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Research Article

Measuring patient satisfaction based on a cross-cultural adaptation of ACTA questionnaire: a cross-sectional study

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ABSTRACT

Introduction: Patient satisfaction after orthodontic treatment is influenced by several factors. Variables such as gender, age, duration of treatment, compliance, and dentofacial improvement also contribute to the level of satisfaction. The aim of this study was to measure patients' satisfaction with their orthodontic treatment using ACTA Questionnaire at the Orthodontic Clinic, Dental Hospital Faculty of Dentistry Universitas Indonesia. **Methods:** A cross sectional study to measure patient satisfaction. A validated patient satisfaction questionnaire consisting of five domains and 34 items, was used. The questionnaire was distributed to all patients who met the inclusion criteria via WhatsApp. This study included 120 respondents (93 females and 27 males). **Results:** The internal consistency of the total scale and the five domains was satisfactory. Respondents were most satisfied with Domain 1, which concerned the doctor-patient relationship and were least satisfied with domain 5, which addressed situational aspects. Patient satisfaction reflects the quality of health services. In this study, 51.6% of female respondents were satisfied with the treatment, but there were no significant differences between genders. **Conclusion:** The doctor-patient relationship remains the most important factor contributing to patient satisfaction. Age, gender, education level and socioeconomic status did not influence patient satisfaction. .

KEY WORDS: patient satisfaction, cross-cultural adaptation, ACTA questionnaire, risk factors, socioeconomic.

Kepuasan pasien diukur menggunakan adaptasi lintas budaya kuesioner ACTA: Studi cross-sectional

ABSTRAK

Pendahuluan: Kepuasan pasien setelah perawatan ortodonti dipengaruhi oleh beberapa faktor. Faktor-faktor seperti jenis kelamin, usia, durasi pengobatan, kepatuhan, dan perbaikan dentofasial juga terlihat berkontribusi pada tingkat kepuasan. Tujuan dari penelitian ini adalah untuk mengukur kepuasan pasien terhadap perawatan ortodontik menggunakan ACTA Questionnaire di Klinik Ortodontik Rumah Sakit Gigi Fakultas Kedokteran Gigi Universitas Indonesia. **Metode:** Untuk mengukur kepuasan pasien, digunakan kuesioner yang divalidasi tentang kepuasan pasien yang terdiri dari 5 domain dan 34 items. Kuesioner dikirim ke semua pasien yang sesuai dengan kriteria inklusi melalui WhatsApp. Penelitian ini melibatkan 120 responden, yang terdiri dari 93 perempuan dan 27 laki-laki. **Hasil:** Konsistensi internal dari skala total dan 5 domain memuaskan. Responden paling puas dalam domain 1 mengenai hubungan dokter-pasien dan paling tidak puas dalam domain 5 pada aspek situasional. Kepuasan pasien adalah hasil dari pelayanan kesehatan yang baik. Dalam penelitian ini 51,6% responden perempuan puas dengan perawatan ortodonti, tetapi tidak ada perbedaan yang signifikan antara jenis kelamin. **Simpulan:** Hubungan dokter-pasien tetap menjadi faktor terpenting yang berkontribusi pada kepuasan pasien. Usia, jenis kelamin, pendidikan dan faktor sosial-ekonomi tidak mempengaruhi kepuasan pasien.

KATA KUNCI: kepuasan pasien, adaptasi lintas budaya, kuesioner ACTA, faktor resiko, sosio-ekonomi

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INTRODUCTION

Among the most important goals of dental care is helping patients achieve an acceptable level of satisfaction with their oral cavity and dentition. Patient dissatisfaction with dental appearance and oral function is a common concern in clinical practice.¹ Several studies have shown that age and sex influence patient satisfaction. Generally, females are more dissatisfied than males, and adult patients tend to be more dissatisfied with their dental treatment.

Patients with malocclusion often experience irregular tooth alignment, which can affect chewing, swallowing, speech function, and temporomandibular joint health. They are also more prone to caries, periodontal disease, and trauma, and may be subjected to bullying because of their facial appearance.¹⁻³ Such conditions can significantly affect an individual's psychosocial wellbeing and are often the main motivation for seeking orthodontic treatment. Although the prevalence of malocclusion is quite high, the utilisation rate of orthodontic treatment remains relatively low, possibly influenced by demographic and socioeconomic factors. Indonesian society often seeks dental care based on financial capacity rather than clinical need.⁴⁻⁶ Over the past decade, a person's perception of the appearance of teeth has changed. In several Asian countries, the proportion of orthodontic patients aged over 40 years doubled between 2008 and 2012 period.⁷ In Indonesia, orthodontic treatment remains costly and is not covered by insurance.⁸

Research on orthodontics has traditionally focused on objective indices of treatment outcome, while subjective measures of patient satisfaction remain limited. Patient-perceived satisfaction reflects not only functional improvement but also self-image and quality of life. Research on patient satisfaction with dental health services has been conducted since the 1970s, consisting of five aspects, namely: (1) Competence (2) Interpersonal factors (3) Comfort (4) Cost, and (5) Facilities. Patient satisfaction studies have been conducted in India, Sweden, Netherlands, Brazil, the United Kingdom and Korea,⁹⁻¹⁸ but only a few studies have correlated patient satisfaction with actual treatment results. Patient satisfaction with orthodontic treatment ranges from 34% to 95%.^{9,11} Previous studies have used diverse instruments and analytical methods, making cross-study comparison difficult.

Krisnawati translated and validated the ACTA questionnaire using Principal Component Analysis (PCA), resulting in 5 domains and 34 valid and reliable items. The novelty of the present study lies in the cross-cultural adaptation of the ACTA questionnaire, representing the first validated instrument in Indonesia for measuring patient satisfaction after orthodontic treatment. In addition, it provides evidence-based insights into risk factors influencing patient satisfaction within the local context. To date, no cross-culturally adapted and validated ACTA questionnaire has been available for use in Indonesia. The aim of this study was to measure patients' satisfaction with orthodontic treatment using ACTA questionnaire at the Orthodontic Clinic.

METHODS

This was a cross-sectional study conducted at the Orthodontic Clinic, Faculty of Dentistry, Universitas Indonesia. The population comprised patients who had completed orthodontic treatment at Orthodontic Clinic of the Universitas Indonesia between January 2021 and July 2023. The sample size was calculated based on previous data from the literature, using G*power software. The questionnaire used in this study was the ACTA Patient Satisfaction Questionnaire, developed by the Academic Centre of Dentistry Amsterdam (ACTA), which originally consisted of six domains and 58 items. Domain 1 assessed the relationship between doctor and patient; Domain 2 measured dento-facial improvement; Domain 3 evaluated the psychosocial aspect; Domain 4 assessed dental function; Domain 5 evaluated the clinical situation; and Domain 6 represented the residual category. We chose this questionnaire because it has demonstrated strong validity and reliability and has been applied previously in the orthodontic clinic at ACTA.

A previous study at ACTA found that only gender was a significant predictor of patient satisfaction regarding the doctor-patient relationship and situational aspects, though the authors acknowledged that these findings could not be generalized because cultural, ethnic, and socioeconomic variations may influence patients' perceptions. In 2023, Krisnawati translated and validated the ACTA questionnaire using Principal Component Analysis (PCA), resulting in five domains and 34 valid and reliable items. The validity and reliability of the questionnaire showed highly satisfactory results with Cronbach's alpha values ranging from 0.737 to 0.923. Domain 1 consisted of nine items assessing the relationship between doctor and patient; Domain 2 consisted eight items measuring dentofacial improvement; Domain 3 included seven items evaluating psychosocial aspects; Domain 4 had seven items assessing dental function; Domain 5 comprised three items measuring the clinical situation. Domain 6, Residual category, originally contained ten items, but only 1 one item was valid; therefore, reliability testing could not be performed.

Each item was scored on a six-point Likert scale ranging from very dissatisfied (1 point) to very satisfied (6 points). The total possible score ranged from a minimum of 34 to a maximum of 204, with higher scores indicating greater satisfaction. The questionnaire was distributed electronically to all patients who had completed their orthodontic treatment between January 2021 and July 2023. Data collection employed a consecutive sampling method with the following inclusion criteria: male or female patients aged 17 years or older who had completed orthodontic treatment during the study period. Exclusion criteria included patients with cleft lip and palate, those with severe skeletal abnormalities, patients who had undergone orthognathic surgery, and those who had completed their orthodontic treatment in other health facilities outside the Universitas Indonesia Dental Hospital. In this study, we also applied Index of Complexity and Orthodontic Need (ICON) to measure treatment outcomes.²⁰ Data were analyzed using SPSS version 23.0 (IBM Corp., Armonk, NY, USA). Since the data were homogeneous, non-parametric statistical tests were used, and differences in satisfaction across groups were analyzed using the chi-square test.

RESULTS

We obtained 122 responses; however, two subjects were excluded due to incomplete data. Thus, a total of 120 patients were included in this study, comprising 93 females and 27 males. Most patients (55%) were in the 20-30 years old age group. Patient satisfaction based on age showed that respondents aged 17 – 19 years had a total score of 176.1, those aged 20 – 30 years scored 172.9, and subjects aged over 30 years scored 169.5

Table 1. Differences in patient satisfaction scores based on age						
Patient Satisfaction score	17-19 years old n=42		20-30 years old n = 69		>30 years old n = 9	
	Mean	SD	Mean	SD	Mean	SD
Doctor-patient relationship	50.4	0.10	49.5	0.76	48.6	0.05
Dentofacial improved	40.5	0.23	42.4	0.1	41.12	0.07
Psychosocial aspect	32.7	0.31	29.7	0.15	29.5	0.12
Dental function	37.8	0.11	35.9	0.14	35.9	0.08
Situational aspect	14.7	0.25	15.4	0.99	14.4	0.08
Total Score	176.1		172.9		169.5	

Total patient satisfaction score based on education showed that the higher the educational background, the greater the total satisfaction score (Table 2).

Table 2. Differences in patient satisfaction scores based on educational background

Patient Satisfaction score	< high school n = 23		Highschool, undergrad. n = 82		Undergraduate, postgraduate n = 15	
	Mean	SD	Mean	SD	Mean	SD
Doctor-patient relationship	50.21	0.73	49.34	0.4	48.73	1.1
Dentofacial improve	42.0	1.1	41.2	0.6	41.9	1.4
Psychosocial aspect	35.8	1.2	35.7	0.54	38.8	0.7
Dental function	32.39	1.7	29.6	0.88	31.8	1.5
Situational aspect	14.9	0.43	14.7	0.23	14.9	0.6
Total Score	175.3		170.54		176.1	

Table 3. Differences in patient satisfaction scores based on socioeconomic status

Patient Satisfaction	Low income		Moderate		High income		Very high	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Doctor-patient relationship	50.2	0.85	50.33	0.95	49.26	0.82	49.03	0.51
Dentofacial improvement	41.7	1.2	41.6	1.6	41.65	0.88	41.24	0.72
Psychosocial improvement	37.05	1.24	34.8	1.2	36.08	1.0	36.2	0.61
Dental function	33.6	1.0	30.26	1.9	29.0	1.8	29.9	0.93
Situational aspect	15	0.49	15.8	0.29	14.34	0.45	14.58	0.27
Total Score	177.5		172.8		170.33		170.95	

Table 3 shows that respondents with a higher income had the lowest satisfaction scores. Bivariate analysis was performed using the Chi-Square test to determine the relationship between the independent variables (gender, age, education, socioeconomic status) and the dependent variable (total satisfaction score)

Table 4. Relationship between risk factors and patient satisfaction

Variable	N=120	Satisfied	Dissatisfied	p-value
Gender				
Female	93	48(51.6%)	45(48.4%)	0.983
Male	27	14(51.9%)	13(48.1%)	
AGE				
17- 19 years old	42	6(60%)	4 (40 %)	0.555
20 -30 years old	69	46(66.6%)	23(33.7%)	
>30 years old	9	20(45.5%)	24(54.5%)	
Education background				
< high school	23	15(65.2%)	8 (34.8%)	0.216
Highschool, college	82	44(39.6%)	38(42.4%)	
S1/S2	15	10 (66.7%)	5 (33.35%)	
Socioeconomic				
Low income	20	13(65%)	7(35%)	0,606
Moderate	15	8 (53.3%)	7(46.7%)	
High income	23	12(52.2%)	11(47.8%)	
Very high income	62	30(48.4%)	32(51.6%)	

*Chi Square Test

Table 4 shows that none of the variables could be included in the multivariate as all of them had p-values greater than 0.25. However, previous studies have shown that age, gender, education, and socioeconomic can influence patient satisfaction.

DISCUSSION

We found that the total satisfaction scores between genders were nearly identical; the proportion of male respondents who were satisfied with the treatment was 51.9%, compared with 48.1% who were dissatisfied. Similarly, among females, 51.6% were satisfied and 48.3% were dissatisfied. The results of this study are consistent with those of Khan and Bos,^{12,13} who did not find any association between gender and patient satisfaction levels.

The present study successfully applied the cross-culturally adapted ACTA questionnaire to measure patient satisfaction among individuals who had undergone orthodontic treatment at the Orthodontic Clinic, Universitas Indonesia Dental Hospital. The response rate was excellent at 98.4% with only two subjects excluded due to incomplete data. Females were predominant ($n = 93$; 77.5%) among the 120 subjects, while males comprised 27 (22.5%). Overall, total patient satisfaction scores decreased as the respondents' ages increased. This finding is consistent with the results of Lee et al.¹⁰ who found that age, gender, and motivation influenced patient satisfaction. Approximately 44.4% of respondents in the over-50 age group underwent orthodontic treatment as part of interdisciplinary treatment to restore the occlusion following periodontal breakdown.

This study also found that patients with higher educational backgrounds tended to report higher total satisfaction scores (175.3, 170.54, and 176.1), although these differences were not statistically significant. In similar studies, Krisnawati et al. reported that, after multivariate analysis, only education and socioeconomic variables significantly influenced patient satisfaction among those treated at the Orthodontic Clinic Dental Hospital, Faculty of Dentistry, Universitas Indonesia. The total patient satisfaction score decreased as the socioeconomic (income) level of the subjects increased. It was assumed that the higher the income, the more respondents were not easily satisfied with the treatment outcome.

This difference may be due to the method used for determining socioeconomic variables for this study, which was based on the Regional Minimum Wage (UMR) for Jakarta, which still prioritizes living cost and education, while in the 2020 study, socioeconomic variables were determined according to the adult-equivalence scale formula. Orthodontic treatment requires high costs and is mostly chosen by those who are educated and from a good socioeconomic background. An increase in socioeconomic level is usually followed by an increase in orthodontic needs, which is accompanied by demands for satisfaction provided by health services. The cost of orthodontic treatment in Indonesia is not covered by insurance because it is still considered primarily for aesthetic purposes. A study by Utari et al. found that the mean value for satisfaction with treatment outcome was generally high (5.99 ± 0.52).²² There was no correlation between orthodontic treatment outcome score and patient satisfaction with the treatment outcome. Studies by Sirin et al. and Sabrina et al.,^{23,24} found a correlation between socioeconomic factors and the need for orthodontic treatment in adolescence.

Domain 1, namely the doctor-patient relationship, appeared to provide the highest mean score (49.5 ± 0.30). This is expected, because orthodontic treatment usually takes a long time (Table 1), allowing a strong relationship to develop between doctor and patient. Effective communication must be well maintained to achieve treatment success. Domain 2, which is dental and facial improvement, has a mean of 41.34 ± 0.13 , followed by Domain 3 (dental function), which also showed a good satisfaction score. These results were similar to those of Aljugmain A. et al who reported that 229 of 243 patients completed the survey, giving the highest satisfaction scores to the doctor-patient relationship (mean 4.33), followed by dental improvement, dental function, and psychosocial improvement. Overall, patients treated in public hospitals were more satisfied with orthodontic treatment than those in private hospitals.^{14,15}

Bos and Vosselman, et al.¹² 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 relationship. Keles and Bos et al.¹² conducted a trend study comparing the satisfaction of orthodontic patients treated at ACTA clinics a decade earlier. The results showed that patient satisfaction in 2009 had increased significantly, but there was still no correlation between sex and patient satisfaction. They predicted that people from different socioeconomic backgrounds, cultures, and ethnicities might produce different results. Khan et.al.¹³ conducted similar studies using a questionnaire with 17 items to measure patient appointments, doctor and staff attitudes, cost efficiency, and clinical condition.¹³ The results showed that 89% of patients were satisfied with their treatment outcomes, and female patients aged 19-24 years had the highest level of satisfaction.

An electronic survey conducted by Brown M et al. evaluated factors influencing potential adult patient preferences for orthodontic care providers. Adults in Canada had a high preference for treatment performed by orthodontists, especially among younger participants and those in metropolitan areas.²⁵ The demographic factors that significantly affected participant choice of orthodontic treatment providers were age and community size. The current data suggest that as the availability of orthodontists increases, so does the likelihood that a person would choose that provider for their care.²⁶

Adult patients need comprehensive explanations before treatment begins, and a good relationship with the doctor increases patient compliance. Saccomanno et al.,²⁷ found that the greatest demand for orthodontic treatment came from females as they pay more attention to aesthetics, including improving their smile, chewing comfort, dentofacial improvement, and space closure and this finding is similar to ours. Lin F et al.,²⁸ found that the psychological impact of dental aesthetics plays an important role for adults seeking orthodontic treatment.^{28,29} Patients who visit the Orthodontic Clinic of the Dental Hospital, Universitas Indonesia, are mostly adults. In contrast to previous studies, the subjects in the present study had a very wide age range, with the youngest patient 17 years old and the oldest 61 years old.

Meric and Naumova et al.,³⁰ which observed whether COVID-19 had an influence on the success of orthodontic treatment and evaluated it using the Objective Grading System (OGS) and PAR index, concluded that the pandemic group had low scores for marginal ridges and high scores on buccolingual inclination. The total PAR and OGS scores did not differ significantly between patients who had brackets removed during the pandemic or before the pandemic. Patients in the pandemic group often canceled appointments, but treatment duration was not significantly different from the non-pandemic group.

In this study, we measured treatment outcomes from pre- and post-model studies using the Index of Complexity, Outcome, and Need (ICON) and found that 86 patients (71.6%) showed greatly improved results, 29 patients (24.2%) showed substantial improvement, 4 showed moderate improvement, and 1 showed minimal improvement. While a previous study in 2020 found that 87,59 % of respondents showed greatly improved results. A study in Dubai on school-aged adolescents found that male ICON scores were significantly greater than female scores, and ICON scores for South Asians were significantly higher than those for Middle Easterners.³¹

The limitation of this study is that the cross-sectional research design cannot explain causal relationships in detail. There may have been selection bias during data collection, and the sample was non-homogeneous. The operators who treated the cases were orthodontic residents with varying skill levels, which may have affected patient satisfaction. Additionally, data were collected immediately post-COVID-19 pandemic where the research subjects experienced the COVID-19 pandemic with varying intensity across countries. The orthodontic clinic of Dental Hospital ,Universitas Indonesia was closed for about five months to limit the spread of the COVID-19 virus, disrupting control schedules and potentially impacting patient satisfaction.

CONCLUSION

Patient satisfaction at the Orthodontic Clinic, Dental Hospital Universitas Indonesia, as measured by the cross culturally adapted ACTA Questionnaire, showed that Domain 1 (Doctor-Patient Relationship) had the highest satisfaction score. Meanwhile, age, gender, education, and socioeconomic variables did not significantly contribute to patient satisfaction among those undergoing orthodontic treatment in 2021-2023. The implication of this study is that orthodontic treatment at Orthodontic Clinic, Dental Hospital, Universitas Indonesia, provides good service and most patients are satisfied. It is proven that more patients are now coming to receive their orthodontic treatment at the Universitas Indonesia Dental Hospital.

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Informed Consent Statement: all participants were given informed consent and their participation in this study was voluntary. All methods conducted in accordance with relevant guidelines and regulations.

Data Availability Statement: Data is unavailable due to privacy.

Conflicts of Interest: The authors declare that they have no conflict of interest

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