0.01$). **Conclusion:** Severe tooth loss and unsatisfactory hygiene contrast with self-perception of oral health. Visual acuity and schooling were related to access and oral health. Actions for promotion and equity are necessary to overcome the inequalities encountered.

Indexing terms: Dental care for disabled. Dental health surveys. Oral health. Socioeconomic factors. Visually impaired persons.

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RESUMO

Objetivo: Avaliar a saúde bucal e fatores relacionados entre deficientes visuais em município do sudeste brasileiro. **Métodos:** Foi realizado um estudo domiciliar, transversal e descritivo em uma amostra representativa de pessoas com deficiência visual em uma cidade de médio porte do Brasil. Realizou-se o exame clínico bucal (avaliando perda dentária, cárie, saúde periodontal, placa dentária, uso e necessidade de prótese) e aplicou-se um questionário semiestruturado, investigando as condições socioeconômicas (sexo, idade, estado civil, cor da pele e renda) e o uso de serviços odontológicos (motivo, tempo decorrido e tipo de serviço utilizado [privado/público] na última consulta odontológica). Foram realizadas análises descritivas e bivariadas para avaliar os fatores associados à saúde bucal.

Resultados: A idade média dos participantes foi de 65 anos ($\pm 15,05$), com maioria de mulheres (70,9%). 53,1% dos entrevistados eram edêntulos, porém, 58,2% apresentaram percepção de saúde bucal boa. Os cegos usam menos os serviços públicos ($p=0,038$) e em menor frequência ($p=0,014$) que os sujeitos com baixa visão. Os menos escolarizados apresentam maiores perdas dentárias e menores problemas periodontais ($p<0,05$). Houve redução de placa dentária seis meses após ação educativa (30,7%; $p=0,01$), sobretudo entre os sujeitos com baixa visão ($p=0,01$). **Conclusão:** Elevada perda dentária e higienização insatisfatória contrastaram com autopercepção dos agravos bucais. Acuidade visual e escolaridade relacionaram-se ao acesso e saúde bucal. Ações de promoção e equidade são necessários para superar desigualdades encontradas.

Termos de indexação: Assistência odontológica para pessoas com deficiências. Inquéritos de saúde bucal. Saúde bucal. Fatores socioeconômicos. Pessoas com deficiência visual.

INTRODUCTION

A quarter of the Brazilians have at least one disability (visual, hearing, motor, mental or intellectual), being the visual impairment the most prevalent (18.6%). This disability is more common among people aged 65 or over and women, being that 730,000 Brazilians were total blind in 2010 in the country [1]. Visual deficiency can interfere in the knowledge of the body itself and in its interrelationship with objects and people [2]. Thus, these people go through innumerable difficulties in their daily lives: physical barriers, adaptation to the educational process, insertion in society and activities such as dressing, feeding and carrying out personal hygiene, including oral hygiene and access to dental services [3]. Hence, the accumulation of plaque and dental impairments among people with disabilities is facilitated [4].

Family Health Strategy (FHS), National Oral Health Policy (NOHP), and National Policy on the Health of Persons with Disabilities [5] included millions of Brazilians in the routines of healthcare services, based on the principle of equity [6]. However, there is still low access to dental services and serious oral health problems in some population groups, including the visually impaired [7]. There is also few dental surveys conducted with the visually impaired in Brazil [8-13]. Available studies show that, although a significant portion of the visually impaired presented dental losses, they had never undergone dental visit and are unaware of the existence of plaque and dental caries. In addition, half of them perceive their oral health as "good" [12]. Thus, the demand for dental care is preferably given in search of curative procedures to the detriment of prevention, with limited access to dental services [14].

This study was conducted considering the existence of scarce information available regarding the visually impaired and blind population in the literature and recognizing the need to produce such data to better understanding those conditions and promote oral health policies and actions. Its aim was to assess oral health conditions and related-inequalities by schooling among the visually impaired in a medium-sized municipality from Brazil Southeast.

METHODS

Ethics statement

The study was approved by the Ethics Research Committee of the Federal University of Alfenas, under protocol nº 116/2010, and informed consent was obtained from the participants at the time of each interview.

Population and study design

This was a cross-sectional and descriptive household study carried out on a sample of people with visual impairments in a medium-sized city of the state of Minas Gerais, Brazil, in 2017. To identify the visually impaired population, we required data for the Family Health Teams (FHT), the Specialty Outpatient Clinic and the Association of Disabled Persons (ADP) of the municipality, obtaining a number of 154 individuals. To be included in the study, persons should: 1) presenting health and cognitive conditions which allowed communication with the researcher during the interview; 2) to have low vision and / or being blind [15]; 3) agreeing to participate in the study.

After prior contact (through the FHT and the ADP), individuals who attempted to inclusion criteria were 55. Those received a home visit, when they responded to a semi-structured questionnaire about socioeconomic conditions, self-perception of oral health and use of dental services and submitted to oral examinations. The latter was performed at participants' home under standardized criteria – according to "Saúde Bucal Brasil 2010 [SB Brasil 2010 Study Protocol] [16] (i.e. under natural light, using a clinical mirror and ballpoint probe) by one dentist researcher previously trained and calibrated in a pilot study (kappa intra-examiner test > 0,8 for the decay, missing and filling teeth index [DMF-T])[16]. All disinfection and biosafety measures were properly taken.

Variables

The outcomes of the study were oral health conditions and access / usage of dental services. Oral evaluation included the self-perceived oral health assessed through the following question: "How do you rate your oral health?" The possible answers were: "poor; bad; regular; good and excellent" [17]. For this study, the answers were dichotomized in "good" (excellent / good); and "bad" (regular / bad / poor). Clinical conditions included dental assessments through the decayed, missing and filled teeth index (DMF-T), which is the sum of decayed, missing and filled teeth; use of dental prosthesis (yes or no); and need of prosthesis (yes or no). Moreover, periodontal health was assessed by means the periodontal community index (PCI) and periodontal insertion loss index (PIL), providing the prevalence of calculus, bleeding, periodontal pocket (4mm or more from the top to the bottom of the pocket in the probing depth) and clinical attachment loss (4mm or more. It is calculated by the distance from the cemento-enamel junction to the base of the pocket. If the gingival margin is coronal to the cemento-enamel, it is subtracted from the probing depth the distance from the cemento-enamel to the gingival margin). All those indices and indicators were evaluated according to World Health Organization codes and criteria [18]. Access / usage of dental services included the last dental visit (public or private); date of last dental visit (less than 1 year or 1 year or more); reason for the last dental visit (prevention or others). Questions related to person responsible for oral hygiene, use and frequency of toothbrush, toothpaste and dental floss and difficulties related to were included in descriptive analysis.

The independent variable of the interest was the schooling level (0-7 or 8 or + years of study). Other independent variables included the degree of visual impairment (low vision or blind); socioeconomic conditions (sex; age group [up to 64 or 65 years and over]; marital status [living with or without a partner]; skin color [white or not white]; and family income [up to 1 or more than 1 Brazilian minimum wage]).

Statistical analysis

Descriptive and bivariate analysis were performed using Stata 14.0 software (StataCorp., College Station, TX, US). The sample was analysed according to the degree of visual impairment and schooling. Exact Fisher's Test was used for the categorical variables to compare relative frequencies of the factors according to the schooling and the degree of visual acuity. Mann-Whitney U-Test was performed to compare means for the DMFT index according to schooling and degree of visual acuity. For all statistical procedures, a significance level of 5% was considered.

RESULTS

The final sample included 55 individuals who attempted to inclusion criteria and accepted participating of the study. The mean age of the participants was 65 years (± 15.05), ranging from 27 to 94 years. The sample consisted of most people with low vision (LV) (63.6%), women (70.9%), white ones (67.3%), subjects with up to 7 years of schooling (81.8%) and those earning up to one minimum wage (83%). Regarding oral health conditions, 58.2% of the participants perceived their oral health as good, however, 53.1% were edentulous. Among the dentate participants, DMFT of 23.8 was recorded. On the periodontal assessment, 26.0% of the subjects presented dental calculus, 28% bleeding, 18% periodontal pocket, and 10% loss of periodontal insertion. Prostheses were used by 58.1% of participants, and 25.5% still needed them. In relation to oral hygiene, the mother appears as the main responsible for the education (29.1%). Conventional toothbrush, toothpaste and dental floss are used by 90.8%, 85.5% and 34.6% of respondents, respectively. 34.5% said to brush their teeth least three times a day. Difficulties during toothbrushing were reported by 23,6% of interviewees. Blind participants were older ($p = 0.021$), had their last dental appointment longer time before ($p = 0.014$) and used a private dental service ($p = 0.038$) when compared to LV subjects (table 1).

Table 1. Demographic and socioeconomic characteristics of the visually impaired participants.

1 of 2

	Total	Visual deficiency		p*
		Blind	Low vision	
Visual deficiency degree, %	100.0	36.4	63.6	
Sex, %				
Male	29.1	50.0	50.0	0.178
Female	70.9	69.2	30.8	
Age group, %				
Adults (up to 64 years)	54.5	50.0	50.0	0.021
Elders (65 years or +)	45.5	80.0	20.0	
Skin color, %				
White	67.3	62.2	37.8	0.745
Not white	32.7	66.7	33.3	
Marital status, %				
Without a partner	65.5	63.9	36.1	0.957
With a partner	34.5	63.2	36.8	
Schooling, %				
0-7 years	81.8	68.9	31.1	0.086
8 or more years	18.2	40.0	60.0	
Family income, %				
Up 1 Brazilian minimum wage	83.0	59.1	40.9	0.089
+ de 1	17.0	88.9	11.1	
Last dental visit, %				0.014
≤ 1 year	49.0	48.0	52.0	
> 1 year	51.0	80.8	19.2	
Where the last visit took place, %				0.038
Public	54.7	51.7	48.3	
Private	45.3	79.2	20.8	
Reason for the last visit, %				0.620
Prevention	30.9	58.8	41.2	
Others	69.1	65.8	34.2	

Table 1. Demographic and socioeconomic characteristics of the visually impaired participants.

1 of 2

	Total	Visual deficiency		p*
		Blind	Low vision	
Self-perception of oral health, %				0.718
Good	58.2	65.6	34.4	
Bad	41.8	60.9	39.1	
Oral health DMF-T (mean)	23.8	24.5	22.5	0.309
Calculus, %	26.0	53.9	46.2	0.282
Bleeding, %	28.0	50.0	50.0	0.136
Pocket, %	18.0	55.6	44.4	0.465
Loss of insertion, %	10.0	80.0	20.0	0.486
Use of prostheses, %	58.1	68.4	31.6	0.343
Need of prostheses, %	25.5	61.5	38.5	0.782

Note: * All statistics were obtained using Fisher's Exact Test, except for the association between DMF-T and visual deficiency, which Mann-Whitney U test was employed.

Table 2 shows that the DMFT is higher ($p = 0.024$) and the periodontal condition - expressed by the prevalence of calculus ($p = 0.021$), bleeding ($p = 0.001$) - is lower among the less educated. This is explained by the greater number of missing sextants (and missing teeth) among the less educated.

Table 2. Oral health and use of dental services among the visually impaired according to schooling.

	Total	Schooling		p*
		0-7 years	8 or + years	
Use of dental services				
Last dental visit, %				0.075
≤1 year	49.02	77.78	42.86	
>1 year	50.98	22.22	57.14	
Where last dental visit, %				0.156
Public	54.72	60.47	30.00	
Private	45.28	39.53	70.00	
Reason for the last visit, %				0.479
Prevention	30.91	28.89	40.00	
Others	69.09	71.11	60.00	
Oral Health				
Self-perception of oral health, %				0.998
Good	58.18	57.78	60.00	
Bad	41.82	42.22	40.00	
DMF-T (mean)	23.82	24.5	20.5	0.024
Calculus, %	74.00	19.05	62.50	0.021
Bleeding, %	28.00	16.67	87.50	0.001
Pocket, %	18.00	11.9	50.00	0.026
Loss of insertion, %	10.00	7.14	25.00	0.176
Use of prostheses, %	74.51	76.74	62.50	0.404
Need of prostheses, %	25.49	25.58	25.00	0.673

Note: * All statistics were obtained using Fisher's Exact Test, except for the association between DMF-T and schooling level, which Mann-Whitney U test was employed.

DISCUSSION

This study evaluated oral health and related-inequalities by schooling among the visually impaired in a medium-sized municipality from Brazil Southeast. Results showed a good oral health self-perception, contrasting with poor clinical

condition. Blind individuals presented greater difficulties to get access to dental services and less educated had worse oral health clinical conditions.

More than half of the participants were edentulous, and the other ones presented few teeth that were also significantly compromised due to caries/restorations and periodontal injuries. These findings are similar to those populations without visual impairment in the municipality [19], in the country [20], or those with the visually impaired participants [11,12]. For example: Peres et al. [20] found that 53.7% of the Brazilian older adults aged 65-74 were edentulous in 2010; and Souza Filho et al. [12] recorded a DMFT mean of 11.5, and 58% of the evaluated sextants with periodontal disease in a sample of visual impairment people in Teresina, PI, Brazil. It is important to state that the Brasil Sorridente (the Brazilian National Oral Health Policy), initiated in 2004, provided a massive insertion of oral health teams in basic health care services and expanded coverage of specialized dental care [9,21]. Because of that, dental caries in children and adolescents have decreased and a considerable reduction in the prevalence of periodontal diseases and dental loss in young adults was observed [20,21]. However, significant advances in elderly have not been recorded, confirmed by a very high rate of edentulism in this group [22]. An interval of a few years, possibly, is not enough to produce perceptible epidemiological changes, confirmed by the stability recorded for clinical measures (functional dentition) in adults and elders, in the 2003 and 2010 surveys in the country [23]. Thus, the pronounced tooth loss recorded in this study is shown as a problem of slow solution and that is common to adults and elderly Brazilians with or without visual impairment.

Despite high dental loss and high prevalence of periodontal problems among the visually impaired, it is noteworthy that almost three fifths of the sample perceive their oral health as Good - which has already been reported in other studies with similar populations [11,12]. In a study carried out with low vision persons in Teresina, PI, Brazil [12], 83.2% of the respondents rated their oral health as excellent, good, or regular, however, 58% of sextants assessed presented periodontal disease.

One possible explanation is the idea that mouth and its structures are not recognized as parts of the body and inserted in the general health [24] Its elements (mainly teeth) are treated as something that can be replaced at any time by prosthetics [12] This process is reported in general population [25,26]. However, in a population in which vision is impaired, aesthetic dimensions and psychosocial aspects of oral health may not substantially affect the daily life. Thus, limited vision would restrict their perception on oral problems that do not hurt or cause discomfort. On the other hand, the functionality of the oral structures could have been greatly impaired, influencing the quality of life and oral health and self-assessment in these population [27] which was not observed in this study. This because most of the dysfunction promoted by tooth loss is supplied by the use of prosthesis - despite the fact that a good part of the examined subjects still need new prosthetic pieces. It should also be considered that, in a population with a mean age of 65 years, in which the loss of dental elements had occurred when they were younger [20], the effects of functional impairment may have been minimized [26]. As these individuals become older, they are more likely to be adapted to the absence of teeth and / or the presence of prostheses [20].

Blind participants used less public dental services and consulted less frequently than subjects with low LV, in disagreement with other studies in which such tendencies were not observed [9,11]. Regarding to the less frequent dental visit by the blind persons, it is necessary to reiterate what has already been stated: there is a difficulty in recognizing the importance of oral health by individuals incapable of recognizing aesthetic and psychosocial aspects [27]. Thus, preferably, blind group considers seeking for dental care when there is pain, discomfort or loss of speech and chewing, neglecting preventive visits [11], in disagreement with another study [9]. On the other hand, the blind group - being presumably the most vulnerable - were precisely the group who less extensively accessed the public service. This points out to the need of policy makers prioritizing these groups in order to facilitate their access and use of public dental services as well as the promotion health actions are requested to be adapted to reach such an audience.

Moreover, the less educated had higher dental losses, worse DMF-T and fewer sextants evaluated than those with more years of education. A common set of inequalities in which the poorest, the less educated, the nonwhite, the women, the inhabitants of less developed areas represent the most impaired group in terms of access to services and in health outcomes [23,28], usually happens due to a phenomenon called "reverse care law". When policies to

expand health services dedicated to promoting equity are implemented [9], their primary beneficiaries are those who least need them [29]. This is the main reason why the expansions in access to oral health actions promoted in Brazil in recent decades, despite having already improved indicators, have not yet been able to eliminate inequalities [20]. Since the clinical conditions of oral health in the participants are similar to those observed in the entire Brazilian population [20], it is inferred that the same determinants acting at national level may also act in a similar way among the visually impaired interviewees. It is also necessary to point out that, in addition to visual impairment, most participants were living alone, with low schooling and income of up to one minimum wage - factors known to be associated with worse general and oral health conditions [23,28]. With regard to periodontal inequalities due to schooling having been equated with paradoxes, the results may be explained due to the high tooth loss and, consequently, the lower number of sextants evaluated in less educated. Thus, the reduced number of teeth and sextants exposed to periodontal problems would lead these individuals (the less educated) to present lower prevalence of these diseases. However, it was perceived that among the most educated, the few remaining teeth were substantially affected by calculus, bleeding, pockets and insertion losses.

This was the first study to identify, locate and collect data on the oral health of the visually impaired in the state of Minas Gerais. Its relevance can be attributed beyond this initial effort at building a database, although there are limitations due to the sample size that limited the inferences. Hence, only bivariate analysis were performed regarding associations between oral conditions and schooling or visual deficiency, preventing us to control the analysis by potential confounders. This is a common difficulty for studies conducted among populations of the visually impaired [11].

In view of the presented results, it is necessary to expand coverage that effectively promotes access to dental services with a focus on the resolution of injuries. However, promotion and prevention actions should not be neglected or impaired to the detriment of curative actions, being necessary to include the patient families in those actions. Equity must be a horizon to be pursued, especially when it comes to vulnerable populations, since even among those in unfavourable condition, there may be subgroups in even worse situations [23,28,29]. This can easily be verified in this study, where the blind group and the less educated used less dental services and had worse oral health indicators, respectively. Thus, the correct identification and prioritization of the most vulnerable groups is necessary in the routine of services. This has been the only action capable of reducing the effects of socioeconomic conditions, deficiencies and limitations in the production of inequalities related to access to services and in health conditions [28,29].

CONCLUSION

The visually impaired show good self-perceived oral health even in the face of poor clinical condition. Blind individuals presented greater difficulties to get access to dental services and less educated had worse oral health clinical conditions. It is necessary to expand coverage that effectively promotes access to dental services, especially for the most vulnerable, without prejudice to the promotion and prevention actions. Future studies should include pooled samples to allow multivariable analyses that can better clarify the determinants of oral health in this population.

Collaborators

GE Moreira and DC Lima, worked on research, methodology, analysis and interpretation and final writing and approval of the version to be published. LAC Gonçalves and EJP Oliveira, analysis and interpretation, final writing and approval of the version to be published. Najara NFB Lemos, worked on the conception and design, research and approval of the version to be published. LA Fernandes, worked on the conception, design, analysis, interpretation and approval of the version to be published. KCS Gasque, final writing and approval of the version to be published.

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