ORIGINAL ARTICLE

Factors influencing the fee setting for orthodontic appliance placement in dental practices in the Medan Petisah Sub-district

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ABSTRACT

Orthodontic treatment is one way to deal with malocclusion problems to achieve good dental occlusion. As a result of the phenomenon of individual needs in overcoming malocclusion, many people come to the dentist's practice to install braces at different rates. This study aims to determine the most dominant factor in influencing the rates of braces fitting in general dental practices in Medan. This type of research is descriptive analytic with cross sectional approach. The study population was dentists who practised actively in Medan and performed fixed orthodontic treatment or braces. The sample size was 30 people with purposive sampling. Data were collected through questionnaires. Data analysis used Spearman's Correlation test and multiple linear regression. The results showed that the mean of the type of braces, practice location, and type of malocclusion were 3.17 ± 0.950; 3.77 ± 0.504; and 9.13 ± 1.383, while the rate of braces had a mean of 1.37 ± 0.490. Spearman;s correlation statistical test can be stated that there is an influence of the type of brace (p=0.002; p≤0.05), practice location (p=0.039; p≤0.05), and type of malocclusion (p=0.005; p≤0.05) on the determination of significant dental practice brace tariffs in Medan Petisah District. The type of brace had a strong degree of influence, while the location of the practice and the type of malocclusion showed a moderate degree of influence. The type of brace is the most dominant factor in influencing the determination of tariffs. The conclusion of this study is that the better the type of brace, the more expensive the fitting rate.

Keywords: brace, type of brace, brace fitting rate, malocclusion

Introduction

Teeth are a crucial component of the body, playing a vital role in masticatory function. A regular dental arrangement is not only beneficial for oral health but also contributes to an individual's appearance. Consequently, there is a prevalent desire among many individuals to undergo dental treatment (Ardhana et al., 2013). Research conducted by the Health Research and Development Agency of the Indonesian Ministry of Health indicates that children aged 12-15 years constitute the age group with the highest prevalence of malocclusion, at 15.6%. Malocclusion can affect children, adolescents, and adults alike (Suala et al., 2021). Malocclusion can lead to various problems, including periodontal health issues, difficulties in swallowing and chewing, speech impairments, and psychosocial aspects related to aesthetics. Furthermore, malocclusion

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increases the risk of dental caries because crowded teeth complicate effective oral hygiene practices. Appropriate management of malocclusion necessitates orthodontic treatment (Farani & Abdillah).

A popular dental treatment among adolescents today is the use of braces, known in dental terminology as orthodontic treatment. Orthodontics is a branch of dentistry that focuses on correcting the alignment of teeth and the relationship between the jaws to ensure optimal dental function. The primary objective of orthodontic treatment is to achieve ideal dental occlusion, both functionally and positionally, thereby establishing a balance between dental occlusion, jaw relations, and overall facial aesthetics (Muttaqin et al., 2021).

Theoretically, the aims of orthodontic treatment are broad and extend beyond simply correcting malocclusion. According to Salzman, the objectives of orthodontics include aesthetic improvement, specifically correcting tooth position and arrangement, and preventing the development of abnormal facial form. Orthodontic treatment is also recommended for functional purposes, such as enhancing masticatory and speech capabilities (Hansu et al., 2013). Due to the widespread desire for orthodontic treatment, commonly known as braces, many individuals consult dental practitioners for their placement, often incurring considerable costs that can vary between different dental practices (PekerJa et al., 2021).

Pricing plays a significant role in influencing consumer purchasing decisions and can determine the marketing success of a product. Therefore, pricing strategies should be carefully managed to align with desired objectives for maximum effectiveness (Nasution et al., 2019). Buchori Alma suggests that pricing can be linked to the perceived benefits of using a product and the quality of its service. At the pricing level itself, the quality of the product and service can be established, which may influence production efficiency (Indrasari et al., 2019). This aligns with the observed reality in dental practices, where different prices are set for various treatments. For example, the cost of braces at dental practice A in the Serdang Bedagai regency differs from that of dentist B practicing in Medan, with dentist A generally offering a lower price. Given this variation in the cost of braces, the author aims to investigate the factors that influence the pricing of orthodontic treatment in dental practices in Medan..

Method

This study employed a descriptive analytical, cross-sectional design conducted in dental practices within the city of Medan from January to March 2025. The study population comprised dentists actively practicing in Medan who provide fixed orthodontic treatment (braces). A purposive sampling technique was used to determine the sample size, based on specific criteria established by the researchers, resulting in a required sample of 30 respondents. Inclusion criteria were dentists with independent practices in Medan, dental practices actively offering fixed orthodontic treatment (braces), and dentists willing to participate as respondents. Exclusion criteria included dentists who were not present at their practice location and dentists who were unwell. The independent variables in this study were the type of braces, practice location, and type of malocclusion, while the dependent variable was the cost of brace placement. The material required for this study consisted of secondary data from clinics containing documents detailing the fees for fixed orthodontic treatment.

Validity was assessed by comparing the r-table value with the calculated r-value. The r-table value was obtained from a two-tailed r-test table using a degree of freedom (df) of 28 and a significance level (alpha, α) of 5%, yielding an r-table value of 0.361. If the calculated r-value was greater than the r-table value, the question was considered valid, and vice versa (Dohude & Audria, 2022). Reliability was measured using Cronbach's alpha, by comparing the r-table value with the calculated Cronbach's alpha value. The decision rule was that if the Cronbach's alpha value was greater than the r-table value, the instrument was considered reliable. A research instrument is indicated to have acceptable reliability if Cronbach's alpha is greater than or equal to 0.70, with higher Cronbach's alpha values indicating better data reliability (Dohude & Audria, 2022).

The research procedures involved establishing the inclusion and exclusion criteria, obtaining ethical clearance from the relevant committee, developing a questionnaire to collect data on the cost of brace placement at each practice, contacting potential respondents for interviews or surveys, and obtaining informed consent regarding their participation. The primary data to be included in the questionnaire consisted of practice location, types of orthodontic treatment offered, types of malocclusion, and the cost of brace placement at each clinic. Data analysis was performed using SPSS software.

Results

The research findings indicated that the male respondents numbered 8 (26.7%), while the female respondents totalled 22 (73.3%). The mean age of the respondents was approximately 33.6 years. The variables investigated in this study were the cost of orthodontic appliance placement, the type of appliance, the practice location, and the type of malocclusion. The complete research results are presented in Table 1.

Table 1. Respondent characteristic

Variable	Mean±SD
Orthodontic appliance placement fee	1.37±0.490
Type of orthodontic appliance	3.17±0.950
Practice location	3.77±0.504
Type of malocclusion	9.13±1.383

For the orthodontic appliance placement fee, the average response is 1.37 with a standard deviation of 0.490. This suggests that the majority of respondents tended to select values clustered around 1.37 on the scale used to measure this fee, with a relatively small spread of responses as indicated by the standard deviation. Regarding the type of orthodontic appliance, the mean response is 3.17 with a standard deviation of 0.950. This indicates a slightly wider dispersion in the types of appliances reported by the respondents compared to the placement fee, as the standard deviation is larger. The average response of 3.17 suggests a tendency towards certain categories within the types of appliances considered.

The practice location variable shows a mean of 3.77 and a standard deviation of 0.504. Similar to the placement fee, the responses for practice location appear to be quite concentrated around the average, given the relatively small standard deviation. This suggests a degree of homogeneity in the reported practice locations of the respondents. Finally, the type of malocclusion variable has the highest mean at 9.13, accompanied by a standard deviation of 1.383. This indicates that, on average, the respondents reported a value of 9.13 for the type of malocclusion, and there is a noticeable variability in the responses for this characteristic, as reflected by the largest standard deviation among the four variables. This suggests a wider range of malocclusion types were reported by the study participants.

In this study, bivariate analysis employed Spearman's rank correlation coefficient due to the non-normal and non-homogeneous distribution of the data, as indicated by the results of normality and homogeneity tests ($p < 0.05$). This test was conducted to analyse the factors influencing the pricing of orthodontic bracket placement in dental practices within the Medan Petisah subdistrict.

Table 2. Spearman's rank correlation results

Variable		P	r
Type of orthodontic appliance Mean±SD 3.17±0.950		0.002	0.541
Practice location Mean±SD 3.77±0.504	Orthodontic appliance placement fee Mean±SD 1.37±0.490	0.039	0.379
Type of malocclusion Mean±SD 9.13±1.383		0.005	0.497

Based on the data presented in the table above, the findings of this study indicate a statistically significant influence of the type of orthodontic bracket used (p=0.002; r=0.541), the practice location (p=0.039; r=0.379), and the type of malocclusion (p=0.005; r=0.497) on the determination of orthodontic bracket placement fees charged by dental practitioners in the Medan Petisah sub-district. The type of bracket demonstrates a strong degree of influence, while the practice location and the type of malocclusion exhibit a moderate degree of influence. Higher quality bracket types, more strategic practice locations, and more complex malocclusion types are associated with higher orthodontic bracket placement fees.

In this research, multivariate analysis employed multiple linear regression statistics, utilizing numerically scaled variables. This test was conducted to analyse the most dominant factors influencing the determination of orthodontic bracket placement fees in dental practices within the Medan Petisah subdistrict. This regression equation can be interpreted as follows: the constant value is 0.168 with a positive direction, indicating that if the value of the brace type variable is considered non-existent or zero (0), the value of the brace fitting fee is 0.168. The regression coefficient for the brace type variable is 0.196 and demonstrates a

positive influence on the brace fitting fee, meaning that for every unit increase in the brace type, the brace fitting fee will increase by 0.196. The results of the multiple linear regression indicate that the independent variable, brace type, has a positive effect on the dependent variable, brace fitting fee. Any increase in the brace type will be accompanied by an increase in the brace fitting fee. Furthermore, the brace type is the most dominant variable influencing the determination of the brace fitting fee.

Table 3. Regression test results

Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.168	.512		-.327	.746
	Type of orthodontic appliance score	.196	.095	.380	2.055	.050
	Type of malocclusion score	.100	.066	.282	1.524	.139

Discussion

Orthodontic treatment represents a modality for addressing malocclusion in individuals (Hamid et al., 2022). Furthermore, it encompasses interventions aimed at restoring dentofacial aesthetics and function (Khan et al., 2022). This study investigated 30 active dentists providing orthodontic treatment in the Medan Petisah sub-district to analyse the potential influence of three factors – appliance type, practice location, and malocclusion type – on the determination of orthodontic appliance fitting fees.

The findings of this research indicate a significant influence of appliance type on the determination of orthodontic appliance fitting fees in dental practices within the Medan Petisah sub-district (p=0.002; r=0.541). Appliance type exhibited a strong degree of influence, accounting for 54.1% of the variance in fitting fees. A correlation was observed whereby more sophisticated appliance types were associated with higher fitting fees, establishing this variable as the most dominant influencing factor.

Traditional metal braces are the most common and effective method for treating a range of orthodontic problems, offering durability and reliable outcomes. Ceramic braces are similar to their metal counterparts but utilise clear or tooth-coloured brackets for enhanced aesthetics. Lingual braces, positioned behind the teeth, are virtually invisible and ideal for patients prioritising aesthetics, while clear aligners (such as Invisalign), which are removable and nearly imperceptible, provide a discreet and convenient orthodontic treatment option (Caseydental, 2024). The choice of appliance type can significantly impact the cost of orthodontic treatment. Traditional metal braces are typically the most affordable option, while aesthetic appliances like ceramic and clear aligners are generally more expensive than metal alternatives (Prihantini, 2022).

The study also revealed a significant influence of practice location on the determination of orthodontic appliance fitting fees in the Medan Petisah sub-district (p=0.039; r=0.379). Practice location demonstrated a moderate degree of influence, accounting for 37.9% of the variance in fitting fees. A trend was observed wherein more strategically located practices tended to have higher fitting fees. This aligns with the assertion by Freytag (2024) that orthodontic appliance fitting fees in urban dental practice locations may be higher than those in rural areas. Similarly, Popinker (2024) noted that fitting fees are more expensive in metropolitan areas compared to rural regions. These findings are supported by research conducted by Prihantini (2022), which indicated that the cost of orthodontic appliance fitting can vary depending on the dentist's practice location, and that selecting a strategic location enhances business development success compared to less favourably situated establishments.

Furthermore, the research demonstrated a significant influence of malocclusion type on the determination of orthodontic appliance fitting fees in dental practices within the Medan Petisah sub-district (p=0.005; r=0.497). Malocclusion type exhibited a moderate degree of influence, accounting for 49.7% of the variance in fitting fees. Greater complexity of the malocclusion was associated with higher fitting fees. A fundamental understanding of the malocclusion to be treated is crucial for dentists undertaking orthodontic treatment. Successful outcomes are unlikely without a thorough comprehension of the specific components of the malocclusion exhibiting abnormalities. This understanding can also impact the duration of treatment (Damaryanti et al., 2019), and the length of orthodontic treatment can, in turn, influence the overall cost. The complexity of the orthodontic problem, such as the severity of the misalignment, can affect the treatment duration (Freytag, 2024).

Conclusion

The type of orthodontic bracket is the most significant factor influencing the cost of orthodontic treatment at dental practices in Medan. Higher quality bracket types correlate with increased treatment fees. Furthermore, the type of bracket, the location of the dental practice, and the type of malocclusion all contribute to the determination of orthodontic treatment costs within dental practices in the Medan Petisah sub-district. Future research should consider additional factors that may influence the pricing of orthodontic treatment. Moreover, further investigation with a larger sample size is recommended to obtain more varied results..

References

1. Ardhana, W. (2013). Identifikasi perawatan ortodontik spesialistik dan umum. Majalah Kedokteran Gigi Indonesia, 20(1), 1.
2. Suala, H. N., Wibowo, D., & Setyawardhana, R. H. D. (2021). Kebutuhan perawatan ortodonti berdasarkan index of orthodontic treatment need pada remaja. Dentin, 5(3), p. 130.
3. Farani, W., & Abdillah, MI. (2021). Prevalensi maloklusi anak usia 9-11 tahun di SD IT Insan Utama Yogyakarta. Insisiva Dental Journal: Majalah Kedokteran Gigi Insisiva, 10(1), 26-31.
4. Muttaqin, Z., Hadi, L., & Naomi, N. (2021). Pengaruh pemakaian peranti ortodonti cekat terhadap status psikososial. Jurnal Prima Medika Sains, 3(2), 78–81.
5. Hansu, C., Anindita, P. S., & Mariati, N. W. (2013). Kebutuhan perawatan ortodonsi berdasarkan index of orthodontic treatment need di SMP Katolik Theodorus Kotamobagu. e-GiGi, 1(2), 99.
6. Pekerja, P. D. T. J. S. (2021). Jurnal Private Law Fakultas Hukum Universitas Mataram, 1(2), p. 707.
7. Nasution, M. A. (2019). Pengaruh harga dan kualitas produk alat kesehatan terhadap keputusan pembelian konsumen pada PT Dyza Sejahtera Medan. Warta Dharmawangsa, 13(1), 7.
8. Indrasari, M. (2019). Pemasaran dan Kepuasan Pelanggan. Surabaya: Unitomo Press.
9. Dohude, G. A., & Audria, C. (2022). Laporan penelitian: Tingkat pengetahuan mahasiswa kedokteran gigi tentang faktor risiko karsinoma sel skuamosa rongga mulut. Jurnal Kedokteran Gigi Universitas Padjadjaran, 34(2), 93–99.
10. Hamid, T., Triwardhani, A., & Wardhana, L. K. (2022). Benefits and risks of orthodontic treatment: A systematic review. Indonesian Journal of Dental Medicine, 5(1), 18–26.
11. Khan, H., Mheissen, S., Iqbal, A., Jafri, A. R., & Alam, M. K. (2022). Bracket failure in orthodontic patients: the incidence and the influence of different factors. Hindawi BioMed Research International, 2022(5128870), 1-6.
12. Caseydental. (2024). Understanding braces cost: factors that influence orthodontic treatment. Diakses 9 April 2025. Available at https://caseydental.com/understanding-braces-cost-factors-that-influence-orthodontic-treatment/.
13. Prihantini, O. (2022). 4 faktor yang mempengaruhi biaya behel. In Dental Clinic,[online] Available at: https://www.indentalclinic.net/id/artikel/4-Faktor- Yang-Mempengaruhi-Biaya-Behel/ [Accessed 27 Feb. 2025].
14. Freytag, O. (2024). How much do braces cost? Factors that affect the price of orthodontic treatment. Diakses 9 April 2025. Available at https://freytagortho.com/blog/how-much-do-braces-cost/.
15. Popinker, A. (2024). How much do braces cost? Diakses 9 April 2025. Available at https://www.thepricer.org/cost-of-braces/.
16. Damaryanti, E., Indrawati, E., & Firdausi, A. (2019). Gambaran tingkat keparahan maloklusi pada pasien orthodonti antara tahun 2012-2015 dan 2015-2018 di RS Universitas Brawijaya menggunakan indeks icon. E-Prodenta Journal of Dentistry, 3(2), 240-248.