Self-esteem and oral health behavior in adolescents

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Abstract *This study investigated the mediation of self-esteem in adolescents' oral health behaviors. The Rosenberg self-esteem scale was used to assess self-esteem, whereas data from socio-demographic and behavior characteristics were analyzed by questions validated in previous surveys. The teenagers had good oral health behavior, except unhealthy diet. The number of adolescents with high self-esteem was a lot smaller than those with low self-esteem. The use of dental services, even when associated with high self-esteem, lost significance after being adjusted by sex, age and tooth brushing frequency. Nevertheless, multiple logistic regression analysis, using unadjusted estimates and adjusted with their respective Confidence Intervals of 95%, showed a relationship of self-esteem with age (p-value=0.001) and tooth brushing frequency (p-value=0.019). Regardless of the sex, students over 16 years old with high self-esteem brush their teeth more often, having probably better oral health. These results confirm the modulation of self-esteem in oral health, and then it is necessary the analysis and the use of these psychosocial factors in the young oral health care.*

Keywords *Self-esteem, Health behavior, Oral health, Adolescent.*

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Introduction

The gradient in the relationship between health issues and socioeconomic factors was established at the end of the last century by Marmot et al.[1] in emphasizing the importance of how people had control over their lives in health outcomes. That is, diseases and health behaviors are not just consequences of the economic circumstances of the labor function exercised. However, decision-making power, work environment, control, satisfaction and social support are mediators of health behaviors and conditions[1-4].

Although many oral health jobs that try to investigate oral health conditions from behaviors, few studies work with psychosocial factors, and even fewer are those working in homogenous populations. Thus, we aim to elucidate whether psychosocial factors are responsible for differences in oral health behaviors of a population of socioeconomically homogeneous students.

In adolescence, intense biopsychosocial modifications place adolescents in one of the groups that are most vulnerable to social[5-8] and health[8,9] problems. Habits acquired in this period have repercussions on future dimensions, such as diet, self-image, individual health, values, preferences and psychosocial development[10].

At this stage, times of neglect with health care become commonplace. While behaviors that contribute to oral health maintenance are reduced[11], the prevalence of alcohol and tobacco use becomes alarming and affects the health of these young people[8,11-14].

Studies have highlighted the association between health habits, such as oral[15,16] and general[17] hygiene, use of dental services[18], use of drugs, cigarettes and alcoholic beverages[19], with psychosocial factors[17,20]. Among these, self-esteem may be related to health practices and stress mechanisms, which expose adolescents to increased physical risks and psychological disorders[21-23].

Due to changes caused by adolescence, this is the stage in which self-esteem assumes the most significant proportions, with consequences that can change health behaviors for the rest of the individual's life, which makes self-esteem an essential predictor of results in adolescents and young adults studies[24].

In addition, although some investigations indicate that high self-esteem is associated with life satisfaction, fewer health problems, more frequent brushing and visits to the dentist and fewer impacts on adolescents' oral health[21,25], and that unstable self-esteem increases risks for oral health[26], the explanations pointed out by the studies are rare and inconsistent when seeking to identify the associations between self-esteem and oral health behaviors among adolescents.

Considering the above, the hypothesis that psychosocial factors influence health, and the lack of research on oral health with a socioeconomically homogeneous population, this study aims to investigate the mediation of self-esteem in oral health behaviors of adolescents due to their sociodemographic characteristics.

Methods

This is a cross-sectional, analytical study with a quantitative approach and is part of the second stage of the epidemiological survey "Association between psychosocial factors and oral health," conducted in 2014, with adolescents aged 14-19 years enrolled in public schools of the Municipality of São Lourenço da Mata, Pernambuco.

The city of São Lourenço da Mata was selected as a development center for the Metropolitan Region of Recife, starting with the installation of the Pernambuco Arena Complex and significant real estate investments, which may affect the living conditions of the adolescent population. One of the oldest cities in Brazil, the municipality is located 16 km from the capital of Pernambuco. It has an area of 262 km² and population density above 392 inhabitants/km². Around 92% of its 102,895 inhabitants reside in the urban area. Essential data from São Lourenço da Mata's economy include the growing service and industries sectors, a Gross Domestic Product (GDP) per capita of R$ 5,369.34 and the average Municipal Human Development Index (HDI) of 0.653[27].

The sample was calculated considering the oral health outcomes investigated in a previous study[28] and the epidemiological survey in which this study is nested[29-32]. Among these outcomes, dental pain had the lowest prevalence, with 20%. Thus, by statistical definition, everything that is > 20% is shown in this set.

Therefore, to calculate the sample size, in the study as a whole, the two-way comparison formula was used, a ratio of 1:1 between groups, with an expected prevalence of 20% of dental pain in this population, test power of 80%,

random error of 2.5% and confidence interval (CI) of 95%. The Epi Info 6 calculation program was used.

We chose to work with adolescents from public schools to obtain a sample considered homogeneous from the socioeconomic viewpoint. According to data provided by the Municipal Education Secretariat, during the period of collection, the public education network had 49 municipal schools (between schools and kindergartens) and eight state schools. The number of students enrolled in the final years of elementary school and high school totaled 8,393 in the public network and 1,464 in the private network[31].

Eleven public schools that had students of the age group required by the research participated in the study and consisted of a sample of 1,154 students, representing a response rate of 81.5% of the sample calculated initially. Each school contributed proportionally to the number of students enrolled in the research age, thus establishing a proportionality quotient.

A randomized draw was conducted from the nominal list of students from the first name of the list, alternating a selected adolescent with an unselected one, excluding the 12th name. Subjects with impaired comprehension to answer the questionnaire were excluded from the study.

A self-administered questionnaire was used to collect data, consisting of valid scales used in other large surveys[34-36], which took place held in the schools' premises, after a previous explanation of the objectives and methods of the study, and all issues were clarified at the time of the survey. The questionnaires were reapplied to every ten participants to perform data quality control. The results showed an acceptable level for the retest analyses ($r > 0.8$).

The psychosocial factor was selected as a dependent variable and measured by the analysis of the "self-esteem" component, which was evaluated according to the Rosenberg scale[32] that refers to adolescents' level of own appreciation or valuation, through adverse situations or not, enabling their confidence vis-à-vis their actions.

This scale is considered a standard measure, due to its good psychometric properties and easy applicability. The version used here was proposed by Sbicigo et al. (2010)[34], translated into Portuguese, due to good internal consistency.It is a three-point Likert-type scale, to facilitate the understanding of adolescents (1 = disagree, 2 = neither agree nor disagree, 3 = agree), with 10 questions, of which six assess positive feelings about the individual (I am generally satisfied with myself; I believe that I have many good qualities; I can do everything as well as other people; I feel that I am a person of value as other people; I have a positive attitude about myself, I have a reason to be proud in life), and four refer to a derogatory view (sometimes I believe I'm not good at anything; I'm ashamed of the way I am; sometimes I feel worthless; all in all, I feel like a failure)[34].

Given the non-normal distribution of the self-esteem variable, the need to establish a rule to evidence the risk factor of the study, and based on the knowledge that the dichotomization of categorical variables is random according to statistics, even with the risk of missing details, for the analysis, a binary variable was created from the use of the 75% percentile, and those with general value of the scale above this percentile were considered as high level of self-esteem.

The independent variables were ordered in two groups: the first one referred to sociodemographic data (gender, age, history of failure, family structure and birth order among siblings); and the second related to oral health behaviors (use of services, hygiene habits, healthy diet and tobacco and alcohol use).

Health behaviors were also dichotomized, based on favorable health standards and parameters used in the previous research[8,18,33], for the analysis of the influence of self-esteem in these habits, as described in Table 1.

Specifically, in the variables use of the dental services, oral hygiene and eating habits, the adolescent had to fit into at least one item to be classified in a specific category.

This measure was adopted because the independent variables were represented by many items. Thus, we created counting variables, evaluated the measures of central tendency and dispersion, and tested normality through the Kolmogorov-Smirnov test.

Since normality was not demonstrated and logarithmic and square tests were not adequate, we chose categorization from the median, since it is the most stable measure from the arithmetic viewpoint. The sample calculations of the dependent and independent variables studied were based on that found in another study[28].

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 18.0 (SPSS for Windows, version 18.0, USA). Percentage frequencies were calculated, and the respective frequency distributions of

Chart 1. Dichotomization of health behavior variables.

Health Behaviors		
Use of dental service	Regular	Access to the dentist–yes
		Time of visit to the dentist–less than one year
	Irregular	Access to the dentist-no
		Time of visit to the dentist–more than one year
Tooth brushing frequency	Regular	Brushes teeth- yes, every day
	Irregular	Brushes teeth- yes, but not every day; Brushes teeth- no
Oral hygiene habits	Regular	Brushes teethevery day
		Uses a toothbrush, toothpaste and dental floss for teeth hygiene
	Irregular	Does not brush teethevery day
		Use toothpick or something for teeth hygiene
Dietary habits	Favorable to oral health	Consumes refined carbohydrate-rich foods less than three days a week
		Consumes sugary foodless than three days a week
		Consumes industrialized beveragesless than three days a week
		Consumes coffee, natural juice, milk and teaat least once a day
		Consumes fruits, vegetables, and cerealsat least once a day
	Notfavorable to oral health	Consumes refined carbohydrate-rich foods at least once a day
		Consumes sugary foodat least once a day
		Consumes industrialized beveragesat least once a day
		Consumes coffee, natural juice, milk, and tealess than three days a week
		Consumes fruits, vegetables, and cerealsless than three days a week
Tobacco use	Lower risk	Not smoking
	Higher risk	Smoking
Alcohol use	Lower risk	Not drinking alcoholic beverages
	Higher risk	Drinking alcoholic beverages

sociodemographic and behavioral data were constructed. Also, the prevalence of the self-esteem level of the evaluated students was calculated.

The Chi-square test was applied for independence to evaluate the influence of self-esteem on students' oral health behaviors. The Fisher's Exact test was applied in cases where the assumptions of the chi-square test were not satisfactory. All conclusions were drawn considering the level of significance of 5%.

In the multiple logistic regression analysis, only the variables that showed significance in the bivariate analysis were considered, except for gender. This was maintained due to its importance shown by the theoretical model. The variables entered the model by blocks through the ENTER method, and the consistency of the models was evaluated by the Hosmer-Lemeshow test, and the unadjusted and adjusted estimates were shown with their respective 95% CI. The rigor in the entry of variables for this analysis and concern to perform the adjustment were employed to minimize the overestimating effect of the logistic regression.

The research was conducted in accordance with ethical principles, as per Resolution No. 466/2012 of the National Health Council (CNS), and was approved by the Research Ethics Committee of the Federal University of Pernambuco (CEP/UFPE). Students participated in the study by signing the Informed Consent Form (ICF), for those aged 18-19 years. Minors were asked to sign the Clarified Assent Form, in addition to the signing of the ICF by the person in charge.

Results

Regarding the study, of the 1,154 adolescents participating in the study, aged 14-19 years, the highest proportion was female (53.5%), aged less than 16 years(52.1%), were never failed at school (56.1%), lived in a nuclear family (55.1%) and were the first in the birth order of their family (45.3%).

Concerning oral health behavioral factors, we found that most students brush their teeth every day (96.6%), have access to dental care (92.9%), went to the dentist less than a year ago (54.2%), with a possible carious (48.4%) or darkened tooth (39.9%) were the main reasons for these consultations. In oral hygiene, the principal used items were toothbrush (96.5%), followed by toothpaste (83.5%) and dental floss (50.8%). Also, the highest proportion of students did not have a good diet concerning the consumption of snacks, sweets, industrialized beverages, coffee/milk, tea and fruits/vegetables (96.0%). However, it is noted that most students do not smoke (98.7%) and those who do smoke, doso only once a day (40.0%), just as among the 6.4% who use alcohol, contact occurs only once a week (88.1%).

Regarding the level of self-esteem, we observed that the prevalence of adolescents with high self-esteem was lower (24.1%) than those with low self-esteem. The distribution of the self-esteem level according to the sociodemographic factors of the adolescents interviewed is shown in Table 1. It is noteworthy that, among these factors, only age showed significance (p-value<0.001), even when noting the lowest proportion of association between sociodemographic factors and the high level of self-esteem.

The distribution of oral health behaviors according to the level of self-esteem is described in Table 2. We found that the level of self-esteem was significant only in the factor tooth brushing frequency (p-value = 0.004) and use of dental services (p-value = 0.033). We also observed that there was a higher prevalence of students who do not brush their teeth every day and show a higher prevalence of irregular use of dental services in the group with low self-esteem. There were no significant differences in oral health habits among the low and high self-esteem groups for the other factors.

The adoption of variables gender, age, use of services and tooth brushing in the multiple logistic regression model, after adjustment, evidenced the significance of the influence of self-esteem on age (p-value = 0.001) and regular brushing (p-value = 0.019), as well as the loss of the statistical value of the frequent use of dental services (p-value = 0.110) (Table 3).

Discussion

In this study, it was possible to establish an association between self-esteem and oral health behaviors through reports of students aged 14-19 years, with similar socioeconomic characteristics. It should be noted that adolescents with higher self-esteem showed more favorable behaviors to their oral health when compared to their peers with lower self-esteem, with a significant correlation between brushing frequency and age. This finding was achieved after the characterization of the studied population, concerning the patterns of self-esteem, oral health-related sociodemographic and behavioral characteristics.

In considering public schools as an indicator of socioeconomic hegemony, in which a hierarchy is established associated with psychosocial factors that affect health behaviors[1-4], we alert the need to understand the adolescents' current environment, the psychosocial factors involved, and then understand and stimulate the adoption of better oral health habits.

The biopsychosocial challenges experienced by adolescents have positive or negative results that influence the level of self-esteem[24,35]. In our study, we found results similar to those found in New Zealand students[23], where the lowest proportion of participants showed high self-esteem and warned how adolescence could threaten the level of this psychosocial factor.

We found that students older than 16 years of age had a high level of self-esteem when compared to younger adolescents. This result is close to the one found in longitudinal studies that point to a positive evolution of self-esteem between adolescence and adulthood, becoming stable over the years[35,36]. This finding confirms the hypothesis of the construction of self-esteem by Rosenberg[32], which shows that this feeling is the product of transitions from human development and shows that it is paramount to work with a more significant commitment to self-esteem in younger subjects.

Other sociodemographic factors have been associated with self-esteem levels. Although we found that the highest proportion was femaleamong the adolescents with a high level

Table 1. Distribution of self-esteem level according to sociodemographic factors of adolescents enrolled in public schools in São Lourenço da Mata (PE), Brazil.

Factor assessed	Level of self-esteem		P-value[a]
	Low	High	
Gender			
Male	408(77,7%)	117(22,3%)	$\chi^2 = 1,794$
Female	454(74,3%)	157(25,7%)	p = 0,180
Age			
< 16 years	472(80,3%)	116(19,7%)	$\chi^2 = 13,404$
≥16 years	383(70,9%)	157(29,1%)	p<0,001[b]
Failure history			
Yes	338(73,5%)	122(26,5%)	$\chi^2 = 2,711$
No	492(77,6%)	142(22,4%)	p = 0,258
Sometimes	27(79,4%)	7(20,6%)	
Family structure			
Nuclear family	476(76,3%)	148(23,7%)	$\chi^2 = 0,122$
Non-nuclear family	386(75,4%)	126(24,6%)	p = 0,727
Birth order			
First	383(75,1%)	127(24,9%)	$\chi^2 = 1,351$
Second	258(76,8%)	78(23,2%)	p = 0,853
Third	119(77,3%)	35(22,7%)	
Fourth	78(76,5%)	24(23,5%)	
Dont know	17(68,0%)	8(32,0%)	

[a]P-value of the Chi-square test for independence.
[b]If p-value <0.05, the factor evaluated influences the level of self-esteem.

Table 2. Distribution of dichotomized oral health behaviors according to the level of self-esteem of adolescents enrolled in public schools in São Lourenço da Mata (PE), Brazil.

Factor assessed	Level of self-esteem		P-value
	Low	High	
Brushes teeth	814(75,1%)	270(24,1%)	p = 0,004[c]
Yes, every day	36(94,7%)	2(5,3%)	
Yes, but not every day	1(100,0%)	0(0,0%)	
No			
Oral hygiene habits			
Regular	368(73,6%)	132(26,4%)	$\chi^2 = 2,537$
Irregular	494(77,7%)	142(33,3%)	p = 0,111[a]
Use of dental services			
Regular	408(73,1%)	150(26,9%)	$\chi^2 = 4,571$
Irregular	454(78,5%)	124(21,5%)	p = 0,033[a, b]
Diet			
Favorable to oral health	34(75,6%)	11(24,4%)	$\chi^2 = 0,003$
Not favorable to oral health	828(75,9%)	263(24,1%)	p = 0,959[a]
Tobacco use			
Lower risk	847(75,8%)	271(24,2%)	p = 1,000[c]
Higher risk	12(80,0%)	3(20,0%)	
Alcohol use			
Lower risk	807(76,1%)	254(23,9%)	$\chi^2 = 0,446$
Higher risk	53(72,6%)	20(27,4%)	p = 0,504[a]

[a]P-value of the Chi-square test for independence.
[b]If p-value <0.05, the factor evaluated influences the level of self-esteem.
[c] P-value Fisher's Exact test.

Tabela 3. Multiple logistic regression results.

Factor assessed	Unadjusted Odds (95% CI)	p-value	Adjusted Odds (95% CI)	p-value
Gender				
Female	1,21(0,92-1,59)	0,181	1,14(0,86-1,50)	0,374
Male	1		1	
Age				
≥ 16 year	1,67(1,27-2,20)	0,000[a]	1,64(1,24-2,16)	0,001[a]
< 16 year	1		1	
Use of dental services				
Regular	1,35(1,02-1,77)	0,033[a]	1,26(0,95-1,66)	0,110
Irregular	1		1	
Tooth brushing frequency				
Regular	6,14(1,47-25,62)	0,013[a]	5,56(1,33-23,36)	0,019[a]
Irregular	1		1	

[a] If p-value < 0,05, the factor evaluated influences the level of self-esteem.

of self-esteem, studies surveyed did not point to a final analysis. The inequality of the level of self-esteem between genders may be related to the difference in the primary source of self-esteem, in which women are more influenced by social relationships, and men, by success in social pursuits[26,35,36].

We also did not find a significant relationship between self-esteem and school and family relationships, which stirs the questioning of the real effect of these relationships on self-esteem, since there is evidence of positive repercussion when young people are inserted in a structured family[37] and have not been failed at school[35]. However, school performance deserves particular attention because it reflects on self-acceptance, confidence and, consequently, social performance[22]. That is, it is believed that adolescent self-esteem is supported in the feedback of essential people, and when these relationships increase self-esteem, they also enhance the feeling of competence of coping with events, such as their oral health problems[39].

During the investigation of the modulation of self-esteem on oral health behaviors, it was possible to identify that this psychosocial factor interferes significantly with the positive behaviors of tooth brushing. In this study, adolescents with a high level of self-esteem reported brushing their teeth more frequently. An equivalent ratio was found by Kneckt et al.[40] when verifying that self-esteem can determine adherence to oral health behaviors. Also, Honkala et al.[15] believe

that the lack of concern for personal appearance is the explanation for the apparent decline of tooth brushing among Kuwaiti students, who mentioned feelings of unhappiness, loneliness, social exclusion and relationship difficulties.

It was also possible to verify, through the regression, that the importance of the use of the dental services decreased in relation to the period of adolescence and the healthy habit of oral hygiene. This finding may be justified by the inverse relationship between those with better oral health habits and those who seek dental services more frequently.

Also, recognizing the existence of a higher risk for oral health among people with unstable self-esteem, this feeling also did not influence the frequency of dental consultations and the main reason for this consultation among Romanian students questioned by Dumitrescu et al.[26]. The same happened when these same authors tried to find an association of these behaviors with self-control and self-confidence[16].

Other behaviors studied, common in adolescence and that caught our attention, were the consumption of oral health-adverse foods and tobacco and alcohol use. Although it is well established in the literature that these habits show health risks, including oral health[41,42], the power of psychosocial factors on them is still divergent. Our results did not show associations between self-esteem and tobacco and alcohol intake. However, some studies relate the feeling

of stigmatization of smokers to low levels of self-esteem[43,44], and others point to high self-esteem as a protective factor of smoking[26,35].

In another study, alcohol appears to play a tobacco-like role. While young people with low self-esteem reported drinking more to escape unhappiness, those with high self-esteem justified the higher consumption of alcoholic beverages by the need to minimize their vulnerability among the social group during recreational moments[44]. The lack of clear associations in this study is perhaps related to the involvement of different grouped phenomena and the young person's mistrust when exposing their risk attitudes, usually marginalized by the population.

The incoherent answers should not have been repeated in the report of the eating habits, since the more significant proportion of the adolescents who participated in this research admitted the consumption of foods not favorable to oral health in their diets, regardless of the degree of self-esteem. However, this association must be investigated better, through a more specific measure, since it stems from a counting variable. Also, attention is paid to the dietary motivations of these young people, since the relationship between self-esteem and eating disorders is very consistent. For example, among Swedish students, high self-esteem interfered positively with healthy food choices[39].

The interpretation of our results should take into account the methodological limitation that the sample is not representative of the population in general. Because it is a school-based study conducted in the public network, the universalization of results for adolescents 14-19 years of age is compromised. Thus, the possibility of generalizing the findings of the present study should be tested, replicating them in other populations.

Nevertheless, this methodology has been adopted in numerous researches, due to the easy access to this population group and the benefits derived from the study, which allows the integrated planning of the health and education sectors with the targeted audience.

It is believed that the evidence shown in this study can help identify the most vulnerable subgroups and, consequently, in the decision-making and planning of appropriate intervention strategies. Also, they may lead to the development of further investigations.

Thus, our findings emphasize the need for intervention studies that seek to improve the sense of self-esteem in adolescents. Thus, data generated will considerably enhance the understanding of the influence of this psychosocial factor on oral health and will serve as a support for dental and non-dental professionals in their decisions, conception, and development of protocols for effective health promotion among young people.

Also, our findings raise questions that can be clarified in future studies. Concerning them, we recommend studying the consequences of modulating self-esteem in oral health behaviors; and the possible factors involved, such as the different realms of social support, body perception, aesthetic valorization, socioeconomic factors, and leisure and employment activities.

These suggestions may be better sized if included in longitudinal follow-up studies so that the impact of these factors can be better understood during the different age groups, and thus, plan specific actions to the needs of each group, improving the care provided and the quality of life of the population.

The results of this study confirm the modulation of self-esteem on adolescents' oral health behaviors and validate our model. In the face of a socioeconomically homogeneous population, regardless of gender, students over 16 years of age and with high self-esteem brush their teeth more frequently, acquiring possibly better oral health.

Thus, we emphasize the relevance of psychosocial factors as mediators of oral health, and it is necessary to elevate the self-esteem of young people to improve their oral health behaviors, which makes the analysis and the exercise of psychosocial determinants in oral health of adolescents essential parts for effective health promotion and prevention.

Colaborations

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