Original Article

Correlation between malocclusion and history of bullying in vulnerable adolescents

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ABSTRACT

Objectives: To assess the correlation between malocclusion and a history of bullying.

Materials and Methods: A cross-sectional study of 494 adolescents aged 12 to 15 years was conducted. The National School Health Survey questionnaire (PeNSE 1 and 2) was used to determine history of bullying by identifying the victim and the abuser. Variables were evaluated based on the individual (age), environment (income, father's and mother's education, housing, government assistance, and parents' occupation), social and emotional well-being (CPQ11–14 domains), self-perceived need for orthodontic treatment, and clinical conditions (crowding, diastema, maxillary and mandibular overjet, and anterior open bite). Data were analyzed by Spearman correlation and by multivariate analysis, which allowed graphical representation of the eight variables studied in only two dimensions.

Results: There was no correlation between bullying and variables related to the individual and the environment. Maxillary overjet and self-perception related to the need for orthodontic treatment were important to explain the data variability.

Conclusions: Malocclusion did not correlate with bullying history. However, increased maxillary overjet influences adolescent self-perception, suggesting a potential condition for bullying events. (*Angle Orthod.* 2022;92:677–682.)

KEY WORDS: Bullying; Malocclusion; Epidemiology

INTRODUCTION

The high prevalence of malocclusion during adolescence is a public health problem with physical and psychosocial implications.[1–5] As a result, the visible esthetic impact of malocclusion directly influences the way people see themselves, often hindering integration into their social environment.[3,5–7] In addition to functional and esthetic limitations, quality of life can also be affected.[8]

Self-esteem, well-being, and the ability to socialize may be associated with episodes of bullying.[9–11] Bullying represents a form of aggressive, violent, and repetitive behavior, especially in the context of school, affecting the social life of victims.[12] This event is observed in a veiled and routine way, and it can manifest itself through physical or verbal aggression and manipulation of social relationships, such as exclusion of the individual.[13]

Different groups can be identified in bullying contexts. The aggressors have a hostile and dominant profile and, in contrast, the victims are more depressed, anxious, and insecure, with low self-esteem and a more introspective behavior.[14] A third group can also be identified who are, concurrently, aggressors and victims, generally presenting extroverted and aggressive behavior.[14–16]

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In the adolescent population, there is significant judgment of physical aspects such as occlusal conditions, which may trigger bullying. Malocclusion can be a source of nicknames, harassment, or teasing, with emotional and social impact.[15,17] Dental characteristics such as increased overjet, crowding, deep overbite, and caries experience have already been described in the literature as targets of bullying.[11,14,18]

In this context, malocclusion must be studied in addition to functional limitations, as dental characteristics are a potential target for bullying among adolescents.[11,19,20] Additionally, there is a lack of results from studies in which variables were studied together in a simultaneous dependence relationship. Understanding the correlation between the social profile of aggressors and victims with a particular occlusal feature resulting in episodes of bullying would promote understanding of the facts for an appropriate approach.[21,22] The purpose of this study was to determine correlations between malocclusion and history of bullying in adolescents. This study was aimed at answering the following question: can clinical conditions and the environment potentiate bullying episodes?

MATERIALS AND METHODS

This study was approved by the Human Research Ethics Committee of Brazil (No. 72059517.50000.5385). Informed consent was obtained from parents and subjects before data collection. The study was conducted in Estiva Gerbi (São Paulo, Brazil) and involved adolescents 12 to 15 years of age. Estiva Gerbi has an estimated population of 11,407 inhabitants and a human development index of 0.74. Data from the municipality's officials (São Paulo Social Vulnerability Index) were used to determine the social vulnerability groups. The adolescents who participated in the study belonged to a group of low and very low social vulnerability.

Adolescents from all four public schools with the target age were selected. The study included only individuals with complete permanent dentition and no current or previous orthodontic treatment. Adolescents with apparent mental and/or physical disabilities that made interviewing or clinical data collection impossible were excluded. After applying the selection criteria, 494 adolescents were selected, which provided a test power greater than 80%, an effect size of 1.5, and a significance level of 5%.

A questionnaire was previously sent to parents or guardians with information about the family's socioeconomic conditions: family income, parents' education, government assistance, and type of housing.

Data were evaluated based on the individual (age), environment (income, father's education, mother's education, housing, government assistance, and parents' occupation), bullying, adolescents' emotional and social well-being, self-perception of need for orthodontic treatment, and clinical conditions (crowding, diastema, maxillary overjet, mandibular overjet, and anterior open bite). The application of the instrument and clinical examinations were carried out at the school.

Bullying was assessed according to the questionnaire used in the National Survey of School Health (PeNSE)[23], which identified individuals who suffered and those who practiced bullying. Bullying was identified using the following question (PeNSE1): "In the past 30 days, have any of your classmates bullied or made fun of you so much that you got hurt/angry/upset?" The second question (PeNSE2), "In the last thirty days, have you ever bullied or made fun of some of your classmates?" identified the bullying practitioners. For both questions, the answer options were: (1) never; (2) rarely; (3) always or almost always. The answers were obtained by interview. The variable was dichotomized for victim/practitioner as presence of bullying (always or almost always) or absence (never or rarely).

The CPQ11–14 (Child Oral Health Quality of Life Instrument) was used to assess oral health-related quality of life.[24,25] CPQ11–14 has 37 questions, divided into four main domains: oral symptoms, functional limitation, emotional well-being, and social well-being, with five answer alternatives on the Likert scale.[24] For data analysis, only the emotional well-being and social well-being domains were used. The final result was obtained by summing the answers to the questions. Higher scores indicated an impact on emotional and social well-being domains.[24]

The esthetic component (AC) of the Orthodontic Treatment Need Index (IOTN)[26] was used to assess self-perceived need for orthodontic treatment. IOTN-AC uses a scale of dental attractiveness illustrated by 10 color photographs along a decreasing and continuous level of attractiveness. Image 1 is the most attractive dental arrangement and 10 is the least attractive.[26] Adolescents performed the assessments, identifying the degree of esthetic compromise in the scale images considered similar to their smile. Images 1 to 4 were related to adolescents with little or no need for orthodontic treatment (grades 1 and 2); images 5, 6, and 7 showed a moderate need (grade 3); and images 8, 9, and 10 showed a severe need (grades 4 and 5). For data analysis, adolescents were categorized into low need (grades 1 and 2) and high need for orthodontic treatment (grades 3, 4, and 5).[27]

The malocclusion evaluation was based on the Dental Aesthetic Index (DAI).[28] In the present study, for analysis purposes, the DAI was not calculated

mathematically. The following DAI components were used separately: anterior crowding, a median diastema, maxillary overjet, mandibular overjet, and anterior open bite. Crowding was considered when the space between the right and left canines was insufficient to accommodate the four aligned incisors in the upper and lower arches. The presence of crowding was measured in millimeters; data analysis used the actual measurement.[28] A midline diastema between the permanent maxillary incisors was recorded in millimeters, from the height of contour or the point of greatest convexity on the proximal surface. The presence of a midline diastema was measured in millimeters; data analysis used the actual measurement.[28] Maxillary overjet was measured in millimeters as the distance between the buccal incisal edge of the most protruding maxillary incisor and the buccal surface of the corresponding mandibular incisor, with the periodontal probe placed in contact with the buccal surface of the mandibular incisor, parallel to the occlusal plane. Mandibular overjet was recorded when the mandibular incisors were in anterior crossbite and was measured in millimeters.[28] Maxillary and mandibular overjet were evaluated in millimeters; data analysis used the actual measurement.[28] Anterior open bite was evaluated in millimeters with a periodontal probe, from the middle of the incisal edge of the teeth involved; data analysis used the actual measurement.[28]

Training and Calibration

Clinical examinations were performed at the school, under natural light, with the aid of a millimeter probe, wooden spatula, and gauze by a single trained and calibrated examiner. Before the experimental phase, 16 hours (4 theoretical hours and 12 practical hours) of training were done. Another 4 hours were set aside for the calibration process to estimate the extent of the malocclusion diagnosis using the DAI. The interexaminer Kappa value obtained for DAI was 0.91.

Statistical Analysis

Spearman correlation analysis was performed between variables related to the individual (age), the environment (income, father's education, mother's education, housing, government assistance, and parents' occupation), bullying (PeNSE 1 and PeNSE 2), social and emotional well-being (CPQ11–14 domains), self-perceived need for orthodontic treatment (IOTN-AC), and clinical conditions (crowding, a diastema, maxillary overjet, mandibular overjet, and anterior open bite). A principal component analysis with clinical variables and bullying was performed in sequence. The multifactorial analysis synthesized the information contained in several original variables into a smaller set of new composite dimensions or statistical variables (factors). The multivariate analysis allowed graphic representation of the eight variables studied in only two dimensions, called principal components. These components are linear combinations of the original variables. All analyses were performed using the R software (R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

Four-hundred and ninety-four (494) adolescents were evaluated. Most were girls (61.95%), white (58.9%), and 14 years of age (53.5%). Adolescents were mostly from low-income families (50.8%), with a father and mother with low education (70.4% and 74.1%, respectively). A total of 35% of the families received government help, and 55.3% lived in houses that were rented. Clinically, crowding was observed in 49.2% of adolescents, diastema in 86.8%, maxillary overjet in 61.3%, mandibular overjet in 2.2%, and anterior open bite in 9.9%. In addition, 10.7% of adolescents perceived a need for orthodontic treatment. Many adolescents (56.5%) reported having suffered and practiced bullying (45.7%).

Figure 1 shows the regression coefficients for each combination of variables studied. The coefficients were very close to zero for the variables relating bullying to the others.

Figure 2 shows the correlation coefficients determined for each combination of variables studied. There was no correlation between bullying and variables related to the individual and the environment.

Figure 3 shows the factor loadings for the clinical variables (crowding, diastema, maxillary overjet, mandibular overjet, anterior open bite, and self-perceived need for orthodontic treatment), as well as for bullying. The graph expresses the relevance of each variable to the principal components. The combinations of the eight variables that constitute them aim to explain data variability. The first principal component explained the variation in the data (39.1%), and the second (orthogonal to the first) explained more than 27.9% of the variability. Thus, the two main components were able to explain 67.0% of the data variation. It can be observed that the maxillary overjet and self-perception related to the need for orthodontic treatment were important to explain the data variability, as they showed factor loadings close to the values +1 and −1, respectively. Meanwhile, the factor loadings of the bullying variables were close to the origin, which indicated that these variables had little relationship with the others and had little influence on the main components.

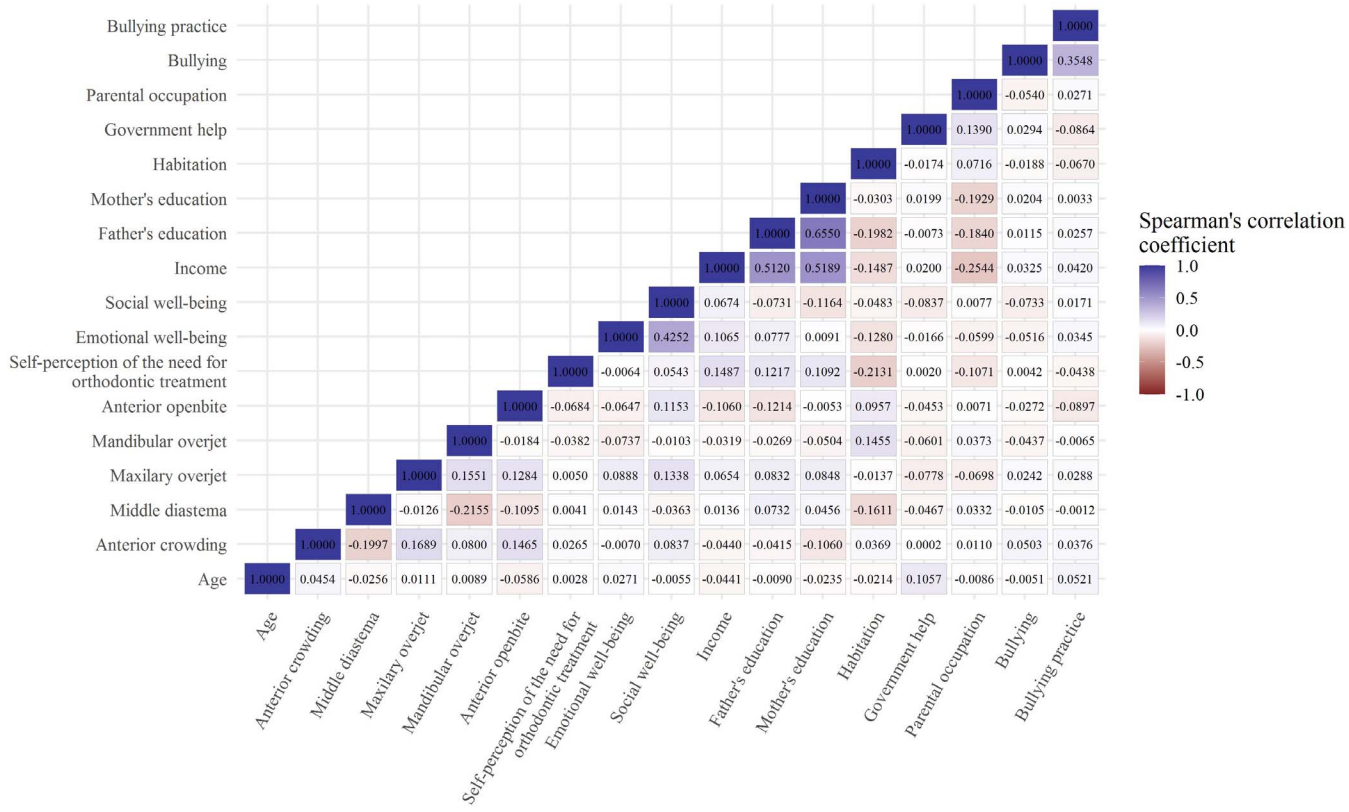

Figure 1. Spearman correlation coefficients between the studied variables.

DISCUSSION

The relationship between the environment and psychosocial conditions for bullying episodes in adolescents is naturally complex and, when clinical conditions are added, the challenge is even more significant. To answer this question, variables were correlated with simultaneous dependence. The correlation of variables and the identification of simultaneous dependency or interdependence relationships allowed identification of the most significant relationships to explain events. This study tested the hypothesis that the environment and clinical and psychosocial conditions in adolescents could explain bullying episodes. Therefore, history of bullying was correlated with variables related to the individual, the environment, bullying, social and emotional well-being, self-perception of the need for orthodontic treatment, and occlusal clinical conditions.

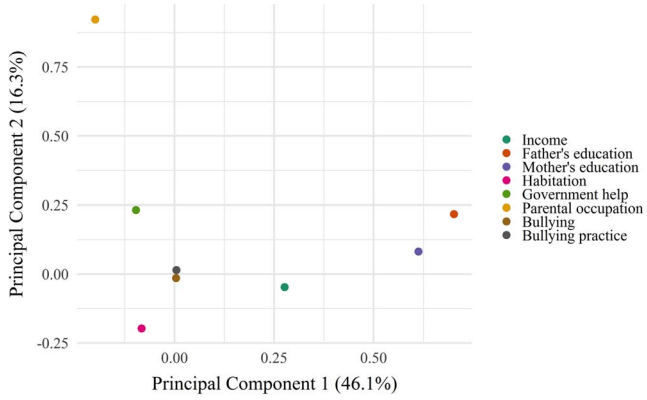

Figure 2. Factor loadings for the clinical variables and bullying.

There is no standard instrument to identify bullying.* Thus, PeNSE was chosen for this study because it is an instrument that identified the aggressor and the victim of bullying.[23] Additionally, interviewer training minimized any interpretation bias.[23] Bullying has a psychological impact on people's lives. Using the emotional and social well-being domains of the CPQ11–14[24,25] allowed assessment of the event's real impact since the instrument's general score could haves masked the possible result.

The findings showed that some adolescents reported being victims and aggressors in bullying episodes. In certain situations, victims are intimidated, and it is common for the victim to retaliate for aggression against the aggressor,[31] which may explain the results. Although the adolescents assessed reported bullying episodes, there was no correlation between individual and environmental variables, thus suggesting aspects

*References 4, 5, 8, 11, 13–15, 17, 19, 22, 23, 29, 30.

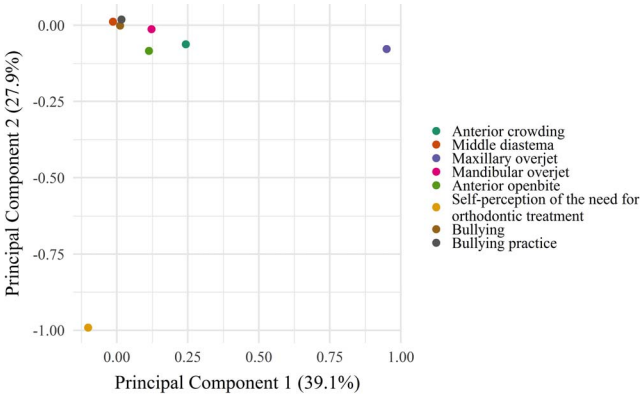

Figure 3. Factor loadings of principal component analysis with orthodontic variables.

related to emotional state. The study included a homogeneous population in a situation of social vulnerability, suggesting that events may have become common in the lives of adolescents.

The present study showed interesting correlations between the self-perceived need for orthodontic treatment and increased anterior overjet. This was in agreement with previous studies[4,29,30] and demonstrates that there is a growing awareness of malocclusion in individuals according to age.[32] This seems to be a triggering factor for bullying episodes. The literature, in general, reported that increased overjet was one of the occlusal conditions that most influenced the esthetics of the smile[29,33–36] and impacted oral health-related quality of life.[34,35,37,38] Thus, self-perception and increased maxillary overjet are important to explain the variability of the data. In addition, the need for orthodontic treatment had twice as much negative impact on oral health-related quality of life.[4]

In this context, the findings reinforced the clinical relevance of the theme. Anti-bullying policies must be effective in the school environment, which plays an essential role in supporting adolescents.

CONCLUSIONS

- Malocclusion was not correlated with bullying history. However, increased maxillary overjet influences adolescents' self-perception, suggesting a potential condition for bullying events.

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