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Aroucha Lyra, Maria Carlla; Cruz, Mônica; Menezes, Virgínia; Vilela Heimer, Mônica
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Original Article

Association between Sense of Coherence and Dental Caries Experience in Adolescents

Maria Carlla Aroucha Lyra[1], Mônica Cruz[2], Virgínia Menezes[3], Mônica Vilela Heimer[4]

[1]Master's degree in Pediatric Dentistry, School of Dentistry, University of Pernambuco, Recife, PE, Brazil
[2]Master's degree in Public Health, School of Dentistry, University of Pernambuco, Recife, PE, Brazil
[3]Master's degree in Adolescent Health, School of Dentistry, University of Pernambuco, Recife, PE, Brazil
[4]Public Health Sector, School of Dentistry, University of Pernambuco, Recife, PE, Brazil.

Author to whom correspondence should be addressed: Maria Carlla Aroucha Lyra, Rua Frei Jaboatão, 280, bloco: B, apto 201, Torre, Recife, PE, Brasil. Phone: 55 8197830848. E-mail: mcarllalyra@gmail.com.

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Abstract

Objective: To analyze the association between sense of coherence and dental caries experience in adolescents. **Material and Methods:** A cross-sectional study was conducted with 100 adolescents aged 11 to 15 years old who were attending the Debora Feijo State School in the city of Recife (Brazil). Information was collected on socio-demographic data – age, gender, school failure and number of residents per home. Sense of coherence (SOC) was evaluated using the SOC-13 questionnaire and the dental caries experience was determined using the DMFT index. For statistical analysis, the correlation test of Spearman and the association tests of Mann-Whitney and Kruskal-Wallis were used. The significance level was set at 5% ($p<0.05$). **Results:** A negative correlation was observed between the SOC and DMFT index ($p < 0.001$) which indicates that the higher the SOC, the lesser the DMFT. The mean SOC score was greater among adolescents with no dental caries experience. The SOC score was lower among those who failed school more often and those who lived with a greater number of people. **Conclusion:** The SOC-13 questionnaire can be considered a positive predictor of oral health status, representing an important tool in the establishment of health promotion actions focused on adolescents.

Keywords: Sense of Coherence; Oral Health; Adolescents.

Introduction

Dental caries is a multifactor condition which involves biological factors, such as dental biofilm and saliva [1], behavioral factors, as oral hygiene habits and sucrose consumption [2,3], and socioeconomic factors, like mother's schooling level, family income and household crowding [4] Dental caries has been considered the most common chronic disease during childhood and adolescence [5]. According to the World Health Organization, adolescence should be a age group of priority regarding health promotion actions, since this life's stage is important to the formation of healthy habits that remains throughout the rest of one's life [6]. Moreover, adolescents exhibit behaviors that make them more vulnerable to the development of dental caries, such as carelessness regarding oral health [7] and a change in eating habits [8].

The increased focus on social determinants of health and illness in recent decades has led to the emergence of technical approaches that emphasize the social context and its interaction with both biological and psychological factors [9]. Thus, the broadening of knowledge on determinants of the health/illness process, in which other dimensions beyond merely the biological component are considered, obligates researchers and clinicians to employ new parameters in the evaluation of this process [10].

In this perspective, the Professor of Medical Sociology, Aaron Antonovsky, conducted studies with women who had survived the World War II concentration camps and he concluded that individuals who are able to overcome hardships while maintaining their physical and mental health have a common characteristic: they cope with problems in life by assuming a positive attitude in the face of adversity. These studies were the basis for the Theory of Salutogenesis, which states that the greater the capacity to cope with hardship the more favorable consequences in health [11].

Sense of coherence (SOC) is a central construct of Salutogenesis and it is considered a new approach in the health field for the evaluation of individuals with chronic conditions or of those pertaining to specific groups, such as the elderly, adolescents, children and pregnant women. The purpose of measuring SOC is to quantify the adaptability of individuals to their environment, which means, their position in the equilibrium between health and illness [11-13]. Thus, SOC is a global orientation – a way of looking at the world and of coping with stressors in daily living [14].

Given the above, it can be emphasized the importance of considering SOC as an instrument to subsidize the public sectors when planning and implementing social policies which can be favorable to health [13,15-17].

As most behaviors are built during childhood and adolescence, the young population is an important group to address from the standpoint of health. Thus, the aim of the present study was to determine the association between SOC and dental caries experience in adolescents.

Material and Methods

An exploratory, cross-sectional study was conducted after approval in the Human Research Ethics Committee of the University of Pernambuco (Brazil) under process number 293.583.

Intentional sampling was performed, including all students enrolled in seventh and eighth grades of a school located in Mangueira in the city of Recife (northeastern Brazil) who met the eligibility criteria (n=100). Mangueira is part of the 5th administrative district of the city, which is composed of 16 neighborhoods with a mean monthly household income of R$ 360.06 [18]. The inclusion criteria were individuals aged between 11 to 15 years old, regularly enrolled in school and without any motor or cognitive impairment that could hinder the evaluations.

Data collection was performed by a single researcher who had undergone training and calibration exercises (Kappa coefficient: 0.88). Socio-demographic data – age, sex, school failure and number of individuals who resided in the home – were collected at first. The SOC-13 questionnaire was then administered for the quantification of sense of coherence [19]. Lastly, data on dental caries experience were collected using the decayed, filled and missing teeth (DMFT) index, following the criteria established by the World Health Organization [20].

For statistical analysis, the correlation test of Spearman and the association tests of Mann-Whitney and Kruskal-Wallis were used. The significance level was set at 5% ($p<0.05$). The Statistical Package for the Social Sciences (SPSS, version 21.0 for Windows) was used for all statistical analyses.

Results

A total of 57% of the 100 adolescents who participated in the present study were male; 20% were 11 years of age, 27% were 12, 24% were 13 and 29% were 14 or 15 years of age. As the study was conducted at a public school, all participants were similar from the socioeconomic standpoint.

Table 1 displays the correlations between SOC and the DMFT index as well as the separate components of this index. Significant negative correlations were detected ($p<0.05$), with the strongest correlations observed in the overall index (-0.628) and in the decayed component (-0.463).

Table 1. Spearman's correlation coefficients for SOC and DMFT index (total and components) of adolescents, Recife, PE, Brazil, 2013.

DMFT	Spearman's correlation coefficient
Decayed	-0.463 (< 0.001)
Missing	-0.267 (0.008)
Filled	-0.323 (0.001)
DMFT	-0.628 (< 0.001)

The Kruskal-Wallis and the Mann-Whitney tests revealed statistically significant associations ($p<0.05$) between SOC and both socio-demographic variables school failure and number of residents per home. The mean SOC score was lower among those who failed school more often and those who lived with a greater number of people (Table 2).

Table 3 displays the results of the association tests of Kruskal-Wallis and Mann-Whitney for the DMFT index and socio-demographic variables. Significant associations were observed between filled teeth and both sexes and between filled teeth and school failure. The mean DMFT index was

higher at 14 years of age, with a significant difference in comparison to 11 years of age after multiple comparisons test analysis. The mean number of filled teeth was higher among females; the mean number of filled teeth and the mean overall DMFT index were higher among adolescents who had failed school. Moreover, each component of the DMFT index increased with the increasing in the number of residents per home.

Table 2. SOC score of adolescents according to socio-demographic data, Recife, PE, Brazil, 2013.

Variable	Mean ± SD	Median	Minimum	Maximum	p-value
• Total group	**27.94 ± 2.52**	**27.00**	**22**	**36**	
• Age					
11	28.50 ± 1.64	28.00	26	33	$p^{(1)}$= 0.202
12	27.96 ± 2.39	27.00	25	36	
13	27.67 ± 2.63	27.00	22	34	
14 and 15	27.76 ± 3.05	27.00	24	36	
• Sex					
Male	27.89 ± 2.27	28.00	24.0	34.0	$p^{(2)}$= 0.977
Female	28.00 ± 2.85	27.00	22.0	36.0	
• Failed school					
Yes	26.33 ± 1.83	26.50	24	29	$p^{(2)}$ =0.015
No	28.16 ± 2.53	28.00	22	36	
Number of residents per home					
3 to 4	29.40 ± 2.83 (A)	28.50	25	36	$p^{(1)}$< 0.001
5 to 6	27.09 ± 1.68 (B)	27.00	22	31	
7 to 8	26.57 ± 1.87 (B)	26.50	24	29	

(1): Kruskal-Wallis for paired comparisons; (2): Mann-Whitney test; Different superscript letters denote significant difference between corresponding categories.

Table 3. DMFT index (total and components) according o socio-demographic variables, Recife, PE, Brazil, 2013.

Variable	Decayed	Missing	Filled	DMFT
	Mean ± SD (Median)	Mean ± SD (Median)	Mean ± SD (Median)	Mean ± SD (Median)
• Total group	1.11 ± 1.15 (1.00)	0.28 ± 0.59 (0.00)	0.84 ± 1.32 (0.00)	2.23± 1.90 (2.00)
• Age				
11	0.90 ± 0.97 (1.00)	0.10 ± 0.31 (0.00)	0.75 ± 1.29 (0.00)	1.75 ± 2.10 (1.00)(A)
12	0.88 ± 0.82 (1.00)	0.19 ± 0.49 (0.00)	0.54 ± 0.99 (0.00)	1.62 ± 1.20 (2.00)(AB)
13	1.17 ± 1.24 (1.00)	0.46 ± 0.66 (0.00)	0.71 ± 1.27 (0.00)	2.33 ± 1.66 (2.00)(AB)
14 and 15	1.41 ± 1.40 (1.00)	0.34 ± 0.72 (0.00)	1.28 ± 1.58 (0.00)	3.03 ± 2.23 (3.00)(B)
p-value	(1) = 0.505	$p^{(1)}$ = 0.126	$p^{(1)}$ = 0.288	$p^{(1)}$ = 0.042
• Sex				
Male	1.16 ± 1.28 (1.00)	0.27 ± 0.62 (0.00)	0.57 ± 1.19 (0.00)	2.00 ± 1.84 (2.00)
Female	1.05 ± 0.97 (1.00)	0.30 ± 0.56 (0.00)	1.19 ± 1.42 (1.00)	2.53 ± 1.97 (2.00)
p-value	p(2) = 0.962	p(2) = 0.526	p(2) = 0.008*	p(2) = 0.162
• Failed school				
Yes	1.75 ± 1.76 (1.00)	0.67 ± 0.98 (0.00)	2.08 ± 1.78 (2.00)	4.50 ± 2.02 (4.50)
No	1.02 ± 1.02 (1.00)	0.23 ± 0.50 (0.00)	0.67 ± 1.16 (0.00)	1.92 ± 1.67 (2.00)
p-value	p(2) = 0.174	p(2) = 0.061	p(2) = 0.003	p(2)< 0.001
Number of residents per home				
3 to 4	0.45 ± 0.64 (0.00)(A)	0.08 ± 0.27 (0.00)(A)	0.25 ± 0.74 (0.00)(A)	0.78 ± 0.97 (0.50)(A)
5 to 6	1.51 ± 1.10 (2.00)(B)	0.27 ± 0.50 (0.00)(A)	0.84 ± 1.13 (0.00)(B)	2.62 ± 1.27 (3.00)(B)
7 to 8	1.71 ± 1.54 (1.00)(B)	0.93 ± 1.00 (1.00)(B)	2.50 ± 1.79 (3.00)(C)	5.14 ± 1.70 (5.00)(C)
p-value	p(1)< 0.001	p(1)< 0.001	p(1)< 0.001	p(1)< 0.001

(1): Kruskal-Wallis for paired comparisons; (2): Mann-Whitney test; Different superscript letters denote significant difference between corresponding categories.

Discussion

The mean DFMT index in the present study was in agreement with data reported in the 2010 Brazilian National Oral Health Survey, as the mean for 12-year-olds was 1.62 in the present investigation and 1.66 in the national survey. There are no parameters for comparison of ages 11, 13 or 14, as the national survey only involved adolescents aged 12 and 15 to 19 years. Regarding 15-year-olds, the present finding differs from the figure reported in the national survey – 3.03 and 3.90 respectively. However, the figure reported herein falls within the confidence interval found in the national survey (95% CL: 2.59 to 5.22) [21]. Regarding the DMFT for 12-year-olds, the decayed component was the highest (0.88), followed by the filled component (0.54) and the missing component (0.19). These findings are in agreement with the data reported in the 2010 national survey for the same age group, which not only observed a higher value for the decayed component but also detected the same value for the filled component (0.54).

The results presented a positive association between higher SOC and lesser dental caries experience, which is in agreement with data described in previous investigations [15,22-24]. The authors of a pioneering study found that SOC was associated with dental caries, periodontal disease, oral hygiene and oral health behaviors, with a high SOC score constituting an important psychosocial factor related to oral health [15]. Subsequent studies also indicated a high SOC score to be a determinant factor of oral health [22-25].

Virtually no difference in SOC score was seen between male and female ($p = 0.977$), which is in disagreement with the findings of a previous study, in which an association favoring males was reported [26]. The SOC was associated with school failure, which is in agreement with findings described in previous studies that report a better academic performance related to a higher SOC [27].

Considering the homogeneity of the sample, it was not possible to compare socioeconomic factors. However, previous studies have reported that a better socioeconomic status in childhood exerts an influence on a higher SOC in adulthood. This statement has been proven in studies on oral health behaviors, revealing that adolescents who are more economically privileged have a higher SOC and adopt better health-related habits [15,28]. Other studies have demonstrated associations with dental caries and demographic/socioeconomic factors, reporting that one's living conditions exert a direct influence on the motivation to adopt adequate oral health behaviors [29,30].

In the present study, the mean DMFT score and the score of each of its components – decayed, missing and filled teeth – increased with the number of residents per home. Indeed, one's place of residence and number of individuals in the home can affect one's health status. The authors of a previous study found that residents of areas with poorer living conditions and a greater number of individuals per home generally exhibit poorer oral health [31]. Other studies have also reported an association between household overcrowding and a poorer health status, [32] concluding that the psychological predisposition of children and family environment can exert a significant influence on tooth brushing habits [33]. Moreover, poorer social conditions are likely associated with fewer

opportunities regarding access to illness prevention, control and treatment, thereby leading to a poorer health status. Thus, socio-demographic aspects can determine the capacity to perceive adverse health conditions and the limitation that such conditions impose [34].

The main limitation of the present study is associated with the intentional sampling, which reduces the external validity and extrapolation of the results. However, this type of sample selection is justified in the exploratory stage of a study, as it serves as the basis for the establishment of hypotheses and it is satisfactory regarding the purpose of the present investigation.

Conclusion

Findings of the present study demonstrate a negative correlation between SOC and dental caries experience among the analyzed adolescents, which highlight the importance of the Theory of Salutogenesis as a new way of focusing in health practices. Thus, SOC can work as an alternative in multidisciplinary intervention to identify potential problems. As a result, SOC can act as a source of information, providing subsides for the establishment of governmental prevention and interventions programs related to oral health as well as for the adoption of new practices regarding health promotion.

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