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ARTÍCULO ORIGINAL

Orthodontic treatment needs in children and its relationship with gender, family income and ethnic groups

Necesidades de tratamiento ortodóncico en niños y su relación con el género, los ingresos familiares y los grupos étnicos

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ABSTRACT

Introduction: malocclusions are considered public health problems, needing an uniform method of assessment that prioritizes the attendance of individuals with greater orthodontic treatment need, with this purpose, the Index of Orthodontic Treatment Need has been used in many countries. **Objetive**: to evaluate the orthodontic treatment need in school going children, attending in Recife, northeast Brazil and also establishes its relationship with gender, family income and ethnic groups. **Methods**: 433 children, aged 6-12 years formed the sample. The dental health component grades it was recorded to define the orthodontic treatment need. **Results**: the findings revealed that 59.5 % of children had at least one type of malocclusion; 40.5 % had no need for orthodontic treatment (grade 1 and 2); 5.5 % were borderlines, indicating moderate need (grade 3); 54 % had definite treatment (grade 4), but no children were classified in grade 5. No statistically significant differences were found between genders (p= 0.217), family income (p= 0.176) and ethnic groups (p= 0.281). **Conclusion**: the most of the children had moderate and great orthodontic needs treatment. There was no association between orthodontic treatment need and gender, family income or ethnic groups.

Keywords: severity of illness index; malocclusion; epidemiology; public health; children.

RESUMEN

Introducción: las maloclusiones se consideran un problema de salud pública, que requiere un método uniforme de evaluación que priorice la asistencia de las personas con mayores necesidades de tratamiento de ortodoncia, para este fin, el Índice de Necesidad de Tratamiento Ortodóncico se ha utilizado en muchos países. **Objetivo**: evaluar la necesidad de tratamiento ortodóncico en niños en edad escolar que viven en Recife, noreste de Brasil, y establecer su relación con el género, el ingreso familiar y los grupos étnicos. **Métodos**: 433 niños de 6 a 12 años conformaron la muestra. Los datos obtenidos en el componente de salud dental fueron recodificadas para definir la necesidad del tratamiento ortodóncico. **Resultados**: los resultados revelaron que 59,5 % de los niños tienen al menos un tipo de maloclusión; 40,5 % no tenía necesidad de tratamiento de ortodoncia (grado 1 y 2); 5,5 % tenía una condición de frontera, lo que indica la necesidad moderada (grado 3); 54 % tenían un tratamiento definitivo (grado 4), y no hubo niños clasificados en el grado 5. No se encontraron diferencias estadísticamente significativas entre sexos (p= 0,217), ingreso familiar (p= 0,176) y los grupos étnicos (p= 0,281). Faculty of Dentistry: La mayoría de los niños tenían necesidad de tratamiento ortodóncico moderada o grande. No hubo asociación entre la necesidad de tratamiento de ortodoncia y el sexo, ingresos o grupos étnicos.

Palabras clave: índice de gravedad de la enfermedad; mal oclusión; epidemiología; salud pública; niños.

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INTRODUCTION

Following dental caries and periodontal disease, malocclusion is one of the most frequent oral health conditions important to report.[1] Because of the reduction of caries in children and adolescents in the recent decades, the world's attention changed focus to watch more closely difficulties related to peoples' occlusion.[2] Due to its high prevalence is considered a public health problem of brazilian population.3 However, is possible to prevent and treat this alteration, avoiding the damage that may cause as a negative social impact by interfering with quality of life of the individuals affected, harming their social interaction and psychological wellbeing.[4,5]

It is essential to monitor the distribution and severity of malocclusion in society and assess the relevant risk factors over time.6 To plan for the solution of any problem of public health should determine where an individual's problem causes more damages.7 Thus, you can develop a plan of action directed to those identified as having serious malocclusions and greater damage to their aesthetic and function. In Brazil, this is particularly important because the public institutions that provide this type of treatment, resources are insufficient to meet demand and, in this case, a system of prioritization is indicated.[3]

The Index of Orthodontic Treatment Need (IOTN) is integrate by the Dental Health Component (DHC) and an Aesthetic Component, described by Brook and Shaw (1989).8 About other methods, IOTN is objective, synthetic and compares different populations, besides being suitable for epidemiological research and policy planning.9,10 Early diagnosis of malocclusions, especially when performed in the mixed dentition can contribute to reducing the time and financial expenditures treatments subsequent orthodontic, sometimes more complex.[11]

Thus, the present study evaluates the orthodontic treatment needs of children in Recife targeting a large sample of 6–12-year-old children, using the IONT dental health component grades and also establishes its relationship with gender, family income and ethnic groups.

METHODS

This cross-sectional study was developed in the city of Recife, capital of Pernambuco, one of nine federal units that comprise the northeast region of Brazil.12 This study was conducted in full accordance with the World Medical Association Declaration of Helsinki. The research project was approved by the Ethics Committee in Research of the Pernambuco State University.

The inclusion criteria employed for selection of samples were:

Age group of 6-12 years: Children whose guardians authorized to participate in the study, signeted children whose guardians authorized to participate in the study by signing the informed consent.

No major local/systemic problems or trauma which affects the growth and development of facial structures or body.

No orthodontic or interceptive treatment carried out.

The sample size was calculated using the Epi Info 7 and was based on pilot study (malocclusion´s prevalence= 37.7 %). A sample error of 5 %, and a confidence interval of 95 % were adopted. The minimal sample size was determined to be 361 children from 6 to 12 years of age. However, the sample size was increased by 20 % to avoid losses, totaling 433 children.

The children were examined by three calibrated examiners (Kappa= 0.83) at the patio, under natural illumination. The examination followed the World Health Organization guidelines.13 For assessing dental occlusion examiners used latex gloves, dental mouth mirrors and millimeter rulers.

The occlusion was assessed following the orthodontic variables below and then was classified according to DHC of IOTN. As the index has some shortcomings, and within each grade includes different types of malocclusions according to their magnitude, to facilitate the framing of the malocclusions in different grades, they were subdivided into the following groups:

Angle´s Classes: Patients were classified according to molar and canine relationship for classes I, II and III.

Table 1. Prevalence of occlusal variables in the total sample (n= 433)

		No.	%	Male (n)	%	Female (n)	%	White (n)	%	Mulatto (n)	%	Black (n)	%
Angle's Classes	Class I	287	68,6	134	69,7	163	67,6	89	71,2	163	70,2	45	59,2
	Class II	86	19,9	37	19,2	49	20	27	21,6	40	17,2	19	25
	Class III	50	11,5	21	11,1	29	12,4	9	7,2	29	12,6	12	15,8
Overjet	Normal	317	73,2	140	72,9	177	73,4	98	78,4	172	77,1	47	65,2
	Overjet > 4 mm	86	19,9	37	19,2	49	20,3	19	15,2	48	20,3	19	26,4
	Edge to edge	22	5,1	11	5,72	11	4,56	7	5,6	11	4,66	4	5,55
	Crossbite	8	1,8	4	2,18	4	1,74	1	0,8	5	2,06	2	2,85
Overbite	Normal	294	67,9	159	65,9	135	70,3	89	71,2	159	67,4	46	63,8
	Edge to edge	32	7,4	19	7,8	13	6,7	9	7,2	18	7,6	5	6,9
	Open bite	36	8,3	24	9,9	12	6,3	10	8	19	8	7	9,7
	Deep bite	71	16,4	39	16,4	32	16,7	17	13,6	40	17	14	19,6
Posterior Crossbite	No	377	87,1	175	91,1	202	83,8	110	88	205	86,8	62	86,1
	Yes	56	12,9	17	8,9	39	16,2	15	12	31	13,2	10	13,9
	Unilateral	50	89,2	17	34	33	66	11	22	30	60	9	18
	Bilateral	6	10,8	1	16,7	5	83,3	3	50	1	16,6	2	33,4

Overjet and Overbite: Values between 0 and 4 mm were considered normal.

Posterior crossbite: Posterior crossbite was diagnosed when there was crossover of at least one tooth in the posterior segments of the dental arches. A posterior crossbite could be unilateral (right or left) or bilateral.

Scissor bite: A scissor bite was considered to be present when the palatal cusps of the upper molars were positioned buccally in relation to the buccal cusps of the lower molars.

Index of orthodontic treatment need: The need for orthodontic treatment was assessed by DHC of IOTN, with five grades: Grades 4 and 5 represent high priority treatment or definite treatment need; Grade 3 showed borderline need; Grades 1 and 2 featured no or little need of treatment.

The examiners administered a questionnaire to parents and guardians in order to obtain information on family income and ethnic groups. These data were used to determine which groups had higher orthodontic treatment needs.

The data were statistically analyzed using the Statistical Package for Social Sciences Version 15.0 (SPSS Inc., Chicago, Illinois, USA). Normal distribution of quantitative data was checked by the Kolmogorov-Smirnov test. Descriptive and inferential statistics was performed, using Mann-Whitney and Kruskal-Wallis test at the 5 % level of significance.

RESULTS

The sample comprised 433 children, mean age 8.73 (SD= 1.85), 192 males (44.3 %) and 241 females (55.7 %). Further, 63 % of the children had at least one type of malocclusion. According to Angle´s classification, Class I comprised for 68.6 %, followed by Class II with 19.9 % and Class III with 11.5 % (table 1).

An overjet greater than 4 mm was observed in 86 subjects (19.9 %), with 1.8 % featuring a negative overjet. In the case of open bite, the prevalence was 8.3 %, deep bite was found in 71 subjects (16.4 %). For variables in the transverse plane, crossbite was present in 12.9 % of the subjects, out of which 89.2 % was unilateral (table 1).

The findings revealed that 59.5 b% had at least one type of malocclusion; 40.5 % of the children had no need for orthodontic treatment (grade 1 and 2); 5.5 % were borderlines, indicating moderate need (grade 3); 54 % had definite treatment (grade 4), but no children were classified in grade 5. Regarding the need for treatment, no statistically significant differences were found between genders (p= 0.217), family income (p= 0.176) and ethnic groups (p= 0.281) (table 2).

DISCUSSION

Table 2. Relationship between need for orthodontic treatment, gender, family income and ethnic groups

	DHC Grade (need for treatment)						
	Grade 1 & 2 (No treatment)		Grade 3 (Borderline)		Grade 4 (Definite treatment)		Total (n)
Gender	No.	%	No.	%	No.	%	
Male	89	37	17	7	135	56	241
Female	86	45	7	4	99	51	192
Gender p value= 0.217*							
Family income							
Less than or equal to minimum wage ($ 282.00)	46	43	10	9	50	48	106
Between two and three minimum wages	107	40	11	4	152	56	270
More than one minimum wage	22	39	3	5	32	56	57
Family income p value= 0.176**							
Ethnic groups							
White	57	46	6	5	62	49	125
Mullato	93	39	13	6	130	55	236
Black	25	35	5	7	42	58	72
Ethnic groups p value= 0.281**							

* Mann-Withney
** Kruskal-Wallis test

The development of an uniform method of epidemiological assessment and grading of malocclusion has been of interest in epidemiological research for several decades.[14] Data regarding the prevalence of malocclusion and need for orthodontic treatment is required in planning in public health, especially where resources are scarce, as in Brazil.15 IOTN developed by Brook & Shaw (1989)[8] is widely used internationally as a method of objectively determining the orthodontic treatment need, prioritizing who most need it. Without the use of an index, determining who requires treatment become difficult, particularly for the dentist, resulting in wrong referrals.[16]

Assessing the need for treatment can be varied as the population analyzed, age, as well as evaluation criteria.[17] However, because of the possibility of early treatment of certain malocclusion there is a need to assess children in mixed dentition as done in this study.[18] Furthermore, this measure could prevent serious problems of social life since there Malocclusion has an adverse impact on the oral health-related quality of life of adolescents.[19]

In this present study, the proporcion of the children with at least one type of malocclusion is according to the national oral health survey conducted in 2003, when 58.1 % of children had some type of malocclusion.20 Another national oral health survey realized in 2010 found that the rate was even higher (66.7 %). A divergence between regions was reported by Thilander et al. (2001),[21] that reviewed previous studies and found a variation from 40 to 93 percent in the prevalence of malocclusion. Although the number of orthodontists in Brazil is increasing 33 % every year, this fact did not indicate an increase in access to orthodontic treatment by the populations that most needed it.[22]

The current results showed a lower number of children that need orthodontic treatment than that reported by Trinidad and Tobago (61.4 %),[9] but higher than that reported for Italy (24.4 %),[23] France (21.3 %),2 United Kingdom (35 %)[25] and Sweden (39.5 %).[2] The Brazil is a country with great racial miscegenation, which may explain the high prevalence of malocclusion found in the present sample.

Studies of human evolution rejects the supposition that some external visible

features (e.g., skin color) could express a representative measure for other characteristics of an individual or population, as malocclusion. Although this theory persists, it is estimated that these features represent only 0.01 % of the approximately 100.000 human genes. However, for modern genetic theories, the differences in frequency of genes between different ethnic groups are not significant.[27] Therefore, it is considered that most of the occlusal variation is a result of the interaction of environmental and genetic factors in each subject or population group.

As discussed previously, there is some variability between ethnic groups, but this effect is subtle, because the genetic similarities are much larger. This factor can explain the lack of statistical difference in relation to orthodontic treatment need among ethnic groups of the same population. In addition, it was also not statistically verified the difference for this index (IOTN) in relation to gender and family income, as reported in other studies.[28,29]

The public health system in Brazil, as in many other countries, still lack sufficient support for the increasing demand for orthodontic treatment, health planners should strength the need for orthodontic preventing treatment of lower cost, smaller complexity and higher coverage.

CONCLUSION

Most children had moderate and great orthodontic treatment needs. There was no association between orthodontic treatment need and gender, family income and ethnic groups.

Statement of conflict of interest

All authors agree to publication of the article and declare no conflict of interest whatsoever.

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