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Attention-deficit Disorder, Family Factors, and Oral Health Literacy

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ABSTRACT

Introduction: Relationships amongst attention-deficit/hyperactivity disorder (ADHD), family factors, and oral health literacy (OHL) in adolescents are unclear. The objective of this research was to investigate whether family environment and signs of ADHD are associated with OHL at the onset of adolescence.

Methods: A cross-sectional study was performed with 448 twelve-year-old adolescents enrolled in schools in Cajazeiras, Brazil. Adolescents responded to an instrument measuring OHL (Brazilian version of the Rapid Estimate of Adult Literacy in Dentistry [BREALD-30]) and a validated questionnaire addressing family cohesion and adaptability (Family Adaptability and Cohesion Scales [FACES III]). Parents and teachers answered subscales of the Swanson, Nolan, and Pelham Questionnaire (SNAP-IV) and a socioeconomic questionnaire. Adjusted Poisson regression analysis was employed for the data analysis (P < .05).

Results: Greater OHL was found in adolescents with higher family cohesion scores (rate ratio [RR], 1.02; 95% confidence interval [CI], 1.01−1.03), those whose mothers had more than 8 years of schooling (RR, 1.07; 95% CI, 1.03−1.12), and those whose families earned more than the Brazilian minimum salary (RR, 1.08; 95% CI, 1.03−1.12). Higher family adaptability scores (RR, 0.99; 95% CI, 0.98−0.99) and more signs of ADHD (teachers' reports) (RR, 0.95; 95% CI, 0.91−0.99) were associated with lower OHL.

Conclusions: OHL in adolescents was influenced by family adaptability and cohesion, signs of ADHD, maternal schooling, and family income.

Introduction

Oral health literacy (OHL) has been defined as the ability to obtain, process, and understand basic information that can assist in better decision-making regarding oral health[1] and has been the object of study in a growing number of investigations in recent years.[2-4] A low level of OHL has been found to negatively affect oral health in diverse age groups[4,5] and has been linked to worse oral health behaviours, the presence of biofilm, visits to the dentist due to treatment needs, dental anxiety, a negative self-perception of one's oral health, the consumption of cariogenic foods, and the occurrence of dental caries.[2,3,5-8] To date, studies have prioritised the association between the oral health status of children and the OHL of parents and guardians,[9,10] whereas few studies have considered OHL in adolescents.[4,5]

It is important to study elements that influence OHL considering adolescents' self-reports, as this developmental phase is marked by existential conflicts and extreme behaviours that can result in negligence with regards to oral health. Moreover, greater independence from the family occurs during this phase of life.[11]

Actions designed to improve OHL can assist in more effective communication with dentists and the increased use of dental services.[12,13] Certain sociodemographic factors have been associated with low OHL, including male sex, a low income, a lower level of formal education, and a greater number of household members.[3,9,13,14]

Family influence is one of the factors that may be associated with OHL in adolescence. Balanced family relations have a positive effect on the care that parents offer their children, which can increase healthy behaviours in adolescents.[15] Two previous investigations conducted with adolescents aged 12 years old and between 15 and 19 years old found that balanced family functioning was associated with higher OHL amongst adolescents.[4,16] Therefore, further research remains necessary for assessing the association between OHL in adolescents and both family cohesion (union) and adaptability (flexibility) to gain in-depth knowledge of how family relations play a role in the oral health behaviour of this population.

Attention-deficit/hyperactivity disorder (ADHD) is characterised by significantly greater inattention, hyperactivity, and impulsivity than expected during normal development.[17] The prevalence of ADHD is estimated to be between 2% and 18% in children and adolescents.[18] Moreover, reports have indicated that inattention and hyperactivity can limit one's ability to read and understand texts.[19,20] Hence, the influence of ADHD on the OHL of adolescents merits investigation, as this disorder is common amongst children and adolescents, whose health habits are undergoing the process of formation and consolidation. However, no existing study has examined whether ADHD and OHL are associated.

Therefore, this study assessed whether the family environment and signs of ADHD are associated with OHL in a representative school-based sample of adolescents. The hypothesis of the present study is that signs of ADHD, lower family cohesion, and higher family adaptability are associated with lower OHL.

Materials and methods

A cross-sectional study was conducted involving 448 adolescents aged 12 years old who were matriculated at public and private educational institutions in Cajazeiras, Brazil. The population of Cajazeiras is approximately 61,993 residents, and approximately 5057 of these are adolescents between 10 and 14 years old.[21] Data were collected between April and November of 2018 following the study's approval by an ethical review board (State University of Paraiba Review Board; approval #: 85,211,418.6.0000.5187) following the ethical standards of the Declaration of Helsinki.

Sample size was calculated employing G*Power software (v.3.1, Franz Faul) based on the comparison of means between independent samples using the following parameters obtained in the pilot study: 95% significance level, 80% study power, mean and standard deviation of OHL scores of 0.8 ($\pm$1.20) in adolescents with ADHD and 1.24($\pm$1.70) in those without ADHD, and effect size of 0.290. These data resulted in the largest possible sample size, which was 376 adolescents. We added 20% to this figure to make up for nonresponse or

being absent during the data collection, which resulted in a final sample of 470 individuals.

Participants were selected for the study through simple random sampling (single state). First, a list was built using the Microsoft Excel programme (Microsoft Office 365 2019) by compiling data offered by the municipal secretary of education with the names of all students enrolled in the city's public and private educational institutions. This list included 1290 adolescents. Next, the software's random function command randomly selected students, who were then invited to take part in the study. The number of selected students from private and public education institutions was proportional to the total number matriculated in each type of institution (38.9% private; 61.1% public).

Eligibility criteria

Adolescents 12 years of age matriculated in public and private schools were included. Only 12-year-olds participated because the World Health Organisation considers this age an index age[22]; this age was therefore chosen in order to examine how study variables behave during early adolescence, in order to support the adoption of early interventions. Adolescents and parents or guardians who were unable to read; those with systemic conditions, such as cerebral palsy and Down syndrome; and those with mental disabilities (according to teachers' reports) were excluded from the study.

Training and calibration

A dentist was trained and calibrated by an expert in the evaluation of OHL. For this process, the Brazilian version of the Rapid Estimate of Adult Literacy in Dentistry (BREALD-30) was used following the training and calibration methods proposed by Vilella et al.[23] The theoretical phase consisted of debating the characterisation of reading errors. The practical phase consisted of assessing 15 videos displaying participants with varying levels of OHL. Agreement regarding the BREALD-30 scores between the evaluator and the gold standard was measured using the intraclass correlation coefficient (ICC) (ICC = 0.98; 95% confidence interval [CI], 0.95−0.99). One week later, the evaluator reassessed the videos in order to measure intra-examiner agreement (ICC = 0.99; 95% CI, 0.98−0.99). Cohen's Kappa coefficients were calculated to appraise word-by-word agreement (inter-examiner agreement: 0.93 [P = .01]; intra-examiner agreement: 0.90 [P = .02]).

Pilot study

To test and evaluate the proposed methodology, a pilot study was conducted with a convenience sample of adolescents enrolled in private (n = 20) and public (n = 20) educational institutions, who were not incorporated into the final study sample. As there were no problems during this phase, the study methodology was not altered.

Data collection

Prior to enhancing data collection, the goals of the study were explained to parents and guardians, and they were asked to

sign a statement of informed consent. Adolescents were also solicited to sign a statement of consent. Two questionnaires were sent to the parents or guardians of the adolescents. One addressed socioeconomic information (sex, maternal schooling, number of household members, and family income) and another was for the detection of signs of ADHD (Swanson, Nolan, and Pelham Questionnaire [SNAP-IV]). To complete these questionnaires, parents or guardians needed to be able to read. Maternal schooling was classified according to the length of time in primary school in Brazil (≤8 and >8 years of schooling). The family income variable was dichotomised according to the Brazilian minimum salary (256.45 USD during data acquisition). After these questionnaires and the informed consent form were returned, the adolescents self-administered the Family Adaptability and Cohesion Scales (FACES III) and read aloud a list of 30 words related to dentistry to determine their levels of OHL, for which the BREALD-30 was used. The trained dentist evaluated one adolescent at a time in a separate room in the schools. Teachers were then invited to complete the SNAP-IV questionnaire in order to detect signs of ADHD in the school environment.

The BREALD-30 has been validated for use in Brazil[24] and has adequate measurement properties for individuals 12 years of age.[5] With this instrument, OHL is evaluated based on a respondent's ability to correctly read aloud 30 words related to dentistry arranged in increasing order of pronunciation difficulty.[25] Each word receives either a score of 1 (correctly pronounced) or 0 (incorrectly pronounced). The final score consists of the sum of correctly pronounced words and varies from 0 to 30, with higher scores indicating an increased OHL level.[24,25]

The adolescents answered the FACES III instrument for the evaluation of family cohesion (the extent to which family members are able to remain integrated despite alterations in everyday life) and adaptability (the capability of family members to modify roles and behaviours in order to adapt to challenges or adverse situations).[26] FACES III is part of the family functioning diagnostic scale and consists of a linear evaluation of family relations.[26] It comprises 20 items with response options organised in a scale of 5 points, in which an answer denoting a higher frequency translates into an increased score ("hardly ever" = 1 to "almost always" = 5). Family cohesion is addressed by the 10 odd-numbered items, whilst family adaptability is evaluated by the 10 even-numbered items. Higher scores in the odd-numbered items indicate more connected and enmeshed families, whilst higher scores in the even-numbered items indicate more flexible and chaotic families.[26]

The Brazilian version of the SNAP-IV questionnaire was employed for the evaluation of the possible presence of signs of ADHD amongst adolescents.[27] This instrument has subscales addressing inattention, hyperactivity and impulsivity, and defiant and oppositional behaviour. The first 9 items address signs of inattention, whereas items 10 through 18 address signs of hyperactivity and impulsivity. The response options are organised following a 4-level scale ("not at all," "just a little," "quite a bit," and "very much"). As one of the instrument's goals is to compare the behaviour of the adolescent at home and at school, parents or guardians and teachers independently responded to the SNAP-IV. Teachers self-administered the questionnaire at school.

Statistical analysis

Data organisation and statistical analysis were performed using the SPSS Statistics software (SPSS for Windows, version 25.0, IBM Inc.). The sample was characterised by frequency distributions. Unadjusted and adjusted Poisson regression models tested whether the outcome variable (OHL) was associated with explanatory variables. A 5% significance level and 95% CIs were considered for the rate ratios (RRs) in the unadjusted and adjusted models.

After the unadjusted analysis, multicollinearity was found in the symptoms of ADHD between parents' and teachers' reports. As adolescents' learning routines occur under the supervision of teachers, the association between their responses and the outcome are stronger than the association between parents' responses and the outcome; thus, teachers' responses were integrated into the adjusted model.

The continuous form of the BREALD-30 scores were used to evaluate OHL. There is no cutoff defined in the literature for categorising OHL. Moreover, the use of this variable in the continuous form facilitates the comparison of the results to those of studies that have used a similar method. Higher BREALD-30 scores suggest better OHL.

For family cohesion and adaptability, the adolescents' answers were treated as discrete-continuous variables. Higher scores for the family cohesion items indicate more connected and enmeshed families, whereas higher scores for the family adaptability items indicate more flexible and chaotic families.[26]

Regarding the categorisation of ADHD, cluster analysis was employed to define groups of adolescents according SNAP-IV questionnaire responses. The 2-step cluster method relying on the Schwartz Bayesian norm was used. This method forms clusters based on the usual answer for each question and its importance.[28] The analysis resulted in 2 new variables, based on the responses of parents/guardians and teachers: one addressing signs of inattention and another comprising hyperactivity. The analysis identified 2 subgroups as the optimal number of clusters. Therefore, the sample was dichotomised into one group of adolescents with more signs of inattention and hyperactivity and another group with fewer signs of these traits. The group classified as having more signs of inattention and hyperactivity had a significantly higher number of "quite a bit" and "very much" answers on the items of the SNAP-IV questionnaire, compared to the group classified as having fewer signs of inattention and hyperactivity (P < .05).

Explanatory variables with a P value <0.20 in the unadjusted analysis were integrated into the adjusted model. Explanatory variables with a P value <0.05 in the final model were considered significantly associated with the dependent variable.

Results

A total of 448 adolescents were included in this study (response rate: 95%). We lost 22 participants as they were absent on the days data were collected.

Table 1 displays the data for the characterisation of the sample. Most adolescents were female, with maternal schooling more than 8 years and with a family income up to the Brazilian minimum salary. The mean BREALD-30 score was 20.3 (SD = 4.5), and the median was 21.0 (Q$_{25}$ = 4.0; Q$_{75}$ = 5.0). Approximately one-third and one-half of participants were classified as having more signs of ADHD according to parents' and teachers' reports, respectively.

Table 2 displays the associations found between the independent variables and OHL. In the adjusted analysis, the following variables remained associated with the outcome: maternal schooling, family income, family cohesion, family adaptability, and signs of ADHD based on the teachers' reports. Adolescents with higher family cohesion scores (RR, 1.02; 95% CI, 1.01−1.03), those whose mothers had more than 8 years of schooling (RR, 1.08; 95% CI, 1.04−1.12), and those whose families earned more than the Brazilian minimum salary (RR, 1.08; 95% CI, 1.03−1.12) had significantly higher OHL. Moreover, adolescents with higher family adaptability scores (RR, 0.99; 95% CI, 0.98−0.99) and more signs of ADHD (teachers' report) (RR, 0.95; 95% CI, 0.91−0.99) had significantly lower OHL.

Discussion

In the current investigation, more signs of ADHD, lower family cohesion, higher family adaptability, and sociodemographic factors were associated with lower OHL amongst 12-year-old adolescents.

Family relations are essential for adolescents' development, socialisation, and learning.[29,30] In previous studies, low family cohesion has been associated with poorer academic performance and poorer oral health behaviours in adolescents, suggesting the importance of investigating the intermediate factors in this process. However, these studies were conducted with older adolescents, and one considered only female adolescents.[15,31] Moreover, the association between family cohesion or adaptability and OHL in adolescence has scarcely been explored, as only 2 studies involving adolescents aged 12 and 15−19 addressed this issue.[4,16]

In the present study, family adaptability was associated with OHL in 12-year-old adolescents. Those with lower family adaptability scores, indicating more rigid and structured families, had greater OHL. These results indicate that a family environment with well-defined roles, no changes in the rules, and a fixed family leader provides a better education for adolescents. In rigid and structured family environments, the effects of parental control on children's education may lead to greater interest in health-related issues and healthy behaviours, which favors greater OHL. A similar finding was described in a study with older adolescents.[4]

Family cohesion was also associated with OHL. Adolescents with lower family cohesion scores, which indicate separated and disengaged families, exhibited lower OHL. This finding suggests that adolescents from families with highly independent members and no emotional ties are less exposed to information regarding oral health, which is likely related to a lower level of communication within the family. Families with higher levels of cohesion offer greater support to adolescents' academic development,[32] which likely exerts an influence on the acquisition of oral health information and greater OHL. Moreover, a troubled family environment alters an adolescent's mood and capacity to learn,[33] which can lead to a low level of OHL. Previous investigations found an association between high family cohesion and greater OHL in older adolescents.[4,16] Such findings highlight the pivotal role of the family in OHL.

Adolescents with more signs of ADHD based on teachers' reports had significantly lower OHL. Inattention and hyperactivity can contribute to problems related to reading skills and comprehension,[19,20] which may explain this result. Such findings likely suggest that adolescents with signs of ADHD are unable to sufficiently understand health information and instructions, which may have a negative impact on OHL. To the best of our knowledge, this is the first study to investigate the association between ADHD and OHL. Further investigations of OHL in adolescents with signs of ADHD should be conducted, as the processing and comprehension of health information are indispensable to self-care and decision-making related to health.

The lower ADHD scores provided by parents or guardians in comparison to those provided by teachers may be due to a lack of information on the part of the parents or guardians regarding this disorder and the fact that teachers are present with students during learning activities. Information is important for recognising signs of ADHD, and teachers have greater technical preparation and contact with students' academic performance than parents do, which facilitates the reporting of such information.[34]

Adolescents whose mothers had up to 8 years of schooling and whose families had lower income had lower OHL. This finding concurs with data described in the literature.[3,4,14,25] It is plausible that mothers with a lower level of formal

Table 1 – Characteristics of the sample.

Variable	Frequency	
	N	%
Sex		
Female	245	54.7
Male	203	45.3
Maternal schooling		
≤8 years of schooling	204	45.5
>8 years of schooling	244	54.5
Family income		
Up to Brazilian minimum salary	243	54.9
More than Brazilian minimum salary	200	45.1
Signs of ADHD (parental report)		
Fewer signs of ADHD	284	64
More signs of ADHD	160	36
Signs of ADHD (teacher's report)		
Fewer signs of ADHD	214	48.1
More signs of ADHD	231	51.9
	Mean (SD)	Median (P$_{25}$−P$_{75}$)
OHL (BREALD-30 score)	20.3 (4.5)	21.00 (18−24)
Family cohesion (FACES III scores)	34.2(5.7)	34.5(30−38)
Family adaptability (FACES III scores)	25.2(5.6)	25(21.2−29)
Number of residents in home	4.31 (1.0)	4.00 (4−5)

ADHD, attention-deficit/hyperactivity disSorder; BREALD-30, Brazilian version of the Rapid Estimate of Adult Literacy in Dentistry; FACES III, Family Adaptability atnd Cohesion Scales; OHL, oral health literacy.

Table 2 – Unadjusted and adjusted Poisson regression of independent variables associated with oral health literacy in 12-year-old adolescents.

Independent variables	Oral health literacy Median ($P_{25}-P_{75}$)	P value[*]	Unadjusted RR (95% CI)	P value[**]	Adjusted RR (95% CI)
Sex					
Female	21.00 (18−24)	−	1.03 (0.98- 1.07)	−	−
Male	20.00 (17−23)	0.200	1.00		−
Maternal schooling					
≤ 8 years of schooling	19.00 (16.5−22)	<0.001[*]	1.00	<0.001[**]	1.00
> 8 years of schooling	22.00 (19−24.5)		1.11 (1.07−1.16)		1.08 (1.04−1.12)
Family income					
Up to Brazilian minimum salary	20.00 (17−22)	<0.001[*]	1.00	<0.001[**]	1.00
More than Brazilian minimum salary	22.00 (19−25)		1.12 (1.08−1.17)		1.08 (1.03−1.12)
Number of residents	4.0 (4−5)	0.160[*]	0.98 (0.96−1.00)	−	−
Family cohesion	34.5 (30−38)	<0.001[*]	1.02 (1.01−1.03)	<0.001[**]	1.02 (1.01−1.03)
Family adaptability	25.0 (21.2−29.0)	0.002[*]	0.99 (0.98−0.99)	<0.001[**]	0.99 (0.98−0.99)
Signs of ADHD (parental report)					
Fewer signs of ADHD	21.00 (18.0−24.0)	0.09[*]	1.03 (0.99−1.08)	−	−
More signs of ADHD	20.00 (17.0−23.0)		1.00	−	−
Signs of ADHD (teacher's report)					
Fewer signs of ADHD	21.00 (19.0−25.0)	<0.001[*]	1.08 (1.03−1.12)	0.013[**]	1.00
More signs of ADHD	20.00 (17.0−23.0)		1.00		0.95 (0.91−0.99)

ADHD, attention-deficit/hyperactivity disorder; RR, rate ratio.

[*] Unadjusted Poisson regression analysis. Variables integrated into adjusted model (P < .20): maternal schooling, family income, number of residents in home, family cohesion, family adaptability, signs of ADHD (teachers' reports).

[**] Adjusted Poisson regression analysis (P < .05).

education have less access to health-related information and face difficulties in sharing such information with their children, thereby contributing to poorer OHL amongst adolescents. Previous studies have reported similar results for adolescents aged 12 and 15 to 19.[4,5] Regarding family income, populations with a lower income tend to have a lower level of education,[4,14] which hinders the use of dental services and contributes to poorer exposure to oral health information, leading to lower OHL. Similar results have been reported in previous studies.[4,5,7,9,14]

Our findings reinforce the urgent need for dentists to adopt a more holistic approach in their clinical practice. Investigating characteristics such as family cohesion and adaptability can reveal crucial information that could assist dentists in determining how to conduct treatment. When treating patients with low family cohesion or high family adaptability, the clinician should be aware of the need to dedicate extra time to these patients in order to promote healthy oral habits. Special attention should also be given to dentist−patient communication. As adolescents with ADHD may have trouble concentrating and understanding complex information, oral health instructions should be clear and focused. Preferably, only one topic should be covered per appointment.

The majority of adjusted RRs between the independent variables and OHL were quite small, which may indicate small effect sizes. However, small effects may be meaningful in certain contexts. Thus, a careful interpretation of the findings as well as further investigations concerning the variables considered in the present study are important to an in-depth understanding of the topic.

One limitation of the study is the absence of a clinical diagnosis of ADHD. However, the SNAP-IV questionnaire is widely employed for the assessment of signs of ADHD in epidemiological studies[35,36] and is an important instrument for clinical diagnosis. In addition, it should be noted that the BREALD-30 is a word recognition test that evaluates reading ability rather than word understanding. However, this is a simple, fast, reliable measure for screening for low functional OHL in 12-year-old adolescents.[5] The generalisability of the study findings is another limitation, as only 12-year-old adolescents were included. On the other hand, the present study was conducted with a randomly selected school-based representative sample of Brazilian adolescents, and data were collected using questionnaires also validated in other settings. Thus, our results can be extrapolated to other populations.

It is also notable that around one-third and one-half of the sample were classified, by parents and teachers, respectively, as having more signs of ADHD. Previous studies have reported frequencies of inattention and hyperactivity ranging between 5% and 15%.[35,37] In the cited studies, participants were categorised based on cutoffs of SNAP-IV mean scores, which is a limited statistical approach. In the present investigation, we used cluster analysis to group participants based on their response patterns to the individual items of the SNAP-IV. This analysis does not aim to provide an exact measure of the frequency of signs of ADHD; thus, caution should be exercised when comparing this study to previous investigations.

The findings of the present study are important and can contribute to the formulation of public policies for increasing adolescents' OHL. The data also suggest the importance of considering factors like ADHD and family dynamics when planning educational activities.

In conclusion, lower family cohesion, greater family adaptability, more signs of ADHD, up to 8 years of maternal

schooling, and family income up to the Brazilian minimum salary were associated with lower OHL amongst adolescents.

Availability of data

All data generated and analysed to support the results of this study were selected by the corresponding author and are available upon request.

Ethical approval

This study received approval from the Human Research Ethics Committee of the State University of Paraíba (certificate number: 85,211,418.6.0000.5187).

Author contributions

All authors made substantial contributions to the conception and design of the study. MFLM, RTF, ETBN, EHMB, and AFGG were involved in the data collection and analysis. MFLM, RTF, ETBN, EMBB, SMP, FMF, and AFGG were involved in the interpretation of the data, writing, and critical revision of the manuscript and approved the final version to be published.

Conflict of interest

None disclosed.

REFERENCES

1. US Department of Health and Human Services. Healthy People 2010. 2nd ed. Washington, DC: US Government Printing Office; 2010. p. 560.
2. Firmino RT, Ferreira FM, Paiva SM, et al. Oral health literacy and associated oral conditions: a systematic review. J Am Dent Assoc 2017;148:604–13.
3. Mohammadi TM, Malekmohammadi M, Hajizamani HR, et al. Oral health literacy and its determinants among adults in Southeast Iran. Eur J Dent 2018;12:439–42.
4. Lopes RT, Neves ÉTB, Dutra LDC, et al. Socioeconomic status and family functioning influence oral health literacy among adolescents. Rev Saude Publica 2020;54:30.
5. Lima LCMD, Neves ÉTB, Dutra LDC, et al. Psychometric properties of BREALD-30 for assessing adolescents' oral health literacy. Rev Saude Publica 2019;53:53.
6. Batista MJ, Lawrence HP, Sousa MDLR. Oral health literacy and oral health outcomes in an adult population in Brazil. BMC Public Health 2018;18:60.
7. Shin WK, Braun TM, Inglehart MR. Parents' dental anxiety and oral health literacy: effects on parents' and children's oral health-related experiences. J Public Health Dent 2014;74:195–201.
8. Jamieson LM, Divaris K, Parker EJ, et al. Oral health literacy comparisons between Indigenous Australians and American Indians. Community Dent Health 2013;30:52.
9. Sanzone LA, Lee JY, Divaris K, et al. A cross sectional study examining social desirability bias in caregiver reporting of children's oral health behaviors. BMC Oral Health 2013;13:24.
10. Firmino RT, Ferreira FM, Martins CC, et al. Is parental oral health literacy a predictor of children's oral health outcomes? Systematic review of the literature. Int J Paediatr Dent 2018;28:459–71.
11. Bombert F, Manso AC, Sousa FC, et al. Sociodemographic factors associated with oral health in 12-year-old adolescents: hygiene behaviours and health appointments. A cross-sectional national study in Portugal. Int Dent J 2018;68:327–35.
12. Horowitz AM, Kleinman DV. Oral health literacy: the new imperative to better oral health. Dent Clin North Am 2008;52:333–44.
13. Atchison KA, Macek MD, Markovic D. The value of a combined word recognition and knowledge measure to understand characteristics of our patients' oral health literacy. Community Dent Oral Epidemiol 2017;45:380–8.
14. Vilella KD, Alves SGA, de Souza JF, et al. The association of oral health literacy and oral health knowledge with social determinants in pregnant brazilian women. J Community Health 2016;41:1027–32.
15. Ferreira LL, Brandão GAM, Garcia G, et al. Family cohesion associated with oral health, socioeconomic factors and health behavior. Cien Saude Colet 2013;18:2461–73.
16. Lopes RT, Neves ETB, Gomes MC, et al. Family structure, sociodemographic factors and type of dental service associated with oral health literacy in the early adolescence. Cien Saude Colet 2020. Avaliable at: http://cienciaesaudecoletiva.com.br/artigos/family-structure-sociodemographic-factors-and-type-of-dental-service-associated-with-oral-health-literacy-in-the-early-adolescence/17483?id=17483. Accessed August 18, 2021.
17. Chau YC, Peng SM, McGrath CP, et al. Oral health of children with attention deficit hyperactivity disorder: systematic review and meta-analysis. J Atten Disord 2020;24:947–62.
18. Rowland AS, Umbach DM, Catoe KE, et al. Studying the epidemiology of attention-deficit hyperactivity disorder: screening method and pilot results. Can J Psychiatr 2001;46:931–4.
19. Stern P, Shalev L. The role of sustained attention and display medium in reading comprehension among adolescents with ADHD and without it. Res Dev Disabil 2013;34:431–9.
20. Little CW, Hart SA, Schatschneider C, et al. Examining associations among ADHD, homework behavior, and reading comprehension: a twin study. J Learn Disabil 2016;49:410–23.
21. Brazilian Institute of Geography and Statistics (IBGE). Statistical information. 2019. Available from: https://cidades.ibge.gov.br/brasil/pb/cajazeiras/panorama. Accessed 10 January of 2020.
22. World Health Organization. Oral health surveys. Basic methods. 5th ed. Geneva: World Health Organization; 2013. p. 125.
23. Vilella KD, Assunção LRDS, Junkes MC, et al. Training and calibration of interviewers for oral health literacy using the BREALD-30 in epidemiological studies. Braz Oral Res 2016;30:e90.
24. Junkes MC, Fraiz FC, Sardenberg F, et al. Validity and reliability of the Brazilian Version of the Rapid Estimate of Adult Literacy in Dentistry—BREALD-30. PLoS ONE 2015;10:e0131600.
25. Lee JY, Divaris K, Baker AD, et al. Oral health literacy levels among a low-income WIC population. J Public Health Dent 2011;71:152–60.
26. Falceto OG, Busnello LD, Bozzetti MC. Validation of diagnostic scales of family functioning for use in primary health care services. Pan Am J Public Health 2000;7:255–63.

27. Mattos P, Serra-Pinheiro MA, Rohde LA, et al. A Brazilian version of the MTA-SNAP-IV for evaluation of symptoms of attention-deficit/hyperactivity disorder and oppositional-defiant disorder. Revista de Psiquiatria do Rio Grande do Sul 2006;28:290–7.

28. Norusis MJ. SPSS Statistics Seventeen Point Zero Advanced Statistical Procedures Companion. Upper Saddle River, NJ: Prentice Hall; 2008.

29. Liu QX, Fang XY, Zhou ZK, et al. Perceived parent-adolescent relationship, perceived parental online behaviors and pathological internet use among adolescents: gender-specific differences. PLoS ONE 2013;8:e75642.

30. Telzer EH, Van Hoorn J, Rogers CR, et al. Social influence on positive youth development: a developmental neuroscience perspective. Adv Child Dev Behav 2018;54:215–58.

31. Rezaei-Dehaghani A, Keshvari M, Paki S. The relationship between family functioning and academic achievement in female high school students of Isfahan, Iran, in 2013−2014. Iran J Nurs Midwifery Res 2018;23:183.

32. Kashahu L, Karaj S, Karaj T. Academic achievements of adolescents and family functioning. Acad J Interdiscip Stud 2016;5:157–70.

33. Timmons AC, Margolin G. Family conflict, mood, and adolescents' daily school problems: moderating roles of internalizing and externalizing symptoms. Child Dev 2015;86:241–58.

34. Serra-Pinheiro MA, Mattos P, Angélica Regalla M. Inattention, hyperactivity, and oppositional−defiant symptoms in Brazilian adolescents: gender prevalence and agreement between teachers and parents in a non−English speaking population. J Atten Disord 2008;12:135–40.

35. Mota-Veloso I, Ramos-Jorge ML, Homem MA, et al. Dental caries in schoolchildren: influence of inattention, hyperactivity and executive functions. Braz Oral Res 2018;32:e52.

36. Ehlers V, Callaway A, Wantzen S, et al. Oral health of children and adolescents with or without attention deficit hyperactivity disorder (ADHD) living in residential care in rural Rhineland-Palatinate, Germany. BMC Oral Health 2019;19:258.

37. Mota-Veloso I, Ramos-Jorge J, Freitas LRP,, et al. The prevalence of malocclusion is higher in schoolchildren with signs of hyperactivity. Am J Orthod Dentofacial Orthop 2021;5:653–9.