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The Impact Of Oral Health Literacy On The Perception Of Parents And/Or Caregivers About The Treatment Of Carious Lesions In Primary Teeth: A Cross-Sectional Study

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SUMMARY

The purpose of this study was to evaluate the influence of literacy on the oral health of parents and/or caregivers in the choice of dental treatment for their children. Forty parents and/or caregivers were subjected to three analysis instruments: a questionnaire about the sociodemographic profile of the nuclear family; BREALD-30 to analyze the level of oral health literacy, and a construct organized by the researchers based on the ICDAS called ETI, to evaluate the choice of treatment. The means and standard deviation were calculated. Data was analyzed with absolute, and relative frequencies (25th and 75th percentiles). The correlations among the BREALD-30 score and the understanding of parents and/or caregivers were analyzed using Spearman's correlation coefficient. Considering significance level at 5%, and confidence at 95%. The majority of the parents and/or caregivers were represented by the mother, at the mean age of 37.6 years and a mean of 11.43 years of education. The results showed an association between BSA and choice of treatment, indicating lower levels of BSA are related to choice of invasive treatments. The inclusion of the BREALD-30 as an instrument is relevant contributing to training and choice for children's treatment of parents and/or caregivers.

KEYWORDS: *clinical decision-making; literacy; nuclear family; pediatric dentistry.*

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I. INTRODUCTION

Scientific evidence has shown that the oral health status of children, especially during infancy, is determined by the behavior of parents and/or caregivers.(1,2) In addition, the oral health habits of parents and/or caregivers affect the oral health of their children.(3,4)

Thus, the knowledge of parents and/or caregivers about oral health may be associated with positive interpersonal relationships with health professionals, guidance in health promotion actions, and provision of basic information about the right choices to meet the treatment needs of their children.(5,6)

Among the treatment needs of children, caries and their clinical consequences are mostly prevalent and are still considered a global public health problem.(7) In addition, studies have emphasized the increased

susceptibility to dental caries in children whose families belong to a vulnerable socioeconomic and cultural class and have low levels of education and literacy in oral health.(8,9)

Instruments for measuring health literacy, particularly in oral health, emphasize that limited literacy potentiates misunderstandings in the interpretation of oral health, affects quality of life and acts as a determinant of dental caries outcomes.(10–12)

However, such instruments do not predict or indicate the oral health knowledge of parents and/or caregivers and its influence on the choices for treatment in the decision-making process.(13)

The validation of the Rapid Estimate of Adult Literacy in Dentistry (BREALD-30) instrument in Portuguese has allowed the measurement of oral health literacy among adults, allowing a cross-cultural comparison of results while pointing out communication strategies to minimize disparities in oral health.(14–16)

Thus, the present study acknowledges the convenience of using the BREALD-30 associated with the socioeconomic and demographic variables of the nuclear family and seeks to fill the knowledge gap regarding how parents and/or caregivers, who are faced with various clinical procedures, can choose the most appropriate treatment for their children.

II. METHODS

Ethics

This study was approved by the Research Ethics Committee of the Centro Universitário INTA-UNINTA, protocol 5,479,633/2022, under CAAE 59400722.0.0000-8133, meeting the ethical and fundamental requirements of Resolution 466/2012 of the National Health Council (studies involving humans). All study participants signed an informed consent form (ICF).

Study design

The study was conducted in the city of Sobral (CE- Brazil), from October to November 2022.

The study design was analytical cross-sectional, with nonprobability sampling, using parents and/or caregivers who seek dental care for their children.

The study began with 45 parents and/or caregivers whose children were aged between 3 and 9 years old and ended with 40 parents and/or caregivers.

The study included parents and/or caregivers who lived in the same house as the child and who agreed to sign the informed consent form and complete the three research instruments. We excluded parents and/or caregivers with impaired vision or hearing, who were not native Portuguese speakers, and who exhibited signs or symptoms of cognitive impairment or drug or alcohol abuse.

Three instruments were used in the study, starting with a questionnaire about the sociodemographic profile and oral health of the nuclear family. The second instrument applied was the BREALD-30(14), followed by a construct represented by clinical images indicating treatment needs.

The questionnaire on the sociodemographic information and oral health profile addressed the following data: caregiver's degree of kinship, sex, age, years of formal education and income, and child's sex, age and education. In addition to data such as number of people residing in the household, number of children in the household, length of stay of the caregiver with the child, last visit of the caregiver and child to the dentist, frequency of tooth brushing of the caregiver and child, caregiver participation in oral health education programs, and interest in television or radio programs about oral health.

The Brazilian version of the BREALD-30, translated, adapted and validated in Portuguese, was used to assess oral health literacy. This instrument consists of 30 words related to dentistry, organized in increasing order of difficulty. A score of 1 or 0 is assigned to each correctly or incorrectly pronounced word, respectively. The total score is obtained by adding the scores of each word, ranging from 0 to 30, such that a higher score reveals a higher level of oral health literacy.(14)

To estimate the respondents' understanding of dental treatment, a construct called images for choice of treatment (ICT) was developed. The ICT consisted of photographs of clinical cases represented by carious lesions in deciduous teeth in stages from active white spots to cavitated carious lesions with dentinal exposure, based on the international caries detection and assessment system (ICDAS),(17) described as follows:

ICT - I = teeth 51 and 61 with ICDAS 2
ICT-II = teeth 51 and 61 with ICDAS 3
ICT-III = tooth 75 with ICDAS 4
ICT-IV = teeth 74/75/84 with ICDAS 5
ICT V = teeth 54 and 55 with ICDAS 6

For each ICT, a brief clinical case report and its manifestations (thermal sensitivity and pain) were provided to the study subjects for a better understanding.

The instrument included the alternatives to be given to parents and/caregivers for each ICT, which were classified by the researchers as conservative, moderate or invasive treatments:

ICT-I= a) hygiene control, diet control and fluoride application: b) "scrape" the white spot with a manual instrument and c) "run the motor" to polish it.

ICT-II and ICT-III= a) hygiene control, diet control and fluoride application; b) remove caries with a manual instrument; c) remove caries with the "little motor".

ICT-IV = a) remove caries with a "little motor"; b) treat the canal; c) "remove" the tooth.

ICT-V= a) remove caries with a "little motor"; b) treat the tooth; c) "pull out" the tooth.

All instruments were systematically administered to each parent and/or caregiver at the same time and in the respective sequence by previously calibrated researchers and recorders. The questionnaires were completed in a quiet and private environment at the educational institution during the children's scheduled dental appointments.

It should be noted that the study participants were instructed that the choice of treatments proposed in the ICT would be reproduced in their children, if necessary.

Statistics

Microsoft Excel 365 and IBM SPSS version 23.0 for Windows (SPSS Inc.; Chicago, IL, USA) were used for tabulation and analysis of the data. Absolute and relative frequencies and mode of the nominal variables; relative absolute frequencies and interquartile medians (25th and 75th percentiles) of the categorical variables; and the means and standard deviation of the continuous variables were calculated. The Shapiro–Wilk normality test was used to assess whether the study data followed a normal distribution. The Spearman correlation coefficient was performed to determine the relationships among socioeconomic characteristics, oral health, BREALD-30 and the understanding of parents and/or caregivers regarding dental treatment. The strength of the relationships[1 19] was measured as follows: positive or negative values from 0.01 to 0.19 were interpreted as a null or insignificant relationship; 0.20 to 0.29 as a weak relationship; 0.30 to 0.39 as a moderate relationship; 0.40 to 0.69 as a strong relationship; and ≥ 0.70 as a very strong relationship. For all analyses, the significance level was set at 5% ($p<0.05$), and the confidence interval was 95%.(18)

III. RESULTS

The concordances found for the calibration of the BREALD-30 in this study were interexaminer kappa (> 0.919) and intraexaminer kappa (> 0.913).

A total of 45 interviews were conducted. However, during the first five interviews, the interviewees had difficulties interpreting the proposed treatments. To improve their understanding and to eliminate doubts as to the type of procedure to be performed, interpretation errors were corrected, and the first five interviews were eliminated from the study.

The final sample consisted of 40 parents or caregivers who were present on the day the child was seen, most of whom were mothers (70.0%), with a mean age of 37.6 years (SD=9.23), 11.43 years (SD=3.91) of study and a mean family income of R$ 2,249.90 (SD=1850.44). Table 1 shows the demographic and socioeconomic characteristics of the sample.

Table 2 shows the descriptive analysis of the oral health of parents and/or caregivers and children and of the health of parents and/or caregivers.

Table 3 shows the descriptive analysis of the understanding of parents and/or caregivers regarding dental treatment and BREALD-30. In images I (47.5%), II (60%), III (65%) and V (62.5%), the interviewees opted for more invasive treatments, and the mean BREALD-30 was 20.6%.

Table 4 shows the analysis of the correlations among the understanding of parents and/or caregivers regarding dental treatment, BREALD-30, sociodemographic characteristics and oral health. A positive relationship of magnitude was identified as strong ($r = 0.400$ to 0.699) and highly significant ($p < 0.01$) between the BREALD-30 and the level of education and income of the participant. The education of the guardian showed a negative relationship of strong magnitude ($r = 0.400$ to 0.699) and highly significant ($p < 0.01$) in relation to the choice of conservative procedures.

Table 5 shows the correlation between the understanding of parents and/or caregivers regarding dental treatment and BREALD-30.

IV. DISCUSSION

In principle, the present study, based on the preliminary results, confirms and suggests the reproducibility of the methodology for use in future studies, demonstrating the feasibility of the BREALD-30 instrument as a guide to parents and/or caregivers regarding the choice of pediatric dental procedures for the treatment of carious lesions.

There seems to be no report in the dental literature about any study that tested the hypothesis that BREALD-30 could influence the choice of dental treatments. This is a novelty of the present research, despite the a pilot study.

In addition to confirming this hypothesis, the results of this study strongly indicate a direct association between the understanding of parents and/or caregivers and the choice of treatment. In absolute values, it is possible to note that the lower the level of oral health literacy is, the less likely the choice of treatments considered invasive, which is similar to findings in other studies.(5,13,19) However, our results on this topic were not statistically significant, possibly due to the study sample.

In this sense, it must be considered that invasive treatments mirror the classical and mechanistic model employed over the years in dentistry and that they do not address the promotion and preservation of oral health,(20) a paradigm that has been disrupted and vigorously replaced by the concept of minimal intervention dentistry.(21–23)

Thus, BREALD-30 can be a transforming agent, educating parents and/or caregivers and qualifying them, when possible, to choose noninvasive or microinvasive approaches and gradually suppressing the idea that caries treatment necessarily requires total removal.(20,24–26)

It is worth noting that in the present study, the parents and/or caregivers opted for invasive treatments when presented with clinical images, particularly clinical images I, II and III. This logic seems to be supported by the belief that carious tissue is contaminated by bacteria and should be removed together with adjacent healthy tissue, reaffirming the technicist model of treatment.(20,22,26,27)

In clinical images IV and V, the choice for moderate/invasive treatment can be credited to the fact that, as the lesion is visually cavitated and in an advanced stage, radical treatment becomes inevitable, according to the knowledge of the caregivers.(5,13,19,27,28)

Regarding the sociodemographic profile of the study participants, the mothers were the predominant caregivers, with an average age of 30 years old, more than 8 years of schooling and a source of income of up to two minimum wages. These data are similar to those of several studies.(28–30)

Regarding income, low family income was closely connected to low knowledge of the ideal conditions of oral health, as well as low levels of education among caregivers. Such factors should be a warning in the organization of strategies to improve the literacy levels of individuals.(29,31)

Studies have also shown an association between oral health literacy and children's oral hygiene behavior.(32,33) However, in our results, the frequency of toothbrushing was not directly related to oral health literacy.

Regarding the frequency and last visit of the child to the dentist, the more time had elapsed since the last visit, the more invasive the choice of treatment, which is markedly represented in clinical image III. The search for and access to dental services was based on the severity and pain symptoms that the child presented, which generates emergency care and consequently the obligation of invariably invasive procedures.(13,19,32,33)

The cross-sectional design of this study can be considered a limiting factor, as it does not allow the determination of causal relationships. In addition, a sample selection bias should not be disregarded because research in clinical settings, as is the case in the present study, presumably allows the research subjects to enjoy more access to health information.(10,21,33) Finally, the interviewees indicated some difficulty in understanding the words contained in the BREALD-30, which was an observation in other studies as well.(3,4,10,12,32)

The actions taken by the researchers were able, to a certain extent, to overcome the limitations of the strict agreement of the Kappa test, both intra- and interexaminer, and the intrinsic weakness of the BREALD-30 in not testing the content for comprehension and only measuring recognition; the BREALD-30 is a simple and fast tool, which has been exhaustively tested in other studies.(14,15,29,31–33)

V. CONCLUSION

Oral health literacy is relevant for epidemiological studies and in the guidance of public health policies, and the inclusion of the BREALD-30 as a tool in this study is evidence of this assertion.

Thus, it is reasonable to conclude that the BREALD-30 is relatively practical and simple to reproduce and potentially contributes significantly to the promotion of oral health, improving public health management and training parents and/or caregivers in oral health and choice of treatment for their children, the primary scope of this study.

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Table 1. Demographic and socioeconomic characteristics of the sample.

Nominal variables	**n**	**%**	**Fashion**		
Degree of kinship of the guardian	40		Mother		
Mother	28	70.0			
Father	5	12.5			
Aunt	1	2.5			
Uncle	2	5.0			
Grandmother	4	10.0			
Sex of parents and/or caregivers	40		Female		
Male	7	17.5			
Female	33	82.5			
Child sex	40		Female		
Male	14	35.0			
Female	26	65.0			
Ordinal variables	n	%	Interquartile range		
			25th percentile	Median	75th percentile
Education			Infantile III	1st year	2nd year
Infantile II	2	5.0			
Infantile III	8	20.0			
Infantile IV	6	15.0			
Infant V	3	7.5			
1st year	7	17.5			
2nd year	7	17.5			
3rd year	7	17.5			
Continuous variables	n	Mean	Standard deviation	**IC de 95%**	
				Lower limit	Upper limit
Age of parents and/or caregivers (years)	40	37.60	9.23	34.64	40.55
Years of formal education of parents and/or caregivers	40	11.43	3.91	10.18	12.67
Income of parents and/or caregivers (R$)	40	2249,90	1850,44	1658,10	2841,70
Number of rooms in the house	40	5.28	1.84	4.69	5.86
Child's age (years)	40	6.28	1.84	5.69	6.87
Number of people living in the house	40	4.03	1.35	3.59	4.46
Number of children in the house	40	1.68	0.94	1.37	1.98
Number of hours/day that the guardian stays with the child	40	8.03	3.29	6.97	9.08

95% CI = 95% confidence interval.

Table 2. Descriptive analysis of oral health and health: parents and/or caregivers and children.

Nominal variables	**n**	**%**	**Fashion**		
Participation in the general health education program	40		No		
Yes	19	47.5			
No	21	52.5			
Participation in the oral health education program	40		No		
Yes	16	40.0			
No	24	60.0			
Continuous variables	n	Mean	Standard deviation	**IC de 95%**	
				Lower limit	Upper limit
Time of last visit to the dentist – parents and/or caregivers (months)	40	11.17	11.90	7.36	14.97
Number of times to brush teeth/day – parents and/or caregivers	40	2.88	0.61	2.68	3.07
Time of last visit to the dentist – child (months)	40	6.37	7.56	3.95	8.79
Number of times to brush the teeth/day - child	40	2.58	0.71	2.35	2.80

95% CI = 95% confidence interval.

Table 3. Descriptive analysis of the understanding of parents and/or caregivers regarding dental treatment and BREALD-30.

Ordinal variables	**n**	**%**	**Interquartile range**		
			25th percentile	Median	75th percentile
Understanding of parents and/or caregivers regarding dental treatment					
Image I	40		1	2	3
Conservative	16	40.0			
Moderate	5	12.5			
Invasive	19	47.5			
Image II	40		2	3	3
Conservative	5	12.5			
Moderate	11	27.5			
Invasive	24	60.0			
Image III	40		2	3	3
Conservative	5	12.5			
Moderate	9	22.5			
Invasive	26	65.0			
Image IV	40		2	2	3
Conservative	5	12.5			
Moderate	18	45.0			
Invasive	17	42.5			
Image V	40		2	3	3
Conservative	0	0.0			
Moderate	15	37.5			
Invasive	25	62.5			
Continuous variables	n	Mean	Standard deviation	**IC de 95%**	
				Lower limit	Upper limit
BREALD-30	40	20.60	7.76	18.12	23.08

Conservative = conservative treatment; Moderate = moderately invasive treatment; Invasive = invasive treatment; 95% CI = 95% confidence interval.

Table 4. Analysis of the correlation between the understanding of parents and/or caregivers regarding dental treatment, BREALD-30 and sociodemographic characteristics and oral health.

Variables	**Understanding of parents and/or caregivers regarding dental treatment**						**BREALD-30**
	Image I	Image II	Image III	Image IV	Image V	General	
Sociodemographic characteristics							
Age	-.049	.017	.170	-.045	-.141	-.035	-.176
Years of formal education of parents and/or caregivers	-.395*	-0.98	-.332*	-.197	-.215	-.507**	.448**
Income of parents and/or caregivers (R$)	-.155	.016	.119	-.294	-.441**	-.214	.421**
Oral health							
Time of last visit to the dentist – parents and/or caregivers (months)	-.112	.102	-.272	.021	.114	-.063	-.176
Number of times to brush teeth/day – parents and/or caregivers	.321*	-.146	-.091	-.153	-.338*	-.143	.323*
Time of last visit to the dentist – child (months)	-.121	.000	-.404**	-.088	-.098	-.312	.085
Number of times to brush the teeth/day - child	.213	-.118	.175	-.036	-.088	.044	.147

Calculated using the Spearman rank correlation coefficient (rep (two-tailed)); * = The correlation is significant at the 0.05 level (two-tailed); ** = The correlation is significant at the 0.01 level (two-tailed).

Table 5. Analysis of the correlation between the understanding of parents and/or caregivers regarding dental treatment and BREALD-30.

Variables	**Understanding of parents and/or caregivers regarding dental treatment**					
	Image I	Image II	Image III	Image IV	Image V	General
BREALD-30	-.169	.022	.006	-.300	-.276	-.266

Calculated using the Spearman rank correlation coefficient (rep (two-tailed)).
BREALD-30 x image 1 p=0.296; image 2 p=0.894; image 3 p=0.971; image 4 p=0.060; image 5 p=0.085; overall p=0.098.