

## Patient Satisfaction Measuring Instrument—A Scoping Review

Krisnawati Erry Tarman<sup>1\*</sup>, Diah Ayu Maharani<sup>2</sup>, Miesje K. Purwanegara<sup>1</sup>

1. Department of Orthodontics, Faculty of Dentistry, Universitas Indonesia, Jakarta 10430, Indonesia.

2. Department of Preventive and Public Health Dentistry, Faculty of Dentistry, Universitas Indonesia, Jakarta 10430, Indonesia.

### Abstract

One of the most important tasks in dental care is helping patients reach an acceptable level of satisfaction with their dentition. Patient satisfaction after orthodontic treatment is poorly covered in the literature. Previous studies found that factors such as gender, age, type of malocclusion, and dentofacial improvement may influence satisfaction.

A scoping literature review was conducted to identify the optimal instrument for measuring patient satisfaction with orthodontic treatment. Using the keyword “patient satisfaction,” we found 68 articles. After exclusion, 12 articles were reviewed.

Seventeen articles met the inclusion criteria; however, 5 articles were excluded. Studies in Brazil and Jordan used the Dental Impact on Daily Living index to assess the level of satisfaction. The Academic Centre of Dentistry in the Netherlands reported on the development of a questionnaire and its application to evaluating patient satisfaction among patients treated from 2000 to 2009. Some studies used the IOTN or Peer Assessment Rating (PAR) Index to assess the degree of dental improvement after treatment.

Studies of patient satisfaction after orthodontic treatment report a wide range of satisfaction from 34% to 75%. The reason for this wide range is the difficulty in finding a relevant instrument that accurately reflects patient satisfaction with orthodontic treatment.

**Review (J Int Dent Med Res 2020; 13(2): 745-751)**

**Keywords:** Orthodontic, satisfaction, questionnaire.

**Received date:** 07 April 2020

**Accept date:** 14 May 2020

### Introduction

The goal of orthodontic treatment is to obtain a normal or ideal occlusion. The quality and stability of orthodontic treatment outcomes have usually been assessed by established metrics or categorical scales. As health services exist primarily to benefit the patient, an important variable for measuring outcomes would be overall patient satisfaction with the care provided. Unfortunately, patient satisfaction with orthodontic treatment is poorly covered in the literature.<sup>1,2</sup> Studies of patient satisfaction after orthodontic treatment have shown a wide range in satisfaction levels from 34% to 75%<sup>1-3</sup> although Birkland *et al.* reported an extremely high degree of satisfaction (95.4%) among adolescents.<sup>4</sup> Several studies have applied

different questionnaires to assess patient satisfaction after orthodontic treatment, making a comparison of results difficult.

Dentofacial problems have variable effects on patients, impacting performance, esthetics, and function. It has been shown that people who are dissatisfied with their facial appearance often express more dissatisfaction with their teeth. Patient satisfaction is defined as a “perceived value judgment and sustained response to service-related stimuli before, during, and after [the] use of the service.”<sup>5</sup> Meanwhile, another study defined patient satisfaction as the “level of [an] individual’s experience [as] compared with his or her expectations.”<sup>6</sup> Satisfaction with one’s dental appearance has been correlated with age and sex; specifically, it has been reported that satisfaction with the dentofacial appearance decreases with age, with adults often being less satisfied with their dentofacial appearance than adolescents.<sup>1</sup> Separately, females are more dissatisfied with the appearance of their dentition than males.<sup>3</sup> Similarly, girls are more concerned about malaligned teeth than boys.

#### \*Corresponding author:

Krisnawati Erry Tarman  
Department of Orthodontics, Faculty of Dentistry, Universitas  
Indonesia, Jakarta 10430, Indonesia.  
E-mail: krisnawati61@ui.ac.id; raniabdillah@gmail.com

In the last decade, orthodontic treatment has become more commonly accepted by adults. A survey in America reported that the proportion of orthodontic patients aged 18 to 54 years increased by 14% between 2010 and 2012.<sup>7</sup> In Asian countries, the ratio of middle-aged orthodontic patients (i.e., older than 40 years) grew twofold between 2008 and 2012.<sup>8</sup> Adult patients often have complex treatment needs in addition to predisposing malocclusion. Adults are more concerned about the impact of their treatment and show active attitudes toward facilitating better progress and results of their treatment. Motivation, expectation, and the subjective level of satisfaction after orthodontic treatment in adult patients can be regarded as important parameters to measure the overall outcome.<sup>8,9</sup>

A systematic review considering the long-term stability of orthodontic treatment and patient satisfaction concluded that only a few studies examining long-term patient satisfaction have been conducted to date, and most of these studies showed little scientific evidence.<sup>10</sup> The present study thus aims to review the available published literature assessing validated and standardized instruments used in orthodontics to measure patients' satisfaction with their orthodontic treatment.

### Materials and methods

A scoping review examining the use of instruments that evaluated patient satisfaction with their orthodontic treatment was planned, and a literature search was conducted by one author. Scoping reviews are useful for mapping, collating, and summarizing existing literature on a topic and can assist researchers in identifying the nature and extent of the current research evidence. The five stages of a scoping review consist of identifying the research question; identifying relevant studies; study selection; charting the data; and collating, summarizing, and reporting the results.<sup>11</sup>

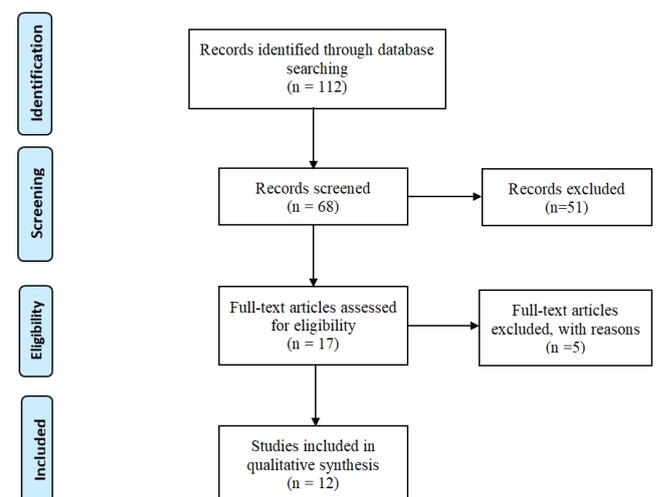
Medical Subject Headings (MeSH) were reviewed to obtain the correct terms for keywords. The final keywords chosen were "patient satisfaction," "orthodontic treatment outcome," and "subjective evaluation." The literature review focused on identifying all available articles in the PubMed database that met the inclusion criteria. Eligible articles were English-language studies

published in the last 10 years between 2009 and 2019. The inclusion and exclusion criteria used in this review are shown in Table 1.

Criteria	Inclusion	Exclusion
Period	2009 to 2019	Outside the date range
Language	English	Not written in English
Article type	Original research article published in a peer-reviewed journal that describes a tool. The article may then proceed to use the tool or report of instrument or tool	Not original research, not a peer-reviewed journal article, and/or unpublished
Study focus	Instruments that evaluate patient satisfaction with their orthodontic treatment	N/A
Geographical area of interest	International studies, including those involving specific cultural groups	N/A
Sample	Human	N/A

**Table 1.** Inclusion and exclusion criteria for article selection.

The literature search identified 68 publications that were screened by title and abstract and according to the stated inclusion and exclusion criteria. The literature search and selection method was adapted from the Preferred Reporting Items for Systematic Reviews and Meta-analyses statement. In total, only 11 publications were finally deemed suitable in light of this review's objective. Figure 1 presents a flow diagram of the literature search and selection process.



**Figure 1.** Flowchart of literature search and selection.

### Results

Among the included studies, many countries were represented, including Brazil,

Canada, China, the Netherlands, the United Kingdom, Sweden, Jordan, Iran, India, Pakistan, Finland, and Korea (Table 2). The age of participants varied between studies, with an overall range of 11- to 60-year-olds. Some studies, such as those in Jordan, Brazil, and India, used the Dental Impact on Daily Living (DIDL) questionnaire to measure subjective orthodontic treatment outcome with a Likert scale or VAS, while objective treatment outcomes were measured with either the Peer Assessment Rating (PAR) index or IOTN. Questionnaires included information about socio-demographic conditions, education level, oral health behaviors, and general health behaviors.

## Discussion

Indices for epidemiological studies, orthodontic treatment needs, or diagnostics are already established, but those considering psychological or subjective outcomes of orthodontic care remain to be assessed. The most frequently used response format is a Likert scale with 5 to 7 points. Other alternatives are the visual analog scale (VAS).

A study was done to examine differences between Chinese, Japanese, and American populations ( $n = 136, 323, \text{ and } 160$ ) regarding responses on a Likert scale. They found that the Japanese respondents more frequently reported difficulty with using the scale, while the Chinese respondents more frequently skipped questions. Further, both of these groups selected midpoint values more frequently on items that involved admitting to a positive emotion than did the Americans.<sup>13</sup> Studies conducted in the past to assess the satisfaction level among patients have largely focused on dental visits in general. Only a few have evaluated satisfaction among orthodontic patients specifically.<sup>14</sup>

In 2003, a study done at the Academic Centre of Dentistry (ACTA) in the Netherlands examined whether compliance was considered as a determinant of patient satisfaction after orthodontic treatment.<sup>15</sup> Ten patients were older than 30 years of age, and 4 patients had a cleft lip and palate; these 14 patients were excluded from the study. The mean age of the subjects was 15.81 years (SD: 1.81 years), and 56% of the population was female. The total scale was divided into 6 subscales, which were doctor-patient relationship, orthodontic clinic, dentofacial

improvement, psychosocial improvement, dental function, and a residual category.

Separately, a study in Jordan sought to identify factors that may affect patients' satisfaction with their dentition after orthodontic treatment.<sup>3</sup> Fifty patients (20 males and 30 females) with a mean  $\pm$  standard deviation age of  $20.7 \pm 4.2$  years who had successfully undergone fixed orthodontic treatment were included in this study. The Dental Impact on Daily Living (DIDL) questionnaire was used to assess the impact of orthodontic treatment on daily living and satisfaction with the dentition in the study sample. The authors also used the NEO Five Factors Inventory to assess personality traits. Pretreatment and posttreatment study models were assessed for each patient to evaluate the success of the orthodontic treatment using the Peer Assessment Rating (PAR) index. All patients had a reduction in the weighted PAR score of more than 80%, indicating a good standard of treatment.<sup>19</sup> In this study, orthodontically treated patients showed high levels of satisfaction. This finding might be justified by the fact that orthodontic treatment can affect dental performance positively. This study also showed that sex had no association with any dimension of dental satisfaction. Further, satisfaction with dentition after orthodontic treatment showed no relationship with age.

A previous study conducted in Brazil reported there were no relationships between gender, age, extraction for orthodontic reasons, or the amount of treatment time with patient satisfaction after orthodontic treatment.<sup>1</sup> This study used the DIDL and PAR Index as the measurement indices. Another study used DIDL only.<sup>20</sup>

Hirvinen *et al.* performed a study to assess the objective and subjective outcomes of orthodontic care in one municipal healthcare facility in Finland. All respondents filled in a semistructured questionnaire and were asked to score their own dental appearance on a VAS using a series of photographs according to the aesthetic component of the IOTN. The authors found that orthodontic treatment seems to improve both occlusal morphology and function.<sup>21</sup>

A trend study was conducted at the ACTA to compare the satisfaction levels of patients treated at the same institution a decade ago.<sup>22</sup> It was found that the satisfaction of patients with orthodontic treatment had significantly increased

over time. No correlation was found between gender and patient satisfaction. The relationship between the doctor and the patient remained the most important factor in patient satisfaction. Orthodontists should be aware that a good relationship with their patients may be even more important for a good outcome than achieving technically successful treatment alone. However, the authors assumed that people from different socioeconomic backgrounds, cultures, and ethnicities might place different values on the results. Another limitation was that, in the present sample, the type of orthodontic treatment was not considered, which may have affected the level of patient satisfaction.

A study was done in Sweden to examine factors associated with treatment outcome satisfaction in adolescent patients using two types of questionnaire. This study found no correlation between sex and satisfaction with treatment outcome, which is similar to the findings of other research.<sup>23</sup> Motivation to undergo treatment showed a correlation with treatment satisfaction, which is similar to the findings of Anderson *et al.*<sup>24</sup>

Another study in Brazil analyzed the psychological aspects of adult patients who underwent orthodontic treatment, evaluating their expectations and discomfort during treatment as well as their level of satisfaction. The authors used a set of questionnaires given to 54 adults, mostly female patients between 20 and 30 years old (53%) who were not satisfied with their smile esthetics and who had received orthodontic treatment. The reason for not seeking orthodontic treatment earlier, the majority answered, was that they did not have the financial means or did not feel inconvenienced by the malocclusion they had.

The motivation and subjective level of satisfaction after orthodontic treatment in adult patients can be regarded as important parameters to facilitate the overall outcome. In clinical settings, the orthodontic outcome is mainly defined through objective features by orthodontic specialists, whereas the evaluation of the subjective outcomes is still limited, especially in adults.<sup>25-27</sup>

Lee *et al.* developed a simple questionnaire that can be applied to evaluate the subjective level of satisfaction after orthodontic treatment.<sup>8</sup> A questionnaire was designed to measure the level of satisfaction in 10 items,

using a 5-point Likert scale. The total mean satisfaction score was 3.9 points. The levels of satisfaction for tooth alignment and confident smile and self-image were significantly higher than those for facial appearance and eating and chewing ( $p < 0.001$ ). Patients aged 50 years or older were more satisfied than younger patients, and males were more satisfied than females ( $p < 0.05$ ).

Recently, a study found that in general, adult orthodontic patients are satisfied with their treatment, and good communication played a major part in this finding. A total of 26 adults were recruited from two sites, a teaching hospital and a private specialist practice. Data were collected using in-depth interviews, and thematic content analysis with a framework approach was applied to analyze the data.<sup>28</sup> Despite the differences in sources, many similarities arose when comparing the factors between the two sites.

## Conclusions

Patient satisfaction with orthodontic treatment is subjective and influenced by many factors. Studies of patient satisfaction after orthodontic treatment have reported a wide range of satisfaction levels from 34% to 75%. The reason for this wide range is the difficulty in finding a relevant tool that reflects patient satisfaction with orthodontic treatment. Subjective orthodontic treatment outcomes can be measured by questionnaires using a Likert scale or VAS, while objective treatment outcomes can be measured using occlusal indices, such as the IOTN or PAR index.

Some studies have found that, instead of sex and age, the relationship between the doctor and the patient plays a significant role in patient satisfaction. A good relationship with the patient may be even more important than achieving technically successful treatment alone. Other factors, such as motivation, the severity of malocclusion, experiences of discomfort during treatment, and quality of treatment, may contribute to the level of satisfaction among orthodontic patients.

## Declaration of Interest

The authors report no conflict of interest.

Author and year of publication	Published title	Aim of study	Instrument used for measuring satisfaction with orthodontic treatment	Sample size
Al-Omiri <i>et al.</i> <sup>3</sup>	Factors affecting patient satisfaction after orthodontic treatment	To identify factors that may affect patient satisfaction with their dentition after orthodontic treatment	DIDL36 questions PAR Index NEO-FFI	n = 50 Male: 20 Female: 30 Mean age: 20.7
Maia <i>et al.</i> <sup>1</sup>	Factor associated with long-term patient satisfaction	To identify factors associated with patient satisfaction at least five years after orthodontic treatment	DIDL	n = 248 Response rate: 62%
Bos <i>et al.</i> <sup>15</sup>	Patient compliance: a determinant of patient satisfaction	To examine whether level of compliance can be considered as a determinant of patient satisfaction	Questionnaires Six subscales	n = 114 patients < 30 years old
Birkeland <i>et al.</i> <sup>4</sup>	Relationship between occlusion and satisfaction with dental appearance in orthodontically treated and untreated groups	To assess the relationship between occlusion, satisfaction with dental appearance, and self-esteem at the ages of 11 (T1) and 15 years (T2)	*AC and DHC from IOTN  *Questionnaires	n = 224 dental cast *16 treated with removable appliances *51 treated with fixed appliance *157 untreated
Khan <i>et al.</i> <sup>14</sup>	Assessment of satisfaction level among orthodontic patients	To determine the level of satisfaction among patients undergoing orthodontic treatment	17 closed-ended questionnaires	n = 309 patient 28.5% male 71.5% female
Feldmann <sup>23</sup>	Satisfaction with orthodontic treatment outcome	To examine factors associated with the treatment outcome satisfaction in a group of adolescent patients	*Questionnaires *Using VAS	n = 120 Male: 60 Female: 60 Mean age: 14.3 years
Keles <i>et al.</i> <sup>22</sup>	Satisfaction with orthodontic treatment	To examine the satisfaction of patients with their orthodontic treatment	*Questionnaire contains 58 questions divided into six subscales * Sent to all patients younger than 30 years old	n = 115 34.8% male 65.2% female

Oliveira P, Tavares R et al. Dental Press J Orthod, 2013	Assessment of motivation, expectations and satisfaction of adult patients submitted to orthodontic treatment	To analyze the psychological aspects of adult patients who sought and underwent orthodontic treatment	*Questionnaires	n = 54 Male: 14 Female: 40 Age: 20–61 years
Hirvinen <i>et al.</i> <sup>21</sup>	The objective and subjective outcome of orthodontic care in one municipal health center	To assess both the objective and subjective outcomes of orthodontic care in one municipal health center	*OMF index *IOTN	n = 67 patient 38 boys and 27 girls Mean age was 15.9 years
Anderson <i>et al.</i> <sup>2</sup>	Adolescent patient treatment motivation and satisfaction with orthodontic treatment	To determine whether adolescent satisfaction with orthodontic treatment outcomes is correlated with the degree to which (1) the adolescents focused on (2) and whether parents' assessments of their children's motivation would correlate with their children's posttreatment satisfaction	Mailed questionnaires  Assessed with a revised version of Kiyak's postsurgical patient satisfaction questionnaire	n = 75 patients Male: 28 Female: 47 Age: 11.6 ± 1.92  n = 72 parents
Lee <i>et al.</i> <sup>8</sup>	Treatment satisfaction and its influencing factors among adult orthodontic patients	To investigate the level of satisfaction with orthodontic treatment among adult patients	*Focus group *Questionnaire  *Likert scale	n = 298 older than 19 years Male: 91 Female: 207
Wong <i>et al.</i> <sup>28</sup>	Factors influencing satisfaction with the process of orthodontic treatment in adult patients	To investigate factors influencing satisfaction with the process of orthodontic treatment in adult patients	In-depth interview from two sites: teaching hospital and private practice	26 adults were recruited (13 at each site)

## References

1. Maia NG, Normando D, Maia FA, Ferreira MA, and do Socorro Costa Feitosa Alves M. Factors Associated with Long-Term Patient Satisfaction. *Angle Orthod* 2010; 80:1155-1158.
2. Bos A, Hoogstraten J, and Prahl-Andersen B. Expectations of Treatment and Satisfaction with Dento Facial Appearance in Orthodontic Patients. *Am J Ortho Dentofacial Orthop* 2003; 123:127-132.
3. Al-Omiri MK, and Abu Alhajja ES. Factors Affecting Patient Satisfaction After Orthodontic Treatment. *Angle Orthod* 2006; 76:422-431.
4. Birkeland K, Bøe OE, and Wisth PJ. Relationship Between Occlusion and Satisfaction with Dental Appearance in Orthodontically Treated and Untreated Groups. A Longitudinal Study. *Eur J Ortho*. 2000; 22:509-518.
5. Aharony L and Strasser S. Patient Satisfaction: What We Know About and What We Still Need to Explore. *Med Care Rev* 1993; 50:49-79.
6. Kumar PD and Zahra F. Factors Affecting Patient Satisfaction Among Those Attending an Outpatient Department in Chennai City-India. *J Indian Assoc Public Health Dent* 2008; 12:15-19.

7. Ackerman JL, Nguyen T, and Proffit WR. The decision-making process in orthodontics. In: Graber LW, Vanarsdall RL, Vig KWL, eds. *Orthodontics: Current Principles and Techniques*. 5th ed. Philadelphia: Mosby; (2012): 3-58.
8. Lee R, Hwang S, Lim H, Cha JY, Kim KH, and Chung CJ. Treatment Satisfaction and Its Influencing Factors Among Adult Orthodontic Patients. *Am J Orthod Dentofacial Orthop* 2018; 153:808-817.
9. Soh J and Sandham A. Orthodontic Treatment Need in Asian Adult Males. *Angle Orthod* 2004; 74:769-773.
10. Bondemark L, Holm AK, Hansen K, et al. Long-Term Stability of Orthodontic Treatment and Patient Satisfaction. A Systematic Review. *Angle Orthod* 2007; 77:181-191.
11. Moher D, Liberati A, Tetzlaff J, Altman DG, and The PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses; 2009.
12. Peter E, Baiju RM, Varghese NO, Sivaraman R, and Streiner DL. How to Develop and Validate a Questionnaire for Orthodontic Research. *Eur J Dent* 2017; 11:411-416.
13. Lee JW, Jones PS, Mineyama Y, and Zhang XE. Cultural Differences in Responses to a Likert Scale. *Res Nurs Health* 2002; 25:295-306.
14. Khan SQ, Ashraf B, Khan NQ, and Hussain SS. Assessment of Satisfaction Level Among Orthodontic Patients. *Pak Oral Dent J* 2014; 34:651-655.
15. Bos A, Vosselman N, Hoogstraten J, and Prah-Andersen B. Patient Compliance: A Determinant of Patient Satisfaction? *Angle Orthod* 2005; 75:526-531.
16. Richmond S, Shaw WC, Roberts CT, and Andrews M. The PAR Index (Peer Assessment Rating): Methods to Determine Outcome of Orthodontic Treatment in Terms of Improvement and Standard. *Eur J Orthod* 1992; 14:180-187.
17. Cobourne M and Andrew D. *Hand book of orthodontics*. 2nd ed. Elsevier; (2016): 25-23.
18. Saucier G. Replicable Item-Cluster Subcomponents in the NEO Five-Factor Inventory. *J Pers Assess* 1998; 70:263-276.
19. Erdinç AM and Dinçer B. Perception of Pain During Orthodontic Treatment with Fixed Appliances. *Eur J Ortho* 2004; 26:79-85.
20. Deepan Kumar CV, Mohamed S, Janakiram C, and Joseph J. Validation of Dental Impact on Daily Living Questionnaire Among the Tribal Population of India. *Contemp Clin Dent* 2015, September; 6:S235-S241.
21. Hirvinen H, Heikinheimo K, and Svedström-Oristo AL. The Objective and Subjective Outcome of Orthodontic Care in One Municipal Health Center. *Acta Odontol Scand* 2012; 70:36-41.
22. Keles F and Bos A. Satisfaction with Orthodontic Treatment. *Angle Orthod* 2013; 83:507-511.
23. Feldmann I. Satisfaction with Orthodontic Treatment Outcome. *Angle Orthod* 2014; 84:581-587.
24. Anderson LE, Arruda A, and Inglehart MR. Adolescent Patient's Treatment Motivation and Satisfaction with Orthodontic Treatment. Do Possible Selves Matter? *Angle Orthod* 2009; 79:821-827.
25. Xiao-Ting L, Tang Y, Huang XL, Wan H, and Chen YX. Factors influencing Subjective Orthodontic Treatment Need and Culture-Related Differences Among Chinese Natives and Foreign Inhabitants. *Int J Oral Sci* 2010; 2:149-157.
26. Pabari S, Moles DR, and Cunningham SJ. Assessment of Motivation and Psychological Characteristics of Adult Orthodontic Patients. *Am J Orthod Dentofacial Orthop* 2011. Dec; 140:e263-e272.
27. Oliveira PG, Tavares RR, and Freitas JC. Assessment of Motivation, Expectations and Satisfaction of Adult Patient Submitted to Orthodontic Treatment. *Dent Press J Orthod* 2013, April; 18:81-87.
28. Wong L, Ryan FS, Christensen LR, and Cunningham SJ. Factors Influencing Satisfaction with the Process of Orthodontic Treatment in Adult Patients. *Am J Orthod Dentofacial Orthop* 2018 March; 153:362-370.