ASSESSMENT OF GENDER DISPARITY IN ORTHODONTIC TREATMENT NEED AMONG PATIENTS ATTENDING ISLAMIC INTERNATIONAL DENTAL HOSPITAL

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ABSTRACT

The objective of this study was to compare the orthodontic treatment need among male and female patients attending Islamic International Dental Hospital, Islamabad (I.I.D.H).

Different studies had been conducted to determine the orthodontic treatment need in Pakistan but so far no individual study had been done to compare orthodontic treatment need on basis of gender. Index of Orthodontic Treatment Need (IOTN) was used on a sample of 200 patients (100 male, 100 female) at Islamic International Dental Hospital, Islamabad Pakistan, to evaluate the need for orthodontic treatment. Using SPSS version 10.0 data was analyzed. Result showed that 36% of female patients and 41% of male patients needed definite orthodontic treatment according to DHC whereas 12.5% of female patients and 23.5 % of male patients were needed definite orthodontic treatment according to AC. Greater percentage of males was found in definite treatment need than females (p =0.005) according to AC whereas DHC showed insignificant difference among males and females for definite treatment need (p =0.133).

Key words: *Index of Orthodontic Treatment Need, Dental Health Component, Aesthetic Component*

INTRODUCTION

The awareness for acceptable dental appearance is giving a distinctive recognition to orthodontics in the field of dentistry. As the individual esthetic consciousness has been increasing, the demand for orthodontic treatment has also been increasing with time.[1,2]

Evaluation of orthodontic treatment need helps to identify individual who will be benefited from treatment. Many indices have been developed with the intention of categorizing malocclusion into various groups according to urgency and need for treatment (Draker, 1960; Grainger, 1967; Saltzmann, 1968; Summers, 1971; Linder-Aronson, 1974).[3]

Among the available range of indices *Index of orthodontic treatment need* [IOTN] is a simple, repeatable, and reliable index.[4] IOTN was described by Brook and Shaw in 1989.[5] This index incorporates an aesthetic component (AC) and dental health component (DHC). The AC was developed originally by Evan and Shaw and it consists of a scale of ten color photographs showing different levels of dental attractiveness.[6]

Aesthetic Component assesses the appearance of an individual dentition through this photographical scale and evaluates treatment need (Figure I). Dental Health Component consists of five grades from grade 1 'no need of treatment' to grade 5 'very great treatment need' given in table I. The DHC identifies the occlusal trait that is potentially detrimental to dental health.

The orthodontic treatment need distribution with respect to males and females has been studied by several researchers (Burden *et al.*, 1994; Güray *et al.*, 1994; Ugur *et al.*, 1998).[7,8] Studies are available that estimate the proportion of the population that

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requires orthodontic treatment in Pakistan.[9, 10] But orthodontic treatment need according to gender is studied as co-variable and no individual studies are available.

METHODOLOGY

It was a cross-sectional study and patients reported to the OPD of orthodontic department of Islamic International Dental Hospital, Islamabad. (I.I.D.H) were selected by purposive sample selection. Approval of the study was taken from ethical committee at IIDH. Duration of the study was ten months from July 2008 to August 2009. Sample included 100 male and 100 female patients between the ages of 13 to 25 years. Informed written consent was taken from the patients. The inclusion criteria for the sample included complete permanent dentition with the possible exception of third molars. The exclusion criteria included refused consents, previous history of orthodontic and/or orthopedic treatment, history of serial extractions and anomalies not listed in Table 1.

DATA COLLECTION PROCEDURE

Dental Health Component of IOTN was clinically assessed on dental chair under dental light. The intra-oral examination was done with the help of a mouth mirror for missing teeth, cleft lip and palate, impeded eruption and molar relationship. The same operator with the help of millimeter ruler (N^0 0504, SWO, China) measured overjet, reverse overjet, overbite, openbite, crossbite and displacement. Findings were recorded on data collection Proforma. Each patient was graded for DHC according to the worst occlusal trait as listed in Table I.

For the assessment of Aesthetic Component of IOTN patient was seated in natural head position on the dental chair. The patient lips were retracted with self-retaining lip retractor (Soft Spender, Ortho Care, U.K). Operator then positioned itself in front of patient at its foot end and evaluated the intra-oral front view under the dental light. Patient was then scored from its intra-oral front view for AC of IOTN for different levels of attractiveness according to the ten-point scale as shown in Figure 1 and recorded on data collection Proforma.

Three categories of treatment need were scored as;[11]

- DHC grades 1-2 and AC grades 1-4 represented no or slight need for treatment

- DHC grade 3 and AC grades 5-7 represented moderate or borderline need for treatment

- DHC grades 4-5 and AC grades 8-10 represented definite need for orthodontic treatment

For the intra and inter-examiner reliability 40 subjects were re-examined and rescored for DHC and AC.

DATA ANALYSIS PROCEDURE

Data was analyzed by using SPSS version 10.0. The variables are grades of Dental Health Component and Aesthetic component. The frequency (percentage %) for each of the five grades of Dental Health Component and each of the ten grades of Aesthetic Component of Index of Orthodontic Treatment Need was calculated. With the help of Chi-Square test association was found between the grades of Dental Health Component and Aesthetic Component. Chi-square test was also used to determine the distribution of DHC and AC grades according to the gender. Comparisons were made among the male and female categories The P value less then or equal to 0.05 was considered as statistically significant. Mean and Standard Deviation for the age of the patients for DHC and AC grades was calculated. The kappa statistics were used to determine the intra and inter-examiner reliability.

RESULTS

The study group consisted of 200 subjects (100 males and 100 females) with chronological age range of 13 to 25 years (Fig 2). The mean age calculated for the over all sample was 16 years (S.D 3.6). The mean age for male patients was 15.9 (S.D 3.3) and for female patients was 17.6 (S.D 3.8). Table 2 shows the gender distribution according to three age groups 13 to 16 years, 17 to 20 years and 21 to 25 years.

Distribution of the grades of Dental Health Component and Aesthetic Component according to the gender is given in table 3 and table 4. According to DHC maximum number of males 41% (82) are reported in definite treatment need as compared to females 36% (72). Whereas according to Aesthetic component the definite treatment need percentages observed are 23.5% (47) and 12.5% (25) for males and females respectively.

TABLE 1: INDEX OF ORTHODONTIC TREATMENT NEED: DENTAL HEALTH COMPONENT (DHC)

Grade 1 (none)

1　Extremely minor malocclusions including displacements less than 1 mm.

Grade 2 (little)

a　Increased overjet greater than 3.5 mm but less than or equal to 6 mm with competent lips.

b　Reverse overjet greater than 0 mm but less than or equal to 1 mm.

c　Anterior or posterior crossbite with less than or equal to 1 mm discrepancy between returded contact position and intercuspal position.

d　Displacement of teeth greater than 1 mm but less than or equal to 2 mm.

e　Anterior or posterior open bite greater than 1 mm but less than or equal to 2 mm.

f　Increased overbite greater than or equal to 3.5 mm without gingival contact.

g　Prenormal or postnormal occlusions with no other anomalies. Includes up to half a unit discrepancy.

Grade 3 (moderate)

a　Increased overjet greater than 3.5 mm but less than or equal to 6 mm with incompetent lips.

b　Reverse overjet greater than 1 mm but less than or equal to 3.5 mm.

c　Anterior or posterior crossbites with greater than 1 mm but less than or equal to 2 mm discrepancy between retruded contact position and intercuspal position.

d　Displacement of teeth greater than 2 mm but less than or equal to 4 mm.

e　Lateral or anterior open bite greater than 2 mm but less than or equal to 4 mm.

f　Increased and complete overbite without gingival or palatal trauma.

Grade 4 (great)

a　Increased overjet greater than 6 mm but less than or equal to 9 mm.

b　Reverse overjet greater than 3.5 mm with no masticatory or speech difficulties.

c　Anterior or posterior crossbites with greater than 2 mm discrepancy between retruded contact position and intercuspal position.

d　Severe displacements of teeth greater than 4 mm.

e　Extreme lateral or anterior open bites greater than 4 mm.

f　Increased and complete overbite with gingival or palatal trauma.

h　Less extensive hypodontia requiring prerestorative orthodontics or orthodontic space closure to obviate the need for a prosthesis.

I　Posterior lingual crossbite with no functional occlusal contact in one or both buccal segments.

m　Reverse overjet greater than 1 mm but less than 3.5 mm with recorded masticatory and speech difficulties.

t　Partially erupted teeth, tipped and impacted against adjacent teeth.

x　Supplemental teeth.

Grade 5 (very great)

a　Increased overjet greater than 9 mm.

h　Extensive hypodontia with restorative implications (more than I tooth missing in any quadrant) requiring prerestorative orthodontics.

i　Impeded eruption of teeth (with the exception of third molars) due to crowding, displacement, the presence of supernumerary teeth, retained deciduous teeth, and any pathologic cause.

m　Reverse overjet greater than 3.5 mm with reported masticatory and speech difficulties.

p　Defects of cleft lip and palate.

s　Submerged deciduous teeth

TABLE 2: FREQUENCIES OF AGE CATEGORIES

Age categories	Frequency	Percent	Valid Percent	Cumulative Percent
13 - 16	111	55.5	55.5	55.5
17 - 20	48	24.0	24.0	79.5
21 - 25	41	20.5	20.5	100.0
Total	200	100.0	100.0	

TABLE 3: CROSS TABULATION COUNT OF GENDER OF PATIENTS AND DENTAL HEALTH COMPONENT

| | | Dental Health Component DHC | | | |
		No/little treatment need	Slight or moderate treatment need	Definite treatment need	Total
Gender of the patients	Male	5	13	82	100
	Female	4	24	72	100
	Total	9	37	154	200

TABLE 4: CROSS TABULATION COUNT OF GENDER OF PATIENTS AND AESTHETIC COMPONENT

| | | Aesthetic Component AC | | | |
		No/little treatment need	Slight or moderate treatment need	Definite treatment need	Total
Gender of the patients	Male	26	27	47	100
	Female	38	37	25	100
	Total	64	64	72	200

TABLE 5: CORRELATION OF DENTAL HEALTH COMPONENT AND AESTHETIC COMPONENT

| | | Aesthetic Component AC | | | |
		No/little treatment need	Slight or moderate treatment need	Definite treatment need	Total
Dental Health Component DHC	No/little treatment need	7	2		9
	Slight or moderate	24	12	1	37
	Definite treatment need	33	50	71	154
	Total	64	64	72	200

Chi-Square test revealed highly significant P value (P = .000) that shows strong association between aesthetic component and dental health component as given in table5.

The kappa values for intra-examiner reliability were found 1.00 (DHC) and 0.95 (AC) whereas for inter-examiner were recorded as 0.99 (DHC) and 0.87 (AC).

According to DHC the difference between male and female sample is statistically insignificant i.e. P = 0.133. While AC showed statistically significant difference between the two groups i.e. P = 0.005.
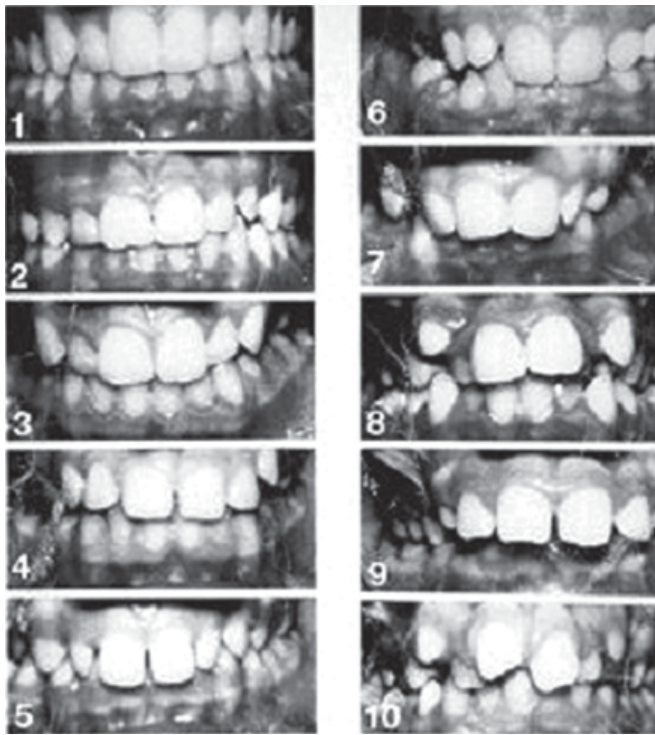
Fig 1: Index Of Orthodontic Treatment Need, Aesthetic Component (AC).

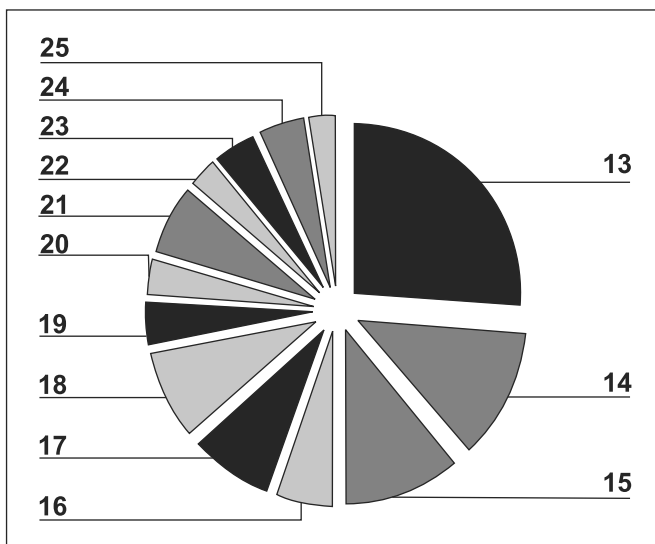The Scan Scale was first published by the European Orthodontic Society. (Evans MR, Shaw WC. Eur J Orthod 1987; 9:314-18)[6]

Fig 2: Age distribution in sample

DISCUSSION

With the increasing oral health awareness, demand for orthodontic treatment has also been increasing in Pakistan. The orthodontic treatment need difference among genders is the most studied covariable and its findings are usually conflicting. [7,8] The present study is the first survey carried out in Islamic International Dental Hospital that consisted of 200 patients (100 males and 100 females) with mean age of 16 years (S.D 3.6).

In this study gender distribution for Dental Health Component DHC showed insignificant difference in definite treatment need category with 41% males and 36% females. Similar difference was found in moderate treatment need and no or slight treatment need categories (Table 3). The Aesthetic Component AC showed significant difference in definite treatment need category. Greater percentage of males (23.5%) was found in definite treatment need than females (12.5%). Although no significant difference was found among males and females in moderate treatment need and no or slight treatment need categories of Aesthetic Component (Table 4). The kappa values showed excellent reproducibility for intra-examiner and inter-examiner reliability.

Study conducted in French school children agree with dental health component DHC results of our study.[3] Differences among males and females in all three categories of DHC (definite treatment need, moderate treatment need and no/slight treatment need) were insignificant. But contrary to DHC, the Aesthetic Component AC result was not in accordance with our result as it also showed insignificant differences among males and females. Results of the study conducted in Peruvian university population also matched with former study with slight difference in DHC and insignificant difference in AC.[7]

A study conducted by Naeem S and Asad S coordinate with definite treatment results of our study but only the aesthetic component of IOTN was used in this study.[12] More male patients (52%) were found in definite treatment need than female patients (37%) that matched with results of our study.

Among the available studies, Mandall found more percentage of females in treatment need whereas Burden et al and Hedayati studies showed significant percentage of males in definite treatment need.[13,14] Whereas Güray et al. (1994), Uur et al. (1998), Uncuncu N (2001) and Souames M (2006) studies showed insignificant difference among males and females for treatment need.[3,15] Further studies on different samples

across the country are required to evolve an overall picture of orthodontic treatment need difference among males and females.

CONCLUSION

It was concluded that in comparison of the treatment need according to AC, males represented more need than females (P= 0.005) and the difference between males and females in treatment need according to DHC is statistically insignificant (P = 0.133).

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