

Students' orthodontic treatment needs and oral-health-related quality of life in Qazvin city, Iran

Roya Naseh MD¹, Parviz Padisar MD¹, Habibollah Shojaei-Nejad DDS²,
Marzieh Morsaghian³

Original Article

Abstract

BACKGROUND AND AIM: Clinical indices that determine the need for orthodontic treatment do not provide information about the impact of malocclusion on the quality of life. The present study was carried out to assess the correlation between the aesthetic component of the Index of Orthodontic Treatment Need (IOTN) and the Child Perception Questionnaire (CPQ₁₁₋₁₄) in determining the need for orthodontic treatment.

METHODS: In 2015, 250 students between 11 to 14 years were randomly selected using a two-stage stratified cluster sampling and the total CPQ₁₁₋₁₄ score was calculated. In addition, the self-perceived and normative needs were determined based on aesthetic component.

RESULTS: A significant correlation existed only between the self-perceived needs and the score of functional limitations. In other domains, no significant correlation was seen between the self-perceived or normative need and CPQ₁₁₋₁₄ scores. Girls had a higher score for mental well-being and total CPQ₁₁₋₁₄ score than boys.

CONCLUSION: The weak correlation between the total CPQ₁₁₋₁₄ score and aesthetic component indicates that these indices have measured different characteristics. It seems that using the criteria of the Oral Health Related Quality of Life (OHRQoL) in assessing the self-perceived need for orthodontic treatment, along with the normative needs, may provide an accurate estimate of the need for orthodontic treatment.

KEYWORDS: Index of Orthodontic Treatment Need; Oral Health; Quality of Life

Citation: Naseh R, Padisar P, Shojaei-Nejad H, Morsaghian M. **Students' orthodontic treatment needs and oral-health-related quality of life in Qazvin city, Iran.** J Oral Health Oral Epidemiol 2016; 5(3): 154-60.

Malocclusion is a common oral disorder that can have a negative impact on oral health, social life and patients' self-image.¹ Traditional clinical indices barely give an indication of how malocclusion can affect the patient's quality of life because of its resulting limitations on performance and psychosocial well-being. Thus, the necessity of introducing and applying other criteria, along with orthodontic treatment need indices, has become evident.^{2,3} Accordingly, there has been an increasing attention directed to applying such criteria in dentistry, known as the Oral

Health Related Quality of Life (OHRQoL) indices.⁴ Quality of life is defined as an individual's perception of health resulting from satisfaction or dissatisfaction in important aspects of life.⁵⁻⁷ Currently, no single OHRQoL criterion is available to be used in particular situations; although it has been recently shown that OHRQoL criteria can be introduced and used in orthodontic treatment.⁸⁻¹¹

Several studies have evaluated the relationship between malocclusion and the quality of life in relation to oral health, with somewhat contradictory results.¹² Taylor et

1- Associate Professor, Dental Caries Prevention Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

2- Dentist, Private Practice, Qazvin, Iran

3- MSc Student, Department of Orthodontics, School of Dentistry, Qazvin University of Medical Sciences, Qazvin, Iran

Correspondence to: Marzieh Morsaghian

Email: mrmorsaghian@yahoo.com

al. reported no significant relationship between orthodontic treatment and changes in the quality of life.¹³ A study by Leao and Sheiham showed that young individuals who had received orthodontic treatment during the previous ten years had a better quality of life compared to those who had not received such a treatment.¹⁴

The Child Perception Questionnaire (CPQ₁₁₋₁₄) is an OHRQoL criterion with 37 questions designed to assess the effects of oral health problems on quality of life in children aged 11 to 14 year, which includes oral symptoms, functional limitations, mental well-being and social well-being. The questionnaire's validity has been confirmed for English speaking children in Canada, England and New Zealand and for Arabic speaking children in Saudi Arabia.¹⁵⁻¹⁸

Racial standards, life style and social, economic and cultural expectations of oral and dental health are effective on quality of life. The quality of life is related with oral and dental health differs in cities and countries with various culture and economy. Though evaluation of these indices should be performed in every society separately.¹⁹

The present study was carried out in Qazvin city, Iran, with the aim of comparing this quality of life measure and the Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN) to assess the orthodontic treatment needs of 11- to 14-year-old children in Qazvin.

Methods

This analytical-descriptive study was carried out on 250 students aged between 11 and 14 years with equal gender distribution in two educational districts of Qazvin, Iran.

The patients were included in the study on the basis of their own ability and interest using two-stage cluster random sampling method. Various parameters relating to different social classes were also taken into account. Students with a history of orthodontic treatment were excluded.

The questionnaire was administered among students who had a written consent form signed by their parents or legal guardian. They were divided into small groups and taken to separate rooms to indicate their need for orthodontic treatment on the basis of the AC of IOTN. They were asked to compare ten standard AC pictures with their own teeth and give a score to themselves (self-perceived need).²⁰ Then, a dental student calibrated by an orthodontist during a preparation session scored the AC of the students, which was considered as the normative need. The CPQ₁₁₋₁₄ containing 16 questions to measure the effect of oral health using a five-point Likert scale was given to the students. The questionnaire used in this study was validated for Iranian population by Khadem et al.¹⁸ Based on this questionnaire, the higher the score the more negative the impacts on the quality of life. The scoring of the questionnaire for each question was between 0 and 4 (never = 0, once or twice = one, occasionally = two, often = three, and every day or almost every day = four) and the total score was between 0 and 64.

The correlation among the variables was assessed using the Spearman's rho correlation coefficient. The Wilcoxon signed-rank test was used to assess the differences between the AC of students and that of the specialist. The difference between the two groups by gender and type of school was assessed using the Mann-Whitney U test, while the Kruskal-Wallis test assessed their difference by age.

Results

The mean age of the students (\pm standard deviation) was 12.5 (\pm 1.11) years. Of these students, 168 (67.2%) studied in private schools and 82 (32.8) in public schools.

Evaluating the relationship between the scores of the AC of IOTN (self-perceived and normative needs), on the basis of the scores of the CPQ₁₁₋₁₄ revealed that the least correlation

coefficient existed between the AC determined by the students and the score of mental well-being of the CPQ ($\rho = -0.039$, $P = 0.54$). The highest correlation coefficient was seen between the AC determined by the students and the score of functional limitations ($\rho = 0.130$, $P < 0.04$). The AC determined by the students (the self-perceived need for treatment) had a statistically significant correlation only with the scores of functional limitations and no such correlation was seen in other domains. As for the scores of the AC of IOTN determined by the dental student (normative need) based on CPQ₁₁₋₁₄, no statistically significant correlation was found between the scores of the four variables, the total score of the CPQ₁₁₋₁₄ and the normative need for treatment. The highest correlation coefficient existed between the normative need and oral symptoms ($\rho = 0.030$, $P = 0.64$); the least correlation coefficient was seen between the normative need and the score of functional limitations of the CPQ ($\rho = 0.001$, $P = 0.98$, Table 1).

In addition, the scores of the four variables and the total score of the CPQ₁₁₋₁₄ by the students' gender were assessed and Mann-Whitney U test showed that the score of mental well-being of the CPQ and the total

score of the CPQ₁₁₋₁₄ were higher in girls than in boys (Table 1).

The scores of the self-perceived need and the normative need showed a moderately significant correlation ($\rho = 0.276$, $P < 0.0001$). Comparison of the mean AC scores by the Wilcoxon signed-rank test showed that the specialist had given higher scores to the AC of IOTN and this difference was statistically significant ($P < 0.0001$, Figure 1).

None of the variables (age, gender or type of school) had significant effects on the severity of the self-perceived and normative need for orthodontic treatment (Table 2).

Table 2. The correlation between the scores of the perceived and need and sex, type of school and age in 11- to 14-year-old children in Qazvin city, Iran, 2015

Variables	Sex*	Type of school*	Age**
Perceived need	$P = 0.21$	$P = 0.16$	$P = 0.28$
Normative need	$P = 0.09$	$P = 0.58$	$P = 0.24$

* Mann-Whitney U test; ** Kruskal-Wallis test

The results of the assessment of the severity of the self-perceived and normative need for orthodontic treatment are presented in figure 2.

Table 1. The correlation between the scores of the Child Perception Questionnaire (CPQ₁₁₋₁₄), the perceived need, the normative need and sex in 11- to 14-year-old children in Qazvin city, Iran, 2015

Variables	Perceived need	Normative need	Sex*
Oral symptoms	$\rho = 0.06$ $P = 0.36$	$\rho = 0.03$ $P = 0.64$	$P = 0.42$
Functional limitations	$\rho = 0.13$ $P < 0.04$	$\rho = -0.001$ $P = 0.98$	$P = 0.96$
Mental Well being	$\rho = -0.04$ $P = 0.54$	$\rho = 0.01$ $P = 0.86$	$P < 0.01$
Social impact	$\rho = 0.06$ $P = 0.37$	$\rho = 0.02$ $P = 0.77$	$P = 0.15$
Total scores	$\rho = 0.06$ $P = 0.35$	$\rho = 0.02$ $P < 0.7$	$P = 0.03$

* Mann-Whitney U test

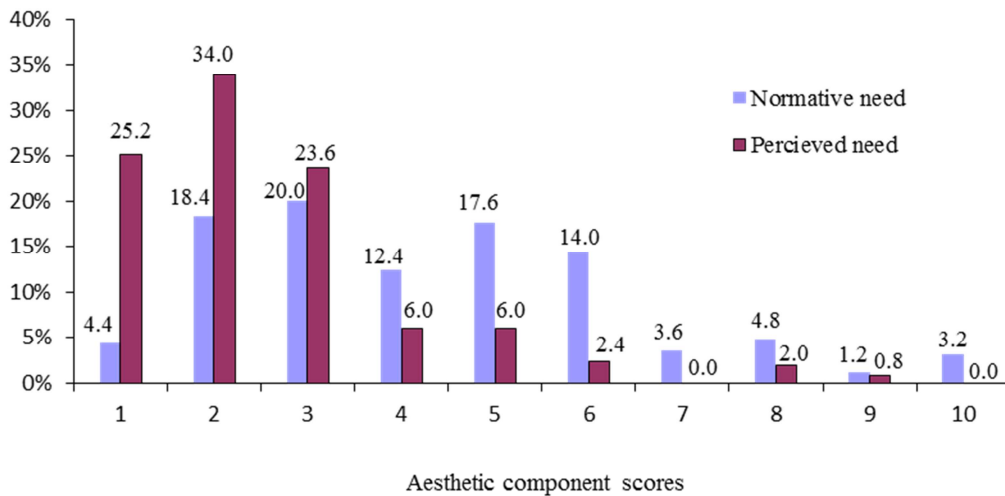


Figure 1. The dispersion of the perceived need and normative need scores in 11- to 14-year-old students in Qazvin city, Iran, 2015

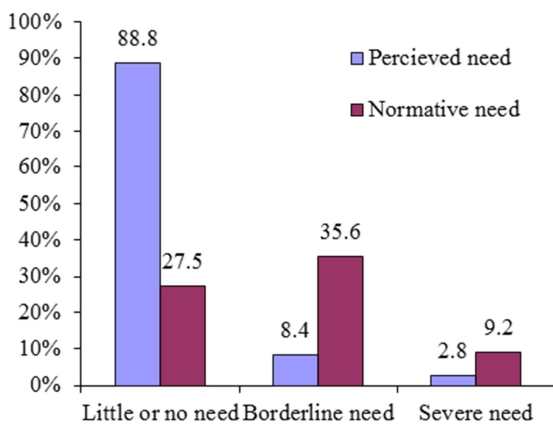


Figure 2. Comparison of orthodontic treatment needs severity in 11- to 14-year-old students in Qazvin city, Iran, 2015

Discussion

The results of the present study showed that there were statistically significant differences between the self-perceived need and the normative need for orthodontic treatment so that the specialist had given higher AC scores to the students than the students themselves (mean value of 4.32 versus 2.56). In assessing the self-perceived need for orthodontic treatment, 88.8% had little or no need for treatment, 8.4% had borderline and 2.8% had severe need for orthodontic treatment. These percentages in assessing the normative need for treatment were 55.2%, 35.6% and 9.2%,

respectively.

Kok et al. compared the AC of IOTN and the total score of the CPQ₁₁₋₁₄ in determining the need for orthodontic treatment and showed that the children had given lower scores to themselves than the scores given by the examiners (statistically significant); this was consistent with our results.²⁰ In addition, de Oliveira et al. in their study on 187 children between 11 to 16 years in England showed that there have been discrepancies in using the IOTN according to the self-perceived and normative determination of the need for orthodontic treatment.²¹ Ghijssels et al. compared normative and self-perceived orthodontic treatment need in 11- to 16-year-old children and showed significant correlations between the normative orthodontic treatment need (IOTN AC) and most of the OHRQoL measures. Similarly, a significant correlation was found between the IOTN AC scores given by the experts and the IOTN AC ratings given by the students.²² Attention to the opinions of those who come for orthodontic treatment, their reasons for seeking treatment and their expectations of the results plays an essential role in achieving a successful outcome; although in some cases, it might be dispersed or even contradictory. Thus, when an

individual's need for treatment is in agreement with the scientific principles and the clinician's opinion, then seeking treatment will be inevitable.²³ Since the environment, friends, parents, and some other factors play an undeniable role in encouraging and referring the patients for orthodontic treatment, this has become a basis for measuring the need for treatment based on an individual's personal views.²⁴ This becomes more evident in orthodontic treatment; hence it can be said that measuring the normative need of an individual for orthodontic treatment cannot determine his/her self-perceived need for orthodontic treatment or predict his/her demand for it. In addition, feelings about mental well-being and other related aspects of being satisfied with one's dental appearance cannot be considered in assessment of the normative need. On the other hand, offering treatment on the basis of normative need may cause bias in selection of patients in favor of the treatment provider(s). Moreover, previous knowledge of the students about the arrangement and order of teeth, prior experience with orthodontic treatment and presence of a dentist or an orthodontist in their family may affect their assessment of their need for orthodontic treatment. Of course, these variables were not assessed in the current study.

The results of our study showed that only the correlation between the AC determined by the students and the score of functional limitations of the CPQ₁₁₋₁₄ was found to be statistically significant, although the correlation coefficient was low. There was no statistically significant correlation between the self-perceived need for orthodontic treatment and the scores of oral symptoms, mental well-being and social well-being in the CPQ₁₁₋₁₄. These findings reveal that malocclusion affects chewing hard foods, pronouncing some words and mental and social well-being and results in longer eating time and problems in drinking cold and hot

drinks. Besides, the correlation coefficients in assessing the correlation between the scores of the four variables, the total score of CPQ₁₁₋₁₄ and the normative need for treatment were lower and there was no statistically significant correlation between them. The highest correlation coefficient existed between the normative need and the oral symptoms and the least correlation coefficient was seen between the normative need and the score of functional limitations of the CPQ. The above-mentioned results indicate that having malocclusion based on a specialist's view had not resulted in appearance of oral symptoms, functional limitations and mental or social well-being problems. In the study by Kok et al., the scores of the AC in determining the normative need for orthodontic treatment had a statistically significant correlation only with the score of mental well-being of the CPQ₁₁₋₁₄ and no such correlation existed in other domains.²⁰ Besides, in the above-mentioned study, the correlation coefficient values between the scores of the self-perceived need for orthodontic treatment and the scores of the CPQ₁₁₋₁₄ were higher compared to those of the normative need; this was consistent with our results. The low values of the correlation coefficient of the AC of IOTN (self-perceived or normative) reveal the fact that these are two different scales that measure different characteristics (malocclusion or need for orthodontic treatment); the same view was emphasized in the study by Kok et al.²⁰ Mandall et al. also reported a weak correlation between the AC of IOTN in determining normative need for orthodontic treatment and the scores of the OHRQoL questionnaire ($\rho = 0.24$).¹⁰ In a study by de Oliveira and Sheiham, despite a statistically significant correlation between the Dental Health Component (DHC) of IOTN and the normative need for orthodontic treatment, a remarkable percentage of those needing orthodontic treatment showed no malocclusion-related

oral symptoms.²⁵ Forty six percent of those requiring orthodontic treatment (degrees 4 and 5 of IOTN) and 67% of those in moderate need of orthodontic treatment (degree 3 of IOTN) reported no social effect of malocclusion on their life while, interestingly, 28.6% of those who had reported social effects of malocclusion on their life did not need orthodontic treatment.

In order to evaluate the OHRQoL, the scores of the four variables and the total score of the CPQ₁₁₋₁₄ were reviewed based on the students' gender. The results showed that females had a higher score of mental well-being and total score of the CPQ₁₁₋₁₄ or a poorer quality of life than males in this study. This indicates their higher vulnerability to mental and psychological aspects of oral health problems. This emphasizes that the need for treatment is higher in girls.

In our study, we used the CPQ₁₁₋₁₄ to evaluate the OHRQoL. The reason for choosing this age group was that in this period, all or most of their permanent anterior teeth have erupted and most of them have not experienced orthodontic treatment. Jokovic et al. applied this questionnaire in 123 children with dental problems and verified its validity and reliability.^{15,26} These two studies showed that oral health has significant effects on individuals' mental well-being and their functionality, as detected in 11 to 14-year-old children. In a study by Goursand et al. the CPQ₁₁₋₁₄ differentiated children with treated dental caries from those with untreated caries.²² The results showed that the children with untreated dental caries had higher CPQ

scores and poorer quality of life than the treated ones. The fact that malocclusion is not the specific cause and other oral conditions may be the cause of high scores is the main limitation of this questionnaire.^{26,27} Hence, other questionnaires and criteria used in the future for evaluating the OHRQoL must be able to distinguish the effects of existence and severity of dental malocclusions from other oral conditions.

Conclusion

The results of our study revealed that there is a weak and minimal correlation between the scores of the four variables and the total score of the CPQ₁₁₋₁₄ and the AC of IOTN; this indicates that these indices have measured different characteristics. It also showed that the self-perceived need for orthodontic treatment was significantly less than the normative need for orthodontic treatment and the specialist determined a higher need for treatment for these students than the students themselves. It seems that using the criteria of the OHRQoL in assessing the self-perceived need for orthodontic treatment, along with normative needs, may provide an accurate estimate of the need for orthodontic treatment.

Conflict of Interests

Authors have no conflict of interest.

Acknowledgments

We wish to cordially thank Mrs. Esmaeli for her help in data collection and analysis. We also appreciate the support of Qazvin University of Medical Sciences for the grant provided for this study.

References

1. Navabi N, Farnudi H, Rafiei H, Tahmasbi Arashlow M. Orthodontic treatment and the oral health-related quality of life of patients. *J Dent Tehran Univ Med Sci* 2012; 9(3): 247-54. [In Persian].
2. Marques LS, Ramos-Jorge ML, Paiva SM, Pordeus IA. Malocclusion: esthetic impact and quality of life among Brazilian schoolchildren. *Am J Orthod Dentofacial Orthop* 2006; 129(3): 424-7.
3. Cunningham SJ, Hunt NP. Quality of life and its importance in orthodontics. *J Orthod* 2001; 28(2): 152-8.
4. Becker M, Diamond R, Sainfort F. A new patient focused index for measuring quality of life in persons with severe and persistent mental illness. *Qual Life Res* 1993; 2(4): 239-51.

5. Slade GD. Measuring oral health and quality of life. Chapel Hill, NC: University of North Carolina; 1997.
6. Zhou Y, Wang Y, Wang X, Voliere G, Hu R. The impact of orthodontic treatment on the quality of life a systematic review. *BMC Oral Health* 2014; 14: 66.
7. Liu Z, McGrath C, Hagg U. The impact of malocclusion/orthodontic treatment need on the quality of life. A systematic review. *Angle Orthod* 2009; 79(3): 585-91.
8. O'Brien K, Kay L, Fox D, Mandall N. Assessing oral health outcomes for orthodontics--measuring health status and quality of life. *Community Dent Health* 1998; 15(1): 22-6.
9. Mandall NA, McCord JF, Blinkhorn AS, Worthington HV, O'Brien KD. Perceived aesthetic impact of malocclusion and oral self-perceptions in 14-15-year-old Asian and Caucasian children in greater Manchester. *Eur J Orthod* 2000; 22(2): 175-83.
10. Mandall NA, Wright J, Conboy FM, O'Brien KD. The relationship between normative orthodontic treatment need and measures of consumer perception. *Community Dent Health* 2001; 18(1): 3-6.
11. Fox D, Kay EJ, O'Brien K. A new method of measuring how much anterior tooth alignment means to adolescents. *Eur J Orthod* 2000; 22(3): 299-305.
12. Navabi N. A science metric study of Iranian published articles about oral health-related quality of life. *J Oral Health Oral Epidemiol* 2013; 2(2): 49-55.
13. Taylor KR, Kiyak A, Huang GJ, Greenlee GM, Jolley CJ, King GJ. Effects of malocclusion and its treatment on the quality of life of adolescents. *Am J Orthod Dentofacial Orthop* 2009; 136(3): 382-92.
14. Leao A, Sheiham A. The development of a socio-dental measure of dental impacts on daily living. *Community Dent Health* 1996; 13(1): 22-6.
15. Jokovic A, Locker D, Stephens M, Kenny D, Tompson B, Guyatt G. Validity and reliability of a questionnaire for measuring child oral-health-related quality of life. *J Dent Res* 2002; 81(7): 459-63.
16. Brown A, Al-Khayal Z. Validity and reliability of the Arabic translation of the child oral-health-related quality of life questionnaire (CPQ11-14) in Saudi Arabia. *Int J Paediatr Dent* 2006; 16(6): 405-11.
17. Foster Page LA, Thomson WM, Jokovic A, Locker D. Validation of the child perceptions questionnaire (CPQ 11-14). *J Dent Res* 2005; 84(7): 649-52.
18. Khadem P, Jabarifar SE, Maryam H, Susan SS, Safaie M. Evaluation of agreement levels between parents and children in reporting oral health-related quality of life in 11-14 year-old children of Isfahan city in 2010. *J Dent Med* 2013; 26(3): 185-93. [In Persian].
19. O'Brien K, Wright JL, Conboy F, Macfarlane T, Mandall N. The child perception questionnaire is valid for malocclusions in the United Kingdom. *Am J Orthod Dentofacial Orthop* 2006; 129(4): 536-40.
20. Kok YV, Mageson P, Harradine NW, Sprod AJ. Comparing a quality of life measure and the Aesthetic Component of the Index of Orthodontic Treatment Need (IOTN) in assessing orthodontic treatment need and concern. *J Orthod* 2004; 31(4): 312-8.
21. de Oliveira CM, Sheiham A, Tsakos G, O'Brien KD. Oral health-related quality of life and the IOTN index as predictors of children's perceived needs and acceptance for orthodontic treatment. *Br Dent J* 2008; 204(7): 1-5.
22. Ghijssels I, Brosens V, Willems G, Fieuws S, Clijmans M, Lemiere J. Normative and self-perceived orthodontic treatment need in 11- to 16-year-old children. *Eur J Orthod* 2014; 36(2): 179-85.
23. Proffit WR, Fields HV, Sarver DM. Contemporary orthodontics. 3rd ed. Philadelphia, PA: Mosby Elsevier; 2000.
24. Jeffers JR, Bognanno MF, Bartlett JC. On the demand versus need for medical services and the concept of "shortage". *Am J Public Health* 1971; 61(1): 46-63.
25. de Oliveira CM, Sheiham A. The relationship between normative orthodontic treatment need and oral health-related quality of life. *Community Dent Oral Epidemiol* 2003; 31(6): 426-36.
26. Jokovic A, Locker D, Guyatt G. What do children's global ratings of oral health and well-being measure? *Community Dent Oral Epidemiol* 2005; 33(3): 205-11.
27. Goursand D, Paiva SM, Zarzar PM, Ramos-Jorge ML, Cornacchia GM, Pordeus IA, et al. Cross-cultural adaptation of the Child Perceptions Questionnaire 11-14 (CPQ11-14) for the Brazilian Portuguese language. *Health Qual Life Outcomes* 2008; 6: 2.