

# Awareness Regarding the use of Clear Aligners as an Orthodontic Treatment Modality among the General Population of Maharashtra, India: A Cross-sectional Survey

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## ABSTRACT

**Introduction:** Fixed orthodontic treatment has been the standard method to treat malocclusions for decades; however, the number of adults seeking more inconspicuous ways to enhance their smiles has significantly increased. This trend has led to the rising popularity of clear aligners among the general population, hailed as the 'invisible treatment' for correcting misaligned teeth.

**Aim:** To assess the level of awareness among residents of Maharashtra regarding clear aligners.

**Materials and Methods:** A cross-sectional study was conducted at the Department of Orthodontics and Dentofacial Orthopaedics, School of Dental Sciences, Krishna Vishwa Vidyapeeth (KVV) Karad, Maharashtra, India with a sample size of 423 participants. An online survey on awareness and perceptions of clear aligners

among the general population of Maharashtra was carried out for one month through the dissemination of an online questionnaire. The questionnaire was administered using Google Forms and consisted of 12 closed-ended questions. The online data was collected and analysed while assessing its content validity.

**Results:** The mean age of the study participants was 28.4±5.88 years. According to the survey, 203 (47.99%) participants had visited an orthodontist, with 87 (43.03%) receiving clear aligner recommendations as a treatment option. Notably, 266 (62.88%) were already familiar with clear aligners, and 268 (63.36%) considered them to be an effective treatment.

**Conclusion:** The study findings indicated that 62.88% of participants had prior knowledge of clear aligners, while only 47.99% had visited an orthodontist.

**Keywords:** Clear trays, Invisalign, Modern orthodontic treatment, Removable orthodontic appliances

## INTRODUCTION

The current world of social media has particularly highlighted the importance of aesthetics and looks across all walks of life [1]. Among the general population, there has been a significant increase in the number of people seeking convenient and less noticeable methods to attain the smile they desire [2]. Traditional orthodontic treatment, while considered the standard, has also been associated with patients experiencing a compromise in facial aesthetics during treatment, which often dissuades them from choosing orthodontic treatment despite their desire to achieve better teeth alignment [3]. This trend has led to more patients searching for aesthetic tools and methods to enhance their smiles. Therefore, clear aligners have become increasingly popular as an orthodontic treatment modality that helps patients overcome these obstacles.

Clear aligners were launched near the end of the 1990s and have since been viewed as a comfortable alternative to traditional multibracket orthodontic therapy [4]. Constructed from thin transparent plastics that snugly fit over all surfaces of the teeth, these aesthetic removable trays have undergone numerous modifications with the addition of different strategies, such as divots, attachments, auxiliary tools, and ridges, allowing aligners to address multiple malalignments [4]. The rapid technological improvements in the production and design of aligners have led to an increase in the number of complexities that can be addressed through this therapeutic treatment [4,5].

Not only are aligners popular among adults, but they are also a popular choice among teenagers looking for less conspicuous methods than fixed orthodontic brackets. Aligners are not only more aesthetic than traditional brackets, but they also help patients maintain better oral hygiene during the course of orthodontic treatment [6,7]. This reduces the chances of patients developing

discolourations, white spot lesions, and tooth decay, which are often considered the disadvantages of fixed appliances. Additionally, clear aligners are reported to cause less pain while reducing the number of appointments and emergency visits [8,9].

However, the popularity of clear aligners has been particularly noted in third-tier or metro cities. There is a lack of data regarding awareness of orthodontic treatment among the general population living in smaller towns in India. This is highlighted by the fact that despite the numerous advantages of clear aligners, several sectors of India still remain unaware of the recent advancements made in the field of dentistry [9].

The present study seeks to address a notable research gap, as previous investigations have primarily focused on awareness levels among different populations regarding various orthodontic modalities. However, none have specifically examined the awareness levels within the general population of Maharashtra regarding clear aligners as a therapeutic orthodontic treatment [9,10].

Against this backdrop, the study aimed to assess the awareness of the general population of Maharashtra, aged 15 to 45, regarding the use of clear aligners as a modern orthodontic treatment modality. The primary objective was to gauge awareness. The present research aimed to bridge existing knowledge gaps and provide valuable insights into the evolving landscape of orthodontic care.

## MATERIALS AND METHODS

In the present cross-sectional survey conducted at the Department of Orthodontics and Dentofacial Orthopaedics, School of Dental Sciences, Krishna Vishwa Vidyapeeth, Karad, Maharashtra, India, data collection spanned from July 2023 to August 2023. The study was reviewed and approved by the Institutional Ethics Committee

Krishna Vishwa Vidyapeeth “Deemed To Be University”, Karad, with reference number KVV/IEC/05/2023.

**Sample size calculation:** The following formula was used to calculate the sample size [11,12]:

Level of significance ( $\alpha$  error)=5%, Power=80%, Type of test=two-sided.

The formula for calculating sample size is:

$$n = (Z1)^2 \{P(1-P)\}/d^2.$$

P	Estimated Population P=50%, knowledge/awareness regarding clear aligners as orthodontic treatment among general population	0.5
1- $\alpha$	Confidence level	0.95
Z	Z value associated with confidence	1.96
d	Absolute precision	0.05
n	Minimum sample size	385

Assuming all factors, the minimum sample size came to be around 385 subjects, increasing to 423 subjects in the present study.

**Inclusion criteria:**

- Participants residing in Maharashtra
- Males or females with age group between 15-45 years

**Exclusion criteria:**

- Temporary residents
- Dental students
- Population below the age of 15 years.

**Study Procedure**

A questionnaire survey was prepared online using Google Docs by a panel of five qualified orthodontists and consisted of 12 close-ended questions about knowledge related to clear aligners, public perception, and reasons for opting for the selected treatment. Lawshe’s method was used for content validity using judgements from a panel of five qualified orthodontists from KVV, Karad.

The questionnaire was distributed among 453 participants through various channels such as personal emails and communications through the phone. Each contributor was requested to fill out a consent form before proceeding with answering the questionnaire survey. The Google form link provided to every participant was filled and submitted by them online. A follow-up reminder was sent via telephonic message to non repondents after one week. The questionnaire was made available to the participants over the course of one month from July 2023 to August 2023. The participants were categorised using the convenient sampling method.

**STATISTICAL ANALYSIS**

The Statistical Package for Social Sciences (SPSS) version 22.0 was used to evaluate the data descriptively and inferentially. At the end of one month, the online data was collected and analysed while assessing its content validity.

**RESULTS**

The present survey recorded a total of 423 responses collected from Maharashtra, with the mean age being 28.4±5.88 years. The findings revealed a multifaceted perspective on orthodontic treatment preferences. Notably, 203 (47.99%) of the population sought orthodontic consultation. An intriguing 77 (38.06%) were advised clear aligners. When it came to comfort, 355 (83.92%) of participants opted for the more comfortable treatment option over the fixed orthodontic approach. Moreover, prior to an orthodontic visit, a remarkable 266 (62.88%) of the population had prior knowledge of clear aligners [Table/Fig-1].

The survey findings revealed a divergence of perceptions among participants regarding the cost of clear aligner treatment, with 292 (69.03%) considering it to be on the higher side. Interestingly, only

Survey questions	Responses
Q1) Have you ever visited an Orthodontist?	Yes: 203 (47.99%) No: 162 (38.4%) Not sure: 58 (13.61%)
Q2) If the answer is yes, what type of treatment were you advised to go for?	Fixed: 116 (56.97%) Clear Aligners: 77 (38.06%) Both: 10 (4.97%)
Q3) Will you prefer going for a more comfortable treatment option rather than a fixed orthodontic treatment?	Yes: 355 (83.92%) No: 47 (11.12%) Not sure: 21 (4.96%)
Q4) Before visiting an orthodontist, did you have any prior knowledge of clear aligner trays?	Yes: 266 (62.88%) No: 142 (33.6%) Not sure: 15 (3.52%)
Q5) If the answer is yes, how do you know about it?	Advertisements/social media: 194 (73.05%) Family/friends: 51 (18.91%) Others: 21 (7.8%)
Q6) Do you think clear aligners are, an effective method of treatment?	Yes: 371 (87.71%) No: 47 (11.09%) Not sure: 5 (1.2%)
Q7) Do you think clear aligners can correct, any kind of dental alignment problem?	Yes: 268 (63.36%) No: 111 (26.24%) Not sure: 44 (10.4%)
Q8) Do you think clear aligner treatment is costly?	Yes: 292 (69.03%) No: 34 (8%) Same as fixed: 97 (22.93%)
Q9) Would you prefer paying a higher price for treatment with clear aligner therapy	Yes: 139 (32.86%) No: 208 (49.17%) Not sure: 76 (17.97%)
Q10) Will you prefer opting for clear aligner treatment, over fixed treatment?	Yes: 325 (76.83%) No: 68 (16%) Not sure: 30 (7.17%)
Q11) If the answer is yes for the above stated question, which statement is the reason	Clear aligners are more aesthetic than fixed: 177 (54.37%) Clear aligners are less painful than fixed: 126 (38.77%) Clear aligners take less time than fixed treatment: 22 (6.86%)
Q12) Do you believe clear aligner treatment, is better than traditional braces?	Yes: 245 (57.92%) No: 128 (30.26%) Not sure: 50 (11.82%)

[Table/Fig-1]: Survey questions with their responses.

139 (32.86%) expressed a willingness to invest more in clear aligner therapy, while 76 (17.97%) were unsure. A total of 325 (76.83%) of participants displayed a clear preference for clear aligners over traditional fixed orthodontic treatment. This preference underscores a general inclination towards clear aligners, despite the reluctance to incur higher costs. In summary, 245 (57.92%) of participants thought clear aligner therapy was a superior choice to traditional braces.

**DISCUSSION**

The results of the present study showed that less than 50% of the participants had made a prior visit to an orthodontist. Devishree RA and Felicitia AS reported similar results regarding awareness of orthodontists [13]. An 83.92% of the participants would choose to opt for a more comfortable form of treatment over fixed orthodontic treatment. In contrast, a minority of 11% of people did not opt for it. Moreover, 62.88% of the population had heard of clear aligners before visiting an orthodontist, most of whom had learned about the therapeutic modality via advertisements and social media, compared to less than 20% being made aware of clear aligners through friends and family members. All of these results were similar to those obtained by Alharbi IS et al., where 28.5% of the population learned about aligners via social media, but in the geographical location of Saudi Arabia [14]. The reason for this indicates a recent increase in media awareness regarding clear aligners through advertisements via different platforms such as social media.

The current study divulged that a majority of 63.36% of people believe that any kind of dental malalignment can be corrected using clear aligners. This result is in accordance with a study conducted by Alharbi IS et al., in the general population of Saudi Arabia, where 74.5% of people believed that clear aligners are highly effective [14].

The majority, 69.03% of people, believed that the treatment cost of aligners was higher than fixed orthodontic treatment. The current study shows a more positive response rate than previous literature, which reported a 55% willingness [15]. However, only a minority of 32.86% of the population showed a willingness to pay extra for being treated with clear aligners, contradictory to the findings in the study by Varghese R et al., [16]. This result could indicate that an individual's socio-economic status is correlated with the choice of orthodontic treatment they would select.

A 76.8% of the population said they would prefer being treated with clear aligners rather than opting for traditional braces, with only 16% choosing fixed orthodontic treatment between the two treatment methods. This indicates a positive acceptance of clear aligners as a new treatment method amongst the general population. These results are supported by studies conducted in different populations over different geographical locations, such as Chennai [16].

In the present study, 54.37% of people would prefer to opt for clear aligners based on the belief that aligners provide a more aesthetic form of orthodontic treatment rather than fixed therapeutic treatment. This addresses the primary anxiety of people while going for orthodontic treatment, which stems from uneasiness during smiling due to the visibility of metallic braces. Ziuchkovsku JP et al., reported metal brackets as being considered unattractive, with a majority opting for clear aligners as the more aesthetic option [17].

Previous literature has reported pain as a significant reason for patient non compliance during orthodontic treatment. This also leads to missed appointments and is considered to be the most common drawback of fixed treatment [18]. To corroborate the aforementioned statement, the study found that 38.7% of the participants would opt for aligners over fixed therapy under the impression that aligners would result in less pain when compared to traditional braces. A 57.92% of the population chose clear aligners as a better orthodontic treatment method over a fixed treatment modality.

### Limitation(s)

Some specific limitations of the study included the cross-sectional design of the study, as there is no indication of a time-based link between exposure and result. Another limitation presented was geographical restrictions. Further studies could be performed with a larger sample size and different ethnicities, which could lead to more awareness and better results.

### CONCLUSION(S)

To summarise, the current study's findings suggest that 76.83% of the population would opt for clear aligner therapy over traditional braces due to primary reasons of aesthetics and comfort. These findings indicate a notable level of awareness and acceptance of clear aligners among the general population in Maharashtra. The shift towards inconspicuous orthodontic treatments, as indicated by the familiarity and positive perceptions of clear aligners, indicates

an evolving preference within this demographic. The prospectus for future studies could involve using the present survey as a template for shedding light on the awareness among the general population regarding the limitations of clear aligner therapy.

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