

## Patient Satisfaction with Orthodontic Treatment

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### Abstract

Healthcare services cannot be considered of high quality if patients are not satisfied. Many studies related to orthodontic patient satisfaction have been conducted in various countries namely Amsterdam, Sweden, Norway, Brazil, the United Kingdom, Korea, and China. Patient satisfaction with orthodontic treatment results ranges from 34% to 95%. This wide range may be due to the difficulty in finding a gold standard measuring tool to assess patient satisfaction. A study was conducted using a patient satisfaction measuring tool, which is a cross-cultural adaptation of the Academic Centre Dentistry Amsterdam (ACTA) questionnaire.

The aim of this study was to find out risk factors associated with patient satisfaction and to obtain the cut-off point of patient satisfaction for those undergoing orthodontic treatment at the Orthodontic Clinic Faculty of Dentistry Universitas Indonesia dental teaching hospital during 2018-2021.

The study began with processing adaptation of the Academic Centre for Dentistry Amsterdam (ACTA) questionnaire. Reliability testing was carried out with Cronbach alpha and Principal Component Analysis to test construct validity, until we obtained 5 domains and 34 questions that were valid and reliable. We conduct bivariate analysis with Independent T test, One Way ANOVA and multivariate analysis with logistic regression to obtain factors that influence patient satisfaction with orthodontic treatment.

The validity and reliability of the patient satisfaction questionnaire can be used in this study. According to the findings of multivariate analysis, the factors that most influence Patient satisfaction are education (OR=0.17) and socioeconomic (OR= 2,31) Analysis using the ROC Curve with a comparison of ICON scores obtained a cutoff point of 162.5 (sensitivity 0.5 and specificity 0.326) comparing between Satisfied and Not Satisfied Group.

This study found that 87.59% of respondents expressed satisfaction with Orthodontic treatment at dental hospital, Faculty of Dentistry Universitas Indonesia. Multiple regression analysis showed that education and socio-economic factors may affect treatment satisfaction.

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### Introduction

The main goal of dental health care is to help patients to provide satisfaction with dental care services. In the last decade, there has been a major change in people's behavior and *mindset* related to health services, including dental health. Patient satisfaction plays an

important role because it is a marketing element that has a positive impact on the health service center and builds consumer loyalty.<sup>1,2</sup>

Patient satisfaction after orthodontic treatment is influenced by several factors like age, gender, compliance, education, socio economic and dentofacial improvement also seem to contribute to the level of satisfaction. Orthodontic treatment is a branch of dentistry procedure related to efforts to improve the arrangement of teeth and jaws and restore function.<sup>3,4</sup>

Malocclusion can be defined as deviation from the ideal that has a negative impact on a person's growth and development and facial

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appearance and decreased self-confidence. Individuals with malocclusion often experience problems related to chewing function, swallowing, speech function to jaw joint abnormalities. Individuals with malocclusion are prone to caries, periodontal disease, or trauma, in addition to being bullied by the appearance of their face.<sup>5,6</sup> The condition can affect an individual's social life so that psychosocial problems are often a reason for a person to receive orthodontic treatment.

Studies in various big cities in Indonesia found that the need for orthodontic treatment in adolescents ranged from 57% - 68%. Although the prevalence of malocclusion is quite high, currently there is still a low rate of dental treatment in the community which may be influenced by demographic, socio-economic factors. Indonesian society depends on the ability to pay rather than the need for care.<sup>7</sup> A person who undergoes orthodontic treatment usually have knowledge of good dental and facial appearance so that he or she hopes to get satisfaction with the results of their orthodontic treatment.

Over the past decade, a person's perception of the appearance of teeth seems to change. The number of patients seeking orthodontic treatment increases as socioeconomic conditions improve, possibly the role of media in influencing a person's perception of facial appearance. A survey by the American Association of Orthodontists showed adult patients aged 18-54 years increased by about 14% in the period 2010-2012. In some Asian countries, patients over the age of 40 doubled in the period 2008-2012.<sup>8</sup>

Expectations and levels of satisfaction after treatment in adult patients are considered important parameters to measure the outcome of orthodontic treatment. Research on orthodontic patient satisfaction in terms of objectives using various indices has been widely carried out while subjective patient satisfaction measurement tools are still limited.<sup>9</sup> Patient satisfaction measurement tool that based the assessment on the success of treatment was still limited in Indonesia.

The main goal of dental health services is to provide a sense of satisfaction for patients for the dental care obtained. Patient Satisfaction is defined as an assessment of health services received before, during and after completion.<sup>8-10</sup>

Dentofacial problems will have a satisfying impact on a person because they involve aesthetics, appearance, and function. A person can feel dissatisfied with his appearance because he is not satisfied with the condition of his teeth.

Research on patient satisfaction with dental health services has been around since the 1970s, which consist of five aspects, namely: 1. Competence 2. Interpersonal factor 3. Comfort, 4. Cost 5. Facilities.<sup>2,8</sup> Patient satisfaction studies have been conducted in the Netherlands, Brazil, Finland, Sweden, Norway, the United Kingdom, Korea, many more but few have linked patient satisfaction to treatment outcomes.<sup>8,9,11-21</sup> Patient satisfaction with orthodontic treatment ranges from 34% - 95%.<sup>8,9,12</sup> In previous studies, different factors have been explored and different instruments/tools have been used. Different questionnaire methods as selected statistical analyses make *cross study* complicated.

Bos, Vosselman *et al* from the Academic Centre of Dentistry Amsterdam (ACTA) found that compliance was not associated with patient satisfaction, only gender was a good predictor of patient satisfaction with doctor-patient communication. Keles and Bos, conducted a *trend study* to compare the satisfaction of orthodontic patients admitted to ACTA clinics a decade earlier. The result was that patient satisfaction treated in 2009 increased significantly but there was no correlation between sex and patient satisfaction. Patient Satisfaction Questionnaire used at the *Academic Centre of Dentistry Amsterdam* (ACTA) consists of 58 questions and 6 domains, namely doctor-patient relationship, situational aspects, dentofacial improvement, psychological aspects, dental function, and other categories.<sup>17</sup> They predict that people from different socio-economic backgrounds, cultures, ethnic may produce different values of result. Feldmann's study on 110 adolescents using 2 (two) sets of questionnaires. The results showed that communication with doctors have the high correlation to patient satisfaction.<sup>18</sup>

A person with malocclusion needs orthodontic treatment to improve tooth alignment, chewing function, possibly even appearance so that they feel more comfortable being accepted in their social environment. Evaluation of patient satisfaction needs to be

done because it will be a reference for the performance of health facilities and influence patients to choose a dentist or dental specialist who will treat them. Therefore, input from patients is an important factor to assess the quality of health services provided so far.

Patient satisfaction is an assessment of health services received before, during and after completion.<sup>2</sup> Generally measured are Competence, Interpersonal factors, Comfort, Cost, Facilities, which has not been elaborate among orthodontics patients in Indonesia. The aim of this study was to find out risk factors associated with patient satisfaction and to obtain a cut-off point of patient satisfaction for those undergoing orthodontic treatment at Orthodontic Clinic of Faculty of Dentistry Universitas Indonesia Dental Hospital during 2018-2021.

### Materials and Methods

This study was *cross sectional* design, carried out in two stages. It was conducted after obtaining Ethical Approval from the Ethics Commission, Faculty of Dentistry UI, no: 125/ Ethical Approval/ FKGUI/ XII / 2019.

The first stage began with the cross-cultural adaptation questionnaire from Academic Centre of Dentistry Amsterdam (ACTA) carried out with protocol for cross-cultural adaptation of research instruments.<sup>14</sup> The second stage was conducted to analyze risk factors that contribute to patient satisfaction. The study population was orthodontic patients who had undergone orthodontic treatment at Faculty of Dentistry Dental Hospital Universitas Indonesia. Based on the following inclusion criteria: male or female patient, age above 15 years old; has finished orthodontic treatment in the period June 2020 to January 2021. Exclusion criteria were patients with cleft lip and palate, patients with severe skeletal abnormalities, orthognathic surgery patients, or finished their orthodontic treatment in health facilities other than Faculty of Dentistry Dental Hospital Universitas Indonesia.

The study began by testing the ACTA questionnaire consisting of 6 domains and 58 items on 30 respondents. Domain 1. Doctors-patient relationship 8 items valid, Cronbach alpha 0.915 . Domain 2, Situational aspects only 4 items valid, Cronbach @: 0.737. Domain 3 Dentofacial improvement 9 items valid with Cronbach alpha @: 0.918 Domain 4 Psychosocial

improvement 8 items with Cronbach @: 0.923 Domain 5, Dental Function 4 items valid with Cronbach @; 0.872 domain 6 only 1 item valid, so it cannot proceed to reliability testing.

*Principal Component Analysis* (PCA) was conducted with Kaizer Normalization rotation method and we obtained 5 domains and 34 valid and reliable questions. The questionnaire was sent to all patients that met the criteria. Until end of January 2021 we got 146 questionnaires; nine were excluded from the study because of incomplete data therefore 137 questionnaires were used in the analyses.

### Statistical Analysis

All the questionnaires were analyzed using SPSS 23.0. Gender differences were tested using an independent sample t-test, while other risk factors such as age, education and socioeconomic were tested using One-way ANOVA.

### Results

| Variable                   | Total (n)  | Percentage (%) |
|----------------------------|------------|----------------|
| <b>Gender</b>              |            |                |
| Male                       | 24 person  | 17.52          |
| Female                     | 113 person | 82.48          |
| <b>Age</b>                 |            |                |
| 15.1 – 19 years            | 16 person  | 11.67          |
| 20 – 25 years              | 42 person  | 30.67          |
| >26 years                  | 79 person  | 57.66          |
| <b>Education</b>           |            |                |
| Middle school              | 56 person  | 40.87          |
| High school, undergraduate | 75 person  | 54.74          |
| Graduate/postgraduate      | 6 person   | 4.37           |
| <b>Ethnicity</b>           |            |                |
| Malay Deutro               | 121 person | 88.32          |
| Non Deutro Malay           | 16 person  | 11.68          |
| <b>Socio-Economic</b>      |            |                |
| Low income                 | 31 person  | 22.62          |
| Moderate income            | 61 person  | 44.52          |
| High income                | 35 person  | 25.54          |
| Very High                  | 10 person  | 7.29           |

**Table 1.** Characteristics of the subject based on socio-demographics.

After obtaining a valid and reliable patient satisfaction questionnaire cross cultural adaptation consisting of 5 domains and 34 questions was distributed to respondents who met the inclusion criteria, and some were sent to sample through *Google Form* with the link:

<https://forms.gle/M3semXpCPXRsuDbh8> for data collection. The study subjects who met the inclusion criteria were 137 respondents consisting of 24 male and 113 female with age range of 15 – 43 years old.

## Discussion

Patients who want orthodontic treatment to increase as socio-economic improvements make it possible that socio-media influence a person's perception of facial appearance. In some Asian countries, patients over the age of 40 doubled in the period 2008-2012. Study by Elaine Tan, Lin Song *et al* from the National University of Singapore found an increase in adult patients who want orthodontic treatment.<sup>22</sup> Dentofacial problems are thought to give satisfaction to a person because they are related to appearance, aesthetics, and function. Pabari, Moles *et al* study's on 172 adult patients undergoing orthodontic treatment at the Dental Hospital, London found that patients' main motivation was to improve their smiles.<sup>23,24</sup>

Orthodontic treatment for the people of Indonesia is still quite expensive and takes at least 18 months to achieve good results. Patients certainly hope that aligning teeth, function and facial appearance will be better at the end of treatment. To determine patient satisfaction with orthodontic treatment, Orthodontic specialist service providers need a Patient Satisfaction measurement tool<sup>25,26</sup> Patient satisfaction studies especially orthodontic patients have been conducted in many countries but very limited that has been carried out in Indonesia. We decided to make cross-cultural adaptations of the ACTA questionnaire with the consideration that the questionnaire was valid and reliable. Studies by Bos, Vosselman *et al* were also a reference from studies in Brazil, Sweden, Korea. Bos *et al* acknowledge the limitations of their study at ACTA, that they are not appropriate for other races, so the results cannot be generalized.

Based on the data collected, subjects who met the inclusion criteria were 137 persons consisting of 113 female and 24 male respondents the age range of 15 years to 43 years, meaning adolescent patients to elderly adults. While respondents in ACTA were patients under 30 years old and an average of 17.3 years. Adolescent patients will recognize themselves based on what they see and are known as self-

image. Adult knowledge, insight and social life have been more developed than adolescent patients. Adults are not easily satisfied, and expectations of treatment outcomes are higher than younger patients because it contribute to career success.<sup>16</sup>

This study also found that subjects under 19-years old had a higher score on all elements of patient satisfaction. These findings were similar with Boss, Johan *et al* who stated that adolescent girls aged 13-16 years are very concerned about the condition of the teeth. Awareness of body shape including teeth will increase until it reaches its peak at the age of 16-17 years. Adolescents are self-aware, have strong internal and external motivation and generally the cost of orthodontic treatment is borne by the family. Most patients who seek orthodontic treatment are female and they pay more attention to appearance so the demands for satisfaction and success are high. Study by Feldmann found no significant correlation between gender and treatment outcomes. The findings are also supported by the studies of Al-Omiri and Maia *et al*. Although male and female consult for dental-facial abnormalities, their expectations are different. Male motivation tends to increase identity in social circles, while female is more related to appearance. The independent T test showed no significant results and concluded that both male and female subjects obtained the same satisfaction with the results of orthodontic treatment from Faculty of Dentistry Dental Hospital, Universitas Indonesia.

Socio-economic factors are obtained by asking the total expenditure and number of family members living in the same house and obtaining data on respondents with the lowest living needs (poorest) to the richest. In this study, we divided it into 4 categories, referring to several studies in the field of Orthodontics related to socioeconomic, The data obtained varied to 10 subjects with very high socioeconomic and 31 respondents with low socioeconomic based on the adult-equivalence scale from Maharani's study concluded that dental health services in the Indonesian population are still uneven, allegedly related to economic and geographical problems.<sup>27</sup> Gao *et al* study found that income level wasn't correlated with pain, anxiety, or quality of life in the study sample.<sup>28</sup> The results of the multivariate analysis showed that educational and socio-economic risk factors play a role in orthodontic patient satisfaction. This finding is accordance

with Sirin's study and Sabrina *et al* that there is a relationship between socio-economic status and perception of the need for orthodontic treatment in adolescents.<sup>29,30</sup>

Most patients who come to the orthodontic clinic at Dental Hospital are adult patients and they pay for their own orthodontic treatment. We also measured the treatment outcome from study model using *Index of Complexity and Treatment Outcome*. (ICON)<sup>31,32</sup> The subjects of this study were mostly class 1 malocclusion with easy to very difficult complexity, while there were 17 cases with class 3 malocclusion. Majority of malocclusion cases can be carried out in a greatly improvement manner although the complexity of the cases varies. ROC analysis found that the cut-off point was 162.5 and as many as 87.59% of respondents were satisfied with orthodontic treatment at Dental Hospital, Universitas Indonesia.

Limitation of this study is the cross-sectional research design, possibility of selection bias during data collection. The number of research subjects were limited and obtained only from one health center because this study took

place during the pandemic covid 19. The sensitivity and specificity of the cut-off point 162.5 probably could be improved if there are more subjects included. It is necessary to add other variables such as motivation and expectations to provide more related factors of patient satisfaction.

### Conclusion

Multivariate analysis found that educational and socioeconomic factors play a role in patient satisfaction. ROC Curve compared to ICON score obtained a *cut-off point* of 162.5 (sensitivity 0.5 and specificity 0.326) means that respondents who have a satisfaction score value above 162.5 satisfied and whom has a total score under 162.5 not satisfied with the results of orthodontic treatment on Faculty of Dentistry Dental Hospital Universitas Indonesia.

### Declaration of Interest

The authors report no conflict of interest.

| Item                                  | Mean | Median | Reliability            |       | Rotated loading from 5 factors |      |       |       |       |  |
|---------------------------------------|------|--------|------------------------|-------|--------------------------------|------|-------|-------|-------|--|
|                                       |      |        | Alpha if item deleted* | CITC* | 1                              | 2    | 3     | 4     | 5     |  |
| <b>A. Doctor-patient relationship</b> |      |        |                        |       |                                |      |       |       |       |  |
| A3                                    | 5.3  | 5      | .682                   | .529  | .630                           | .133 | .095  | .424  | .066  |  |
| A5                                    | 5.4  | 5      | .653                   | .679  | .800                           | .227 | .206  | -.091 | .126  |  |
| A6                                    | 5.3  | 5      | .657                   | .783  | .708                           | .102 | .239  | .054  | .020  |  |
| A7                                    | 5.4  | 5      | .657                   | .583  | .707                           | .283 | .059  | .200  | .104  |  |
| A8                                    | 5.5  | 6      | .652                   | .720  | .768                           | .213 | .110  | .119  | .113  |  |
| A9                                    | 5.3  | 5      | .655                   | .743  | .769                           | .262 | .189  | .038  | .097  |  |
| A10                                   | 5.2  | 5      | .700                   | .314  | .555                           | .116 | .168  | .174  | .440  |  |
| A11                                   | 5.6  | 5      | .680                   | .549  | .763                           | .172 | .032  | .285  | .073  |  |
| <b>B. Situational aspects</b>         |      |        |                        |       |                                |      |       |       |       |  |
| B5                                    | 5.2  | 5      | .753                   | .454  | .565                           | .219 | .227  | .413  | .172  |  |
| B6                                    | 4.7  | 5      | .661                   | .451  | .176                           | .173 | .180  | .176  | .743  |  |
| B12                                   | 4.3  | 5      | .567                   | .489  | .153                           | .122 | .130  | .179  | .804  |  |
| B13                                   | 4.6  | 5      | .685                   | .526  | .100                           | .092 | .080  | .215  | .862  |  |
| <b>C. Dentofacial improvement</b>     |      |        |                        |       |                                |      |       |       |       |  |
| C1                                    | 5.5  | 5      | .916                   | .603  | .302                           | .500 | -.105 | .514  | .097  |  |
| C2                                    | 5.4  | 5      | .923                   | .483  | .355                           | .351 | .037  | .650  | .020  |  |
| C3                                    | 5.0  | 5      | .900                   | .833  | .171                           | .739 | .297  | .062  | .097  |  |
| C4                                    | 5.0  | 5      | .915                   | .625  | .100                           | .656 | .442  | .087  | -.005 |  |
| C5                                    | 4.9  | 5      | .910                   | .708  | .191                           | .769 | .239  | .161  | .129  |  |
| C6                                    | 5.2  | 5      | .905                   | .774  | .360                           | .495 | .105  | .589  | .119  |  |
| C7                                    | 5.1  | 5      | .903                   | .802  | .321                           | .775 | .181  | .215  | .102  |  |
| C8                                    | 5.0  | 5      | .905                   | .766  | .299                           | .743 | .313  | .177  | .140  |  |
| C9                                    | 5.2  | 5      | .900                   | .838  | .244                           | .754 | .223  | .225  | .209  |  |
| <b>D. Psychosocial aspects</b>        |      |        |                        |       |                                |      |       |       |       |  |
| D2                                    | 4.5  | 5      | .912                   | .780  | .163                           | .309 | .698  | .209  | .060  |  |
| D3                                    | 4.5  | 5      | .910                   | .788  | .185                           | .303 | .725  | .250  | .108  |  |
| D4                                    | 4.3  | 5      | .908                   | .823  | .049                           | .199 | .800  | .169  | .254  |  |
| D5                                    | 5    | 5      | .921                   | .613  | .213                           | .560 | .436  | .052  | .161  |  |
| D6                                    | 4.1  | 4      | .906                   | .855  | .150                           | .186 | .806  | .161  | .092  |  |
| D7                                    | 3.7  | 4      | .914                   | .755  | .075                           | .039 | .810  | .057  | .070  |  |
| D8                                    | 4.1  | 4      | .909                   | .808  | .196                           | .217 | .752  | .082  | .003  |  |
| D9                                    | 4.3  | 4      | .920                   | .651  | .257                           | .293 | .644  | .232  | .151  |  |
| <b>E. Dental Function</b>             |      |        |                        |       |                                |      |       |       |       |  |
| E1                                    | 5.0  | 5      | .813                   | .781  | .116                           | .118 | .264  | .788  | .295  |  |
| E2                                    | 5.0  | 5      | .763                   | .910  | .105                           | .169 | .256  | .824  | .275  |  |
| E3                                    | 4.9  | 5      | .809                   | .789  | .056                           | .220 | .273  | .729  | .335  |  |
| E4                                    | 5.2  | 5      | .930                   | .459  | .114                           | .025 | .205  | .681  | .041  |  |
| <b>F. Other Categories</b>            |      |        |                        |       |                                |      |       |       |       |  |
| F6                                    | 5.2  | 5      | .359                   | .383  | .421                           | .569 | .067  | .356  | -.013 |  |

**Table 2.** Results of Reliability Analysis and Principle Component Analysis (PCA).

\* Rotation Method: Varimax with Kaiser Normalization

† Rotation Converged in 8 iterations.

‡ Cronbach alpha if item deleted

§ CITC = corrected item-total correlation

| <b>Factor 1. Doctor-Patient Relationship</b> |  | <b>1</b>                 | <b>2</b>                 | <b>3</b>                 | <b>4</b>                 | <b>5</b>                 | <b>6</b>                 |
|--|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 3  | Orthodontist(s) always checked their work carefully  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5  | Orthodontist(s) was gentle when treating me  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6  | Before treatment began. my orthodontist explained what treatment would be like                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7  | I like the orthodontist(s) who treated me  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8  | Questions I had about my treatment were answer promptly  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9  | The assistants were gentle when treating me  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10   | The orthodontist staff treated me with respect   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11   | The orthodontist(s) treated me with respect  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| B5   | Problems that arose during treatment were quickly taken care of  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>Factor 2. Dentofacial Improvement</b>     |  | <b>1</b>                 | <b>2</b>                 | <b>3</b>                 | <b>4</b>                 | <b>5</b>                 | <b>6</b>                 |
| 3  | Orthodontics treatment is complete. I think I have a more attractive face  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4  | I really thought that my appearance would improve better than it did   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5  | My appearance has change exactly like I expected   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7  | When I look in the mirror. I feel very satisfied about the way my appearance is improved since orthodontic treatment | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8  | After my orthodontic treatment. I feel happy when I look in the mirror   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9  | I feel very happy because I look so much better since I have been treated  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D5   | I feel more confident because of orthodontic treatment   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| F3   | I am satisfied with the result of my orthodontic treatment   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>Factor 3. Dental Function</b>             |  | <b>1</b>                 | <b>2</b>                 | <b>3</b>                 | <b>4</b>                 | <b>5</b>                 | <b>6</b>                 |
| C1   | After my orthodontic treatment is complete. my teeth are straighter  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| C2   | After my orthodontic treatment is complete. I have a better bite   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| C6   | My teeth fit very well since I have been treated   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1  | Eating is easier since I have been treated   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2  | Chewing is easier since I have been treated  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3  | I can bite food easier since I have been treated   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4  | I would recommend orthodontic treatment to everyone who has difficulties chewing food                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>Factor 4. Psychosocial Improvement</b>    |  | <b>1</b>                 | <b>2</b>                 | <b>3</b>                 | <b>4</b>                 | <b>5</b>                 | <b>6</b>                 |
| 2  | I believe I will have better career opportunities because of orthodontic treatment                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3  | I believe my school performance is better because of orthodontic treatment   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4  | I feel more outgoing because of orthodontic treatment  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6  | I think I will be able to get a better job once out of school because of orthodontic treatment                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7  | I feel more popular because of orthodontic treatment   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8  | I received positive comments about my appearance. even from people I do not know very well                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9  | When I meet people for the first time. they react much more positively to me since I have been treated               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>Factor 5. Situational Aspects</b>         |  | <b>1</b>                 | <b>2</b>                 | <b>3</b>                 | <b>4</b>                 | <b>5</b>                 | <b>6</b>                 |
| 6  | The treatment area was modern and up to date   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5  | The waiting room was comfortable   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6  | The treatment area was clean and sanitary  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Table 3. Patient Satisfaction. Cross-cultural Adaptation ACTA Questionnaire.**

\* 1.Strongly disagree 2. Disagree 3. Almost disagree 4. Almost agree 5.Agree 6.Strongly Agree

† A multivariate regression analysis was used to determine which variable affected patient satisfaction. The results of bivariate analysis showed that age, education and socioeconomic variables can be included in multivariate model because it has  $p < 0.25$

‡ For analysis purposes, these variables are categorized into:

- Under 25 years old and over 25 years old.
  - Education below high school and above high school
  - Socio-economic low and moderately high and very high.
- § After a multivariate analysis. it found that age variable was eliminated so the final model of the multivariate analysis showed only educational and socio-economic factors that played a role in orthodontic patient satisfaction.

| Variable       | B      | SE    | p-value | OR     | CI 95%       |
|----------------|--------|-------|---------|--------|--------------|
| Education      | -1.774 | 0,777 | 0.022   | 0.17   | 0,268-1,163  |
| Socio-economic | 0.839  | 0.677 | 0.215   | 2.314  | 0.647-16.986 |
| Constant       | 3.052  | 0.736 | 000     | 21.158 |              |

**Table 4.** Logistic Regression Analysis.

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