

ORIGINAL ARTICLE

What Sociodemographic factors Influence the Perceived Orthodontic treatment need among Adolescents in Kottayam city- a Cross-Sectional Study

¹Kevin Suresh, ²Manjunath C, ³Archana Krishnamurthy, ⁴Swagat Kumar Mahanta, ⁵Sonali Mallick, ⁶Madhushree Das

¹Senior Lecturer, Department Of Public Health Dentistry, Govt. Dental college, Kottayam, Kerala, India.

^{2,3} Professor, Department Of Public Health Dentistry, The Oxford Dental College and Hospital, Bangalore, Karnataka, India.

⁴Assistant Professor, Department Of Public Health Dentistry, MB Kedia Dental College, Birgunj, Nepal.

⁵Senior Lecturer, Department Of Public Health Dentistry, Hi-Tech Dental college and Hospital, Bhubaneswar, Odisha, India

⁶ Post Graduate student, Department Of Public Health Dentistry, The Oxford Dental College and Hospital, Bangalore, Karnataka, India.

Corresponding Author's E-mail address; kevvcks@gmail.com

ABSTRACT

Orthodontic treatment is pursued mainly to enhance facial appearance. Self-perception of dental aesthetics has been found to be influenced by various factors like gender, irregularity of dental attendance, etc. Although a correlation between subjective and objective assessment of aesthetics has been reported, laypeople tend to underestimate their own aesthetic needs. The study was conducted to investigate the effects of factors like gender, socioeconomic status (SES), dental attendance pattern and normative need on perceived orthodontic treatment need. The sample comprised of 400 adolescents (212 males, 188 females) aged 13-15 years from Kottayam, India. Demographic data and information concerning perceived need, dental attendance pattern, and brushing frequency were collected in prepared format. SES was established by using Kuppusswamy's Socio-Economic Status Scale. The normative treatment need was assessed by using the Index of Orthodontic Treatment Need. Chi-squared test and logistic regression analysis were used for the statistical analysis. Approximately 19.5% of the subjects had a definite and 47.2% had a borderline orthodontic treatment need. The perceived need for orthodontic treatment was found in 34.2% of the subjects. Adolescents attending public school (OR = 2.0 (1.07-3.7)), definite need for Dental Health Component (DHC) (OR = 2.93 (1.41-6.3)) and Aesthetic Component (AC) (OR = 3.63 (1.7-7.6)) had a predictive effect on perceived treatment need. Adolescents attending public schools exhibited greater perceived orthodontic treatment need than from private schools.

Keywords: Normative need, Perceived need, Socioeconomic status.

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INTRODUCTION

The Dentofacial appearance that varies from normal may have a negative impact on social, physiological and psychological roles. In modern society aesthetics have become an important predicament [1]. In the past, functional demands were the main considerations in dental treatment need, but now a focus has been shifted towards dental aesthetics, hence the distinguishing specialties exist. A number of dental traits like increased overjet, anterior cross bite and traumatic overbite have an adverse effect on the longevity of the dentition, indicating long term dental health benefit on their correction [2]. Reports in some populations indicate that socioeconomically deprived persons have unmet oral health needs and lack of access to oral health services [3]. Furthermore, orthodontic treatment is not always covered by

dental insurance plans, rendering socioeconomically deprived persons unable to obtain it. In a recent study, the uptake of orthodontic treatment was reported to be significantly less in cases from low socioeconomic settings [4]. However, whether this is because of their lower perceived or normative needs, higher satisfaction with the appearance or irregularity of dental attendance is not yet clear. To date, the evidence regarding the effect of socioeconomic status (SES) on normative and perceived treatment need is not consistent. Some studies have found a positive connection between them, whereas others have not [5-8]. There is little data on the normative and perceived orthodontic treatment need among adolescents and the outcome of several factors like Socioeconomic status (SES), Gender, Type of school attended and Dental attendance pattern of the Indian population. Such information is required for better planning of orthodontic services and to ensure that health care is provided equally among all social classes, especially in publicly funded clinics [5].

With this background, the present study is undertaken to assess the effect of various factors on normative and perceived orthodontic treatment need and treatment uptake among adolescents, Kottayam city.

MATERIALS AND METHODS

The present study was conducted in both the government and private schools in the Kottayam city from July 2014 to August 2014. A complete list of schools and formal approval from the block education officer as well as from the head of the schools was obtained prior to this work. From the two zones of Kottayam city 4 public and 4 private schools were randomly selected. Students were selected by using stratified random sampling technique. For 95% Confidence Level the sample size was estimated to be 378 and it was rounded off to 400.

Inclusion criteria: Adolescents in the age group of 13-15 years who were willing to participate in the study with consent from the parents.

Demographic data: A questionnaire was used to collect demographic data about each subject including age, parents' education and whether they had any previous orthodontic treatment. The SES was calculated using an index of socioeconomic classification developed by kuppusswamy i.e. Modified Kuppusswamy's SES (2014) [9]. This was primarily grounded on the caregiver job, their educational background, and total household income. Each variable was given a weight, the total of which established the socioeconomic weight. Another variable measured was the regularity of dental attendance; subjects who visited a dentist for a check-up at least once a year were considered as regular attendants. Tooth-brushing was measured with the response of \geq twice a day, or \leq once a day.

Parents' level of education was measured with the options: low (middle school certificate), medium (high school/ post high school diploma or intermediary) and High (Graduate or post graduate/ profession).

The perceived need for treatment was determined by asking each subject, whether she/he thought they needed treatment (1 extremely unlikely; 5 extremely likely). For the analysis, perceived need for treatment was dichotomised into No (extremely unlikely, unlikely, Neutral) and Yes (likely, extremely likely)

Normative treatment need was assessed for subjects who did not receive orthodontic treatment using the Index of Orthodontic Treatment Need (IOTN) [10]. IOTN is composed of 2 components: the dental health component (DHC) to represent the various occlusal traits and the aesthetic component (AC) to identify the perceived aesthetic of the malocclusion. The first author was calibrated with the use of IOTN and recorded both the DHC and the AC. The weighted kappa values (0.87 and 0.83) for DHC and AC showed good agreement with these observations and measurements in terms of inter-examiner variability which validated the examination procedure.

STATISTICAL ANALYSIS

Statistical Package for the Social Sciences version 19.0 (SPSS Pty Ltd, Chicago, IL, USA) was used for statistical analysis. Chi-squared test was used to investigate differences in perceived treatment need according to SEC, gender, brushing pattern, dental attendance pattern, DHC and AC. Logistic regression analysis was used to study the effect of the above-mentioned variables on perceived treatment need using three models. Only the significant variables found in chi-square test were used in logistic regression. In the first model only the type of school was used and in the second model, SES was used. In the third model type of school and SES was adjusted for normative need (DHC and AC).

RESULTS

In the present study, a total of 400, 13-15-year-old school going students participated among which majority of student respondents i.e. 354 (89%) had not undergone orthodontic treatment and only 46 (11%) had undergone or is undergoing orthodontic treatment. Normative and perceived orthodontic

treatment need was assessed for the 354 students. Hence, the statistical analysis was done on these 354 students to find the effect of various factors on normative and perceived orthodontic treatment need.

Normative treatment need: There are two components used here to assess the normative need dental health component and the aesthetic component. Based on AC majority (55.1%) had no need for treatment and 30.5% had a borderline need. In the DHC majority had a borderline need (47.2%) followed by, no need (33.7%) and the definite need remained low for both AC and DHC with 14.4% and 19.5% respectively. According to AC, there was no significant difference between the definite need for males (15.3%) compared to females (13.3%) and according to DHC also. (Table 1)

Table 1- Gender wise distribution of Normative treatment needs of the study subjects

GENDER	DHC*			AC*		
	No need	Borderline need	Definite need	No need	Borderline need	Definite need
Total	118(33.7)	167(47.2)	69(19.5)	195(55.1)	108(30.5)	51(14.4)
MALE	60(31.7)	89(47.1)	40(21.2)	104(55.1)	56(29.6)	29(15.3)
FEMALE	58(35.2)	78(47.2)	29(17.6)	91(55.2)	52(31.5)	22(13.3)

* (P >0.05)

The perceived treatment need was compared across all the variables in Table 2. 34.2% of the students had a perceived need for treatment. Students attending public school (67.8%) had a significantly higher (p < 0.001). Perceived need for treatment compared to private school (32.2%).

Dental attendance, brushing pattern and parent's level of education had no significant effect on perceived need.

In relation to SES, the adolescents of the upper class (14%) had a significantly lower (p < 0.001) perceived need for treatment compared to adolescents from lower middle class (55.4%). In both the DHC and AC, the majority of the adolescents who were having borderline and definite need significantly reported (p < 0.001) having a perceived need for treatment.

Table 2- Distribution of study subject based on perceived treatment need according to various variables.

Variables	Perceived orthodontic treatment need		P
	Yes(1) (34.2%)	No(0) (65.8%)	
Gender			
Male	68(56.2)	121(51.9)	0.445
Female	53(43.8)	112(48.1)	
School			
Public	82(67.8)	104(44.6)	0.001*
Private	39(32.2)	129(55.4)	
Mothers education			
Low	32(26.4)	55(23.6)	0.219
Medium	59(48.8)	135(57.9)	
High	30(24.8)	43(18.5)	
Socio economic status			
Upper	17(14)	65(27.9)	0.001*
Uppermiddle	24(19.8)	54(23.2)	
Lower middle	67(55.4)	81(34.8)	
Upper lower	13(10.7)	33(14.2)	
Dental care			
Regular	39(32.2)	77(33)	0.877
Irregular	82(67.8)	156(67)	
Brushing pattern			
≤1	42(34.7)	83(35.6)	0.865
≥2	79(65.3)	150(64.4)	
AC			
No need	41(33.9)	154(66.1)	0.001*
Borderline	50(41.3)	58(24.9)	
Definite	30(24.8)	21(9)	
DHC			
No need	25(20.7)	93(39.9)	0.001*
Borderline	56(46.3)	111(47.6)	
Definite	40(33.1)	29(12.4)	

* (P < 0.05)

Regression analysis

A logistic regression analysis was performed to the level of perceived need for treatment as the dependent variable (no = 0; yes =1). The independent variables were the type of school, SES and normative need (DHC and AC) (Table 3). In the first model, adolescents attending public school were 2.60 (1.64-4.63) times more likely to report perceived need for treatment compared to adolescents from private school. In the second model, adolescents from lower middle class were 3.16 (1.69-5.9) times more likely to report perceived need for treatment compared to adolescents from the upper class. In the third model, after adjusting for normative need and the other variables it was found that adolescents attending public school were 2.0 (1.07-3.7) times more likely to report perceived need for treatment compared to adolescents from private school. SES was not found to have a predictive effect on adjustment and adolescents who have had a definite treatment need according to DHC and AC were 2.93 (1.41-6.3) and 3.63 (1.7-7.6) times more likely to report perceived need for treatment compared to adolescents having no need for treatment.

Table 3- Multivariate logistic regression (N = 400) with perceived orthodontic treatment need as the dependent variable (no = 0; yes =1)

Variables	MODEL 1	MODEL 2	MODEL 3
Type of school			
Private school		1	
Public school	2.60 (1.64- 4.13)		2.0(1.07-3.7)
Socio economic status			
Upper		1	
Uppermiddle		1.69(0.82-3.4)	1.14(0.49-2.6)
Lower middle		3.16(1.69-5.9)	2.19(0.97-4.96)
Upper lower		1.50(0.65-3.47)	.747(0.25-2.17)
DHC			
No need		1	
Borderline			.80(0.41-1.58)
Definite			2.93(1.41-6.3)
AC			
No need		1	
Borderline			3.58(1.9-6.63)
Definite			3.63(1.7-7.6)

1= reference category

DISCUSSION

In the present study, IOTN was used because of its suggested reproducibility and validity. Additionally, using the same assessment methodology allowed the comparison of the results from different countries that selected a similar approach. In this study, 0.87 and 0.82 were the kappa values indicating a substantial agreement for both DHC and AC. The kappa values obtained by different authors being Ucuncu *et al.* [11]- 0.91 and 0.78 and Badran *et al.* [5] - 0.98 and 0.90.

In our study, based on Aesthetic Component, the majority (55.1%) had no need for treatment and 30.5% had a borderline need. In the Dental health Component majority had a borderline need (47.2%) followed by, no need (33.3%) while the definite need remained low for both AC and DHC with 14.4% and 19.5% respectively. The findings were similar to the distribution of AC grades studied by several researchers where the definite need was found to be 16.7% by Bilgic *et al* [12] in Turkey, 14% by Philips *et al* [13], 15.3% by Janošević *et al.* [14] in Serbia. These studies conducted in different regions show similar outcomes in terms of the need for orthodontic treatment in individuals with different socio-cultural features in various locations. However, contrasting results were also shown in which the distribution of DHC grades for definite need was found to be 28% by Bilgic *et al.* [12] in Turkey, 39.5% by Josefsson *et al* [15] in Sweden, 35% by Chestnutt *et al* [16] in UK, 27.4% by Janošević *et al* [14] in Serbia, 49.3% by KC *et al.* [17] in Karnataka. The findings of the present study indicated that a substantial need for orthodontic intervention was present in the adolescents of Kottayam city. In the present study, perceived need for treatment was 34% and had a significant effect on normative need. The majority of the studies substantiated this finding [5,6,8]. The findings are almost similar in a study conducted by Badran *et al.* [5] in Jordan were 26% reported a perceived need for orthodontic treatment.

The distribution with respect to males and females of orthodontic treatment need has been contemplated by many researchers. In our present study, Aesthetic Component of Normative needs more males had definite treatment need (15.3%) compared to females (13.3%). There was no significant difference in perceived orthodontic treatment need between males and females. Similar results were shown by in a study by Ucuncu *et al.* [11] as he found no significant difference was found between the genders. On the contrary, Bureden *et al.* [18] found that significantly more males than females were in the need for orthodontic treatment. The normative need for treatment varies with each geographical area. In case of treatment uptake Deli *et al.*[19] and Krey *et al.*[20] found a strong predictive effect on females (2.09 and 1.32 times). We found that adolescents belonging to the upper class (14%) had a significantly lower Perceived need for treatment compared to adolescents from lower middle class (55.4%). The higher self-perceived need reported by the low SES group could be due to their lower satisfaction with their dental appearance[8]. Similar reports were given by Badran *et al.* [5]. However, the majority of the studies showed no relation between normative need and SES [1, 6,7,21].

In this study, Public schools were found to have a predictive effect on perceived need even after adjusting for normative need and SES. Various factors like appearance of the mouth due to missing teeth, alignment of the teeth and ridicule from other people regarding the appearance of the teeth can contribute to the perceived orthodontic treatment need [8].

As with any study, there were limitations to this study, which need to be discussed. First, adolescents perceived need will be influenced by parents and peers. Hence, their perceived need also should be assessed. Secondly, professional evaluation of treatment need may not coincide with factors such as functional and social needs. Hence, further studies should be done evaluating all these factors in order to enhance the applicability of IOTN.

Since the perceived need was found to be much higher than the normative need, the general population must be made aware of the dental anomalies that are so common in our society to bring about general awareness of dental health. Implementing measures to prioritize treatment using indices for treatment need would ensure treatment for the most in need.

CONCLUSION

- It is interesting to note that the need for orthodontic treatment in adolescent is high (53.3%), which indicates the importance of preventive as well as curative treatment.
- There was a predictive effect on perceived need in students going to public schools, AC and DHC respectively.

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