

Knowledge, attitude, and practices of clear aligners among general dentist and non-orthodontic postgraduates – A cross-sectional questionnaire survey

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ABSTRACT

Background. Over the past few years, there has been a discernible surge in the demand for orthodontic treatments involving clear aligners. Although orthodontists have long held expertise in offering braces treatments, the advent of clear aligners has put out the curiosity of general dental practitioners. This study is thus centered on the assessment of general dentists' knowledge, attitudes, and approaches in incorporating clear aligners in their practice.

Materials and methods. A Google Form with a questionnaire was created which consisted of 25 multiple choice closed-ended questions.

Results. A total of 156 participants responded to the questionnaire. The comparative analysis showed a highly significant difference in knowledge, attitude and practice scores between general dentists and non-orthodontic postgraduates. No significant correlations were observed, except for the specialty and qualification related to orthodontic knowledge and found that most of them were familiar with aligners. The results of the study showed that nearly 50% of participants were not aware of aligner material, type of tooth movements easier with aligners, the use of composite attachments, retention protocols followed and case preference and only 56% of participants held the view that Orthodontists' involvement was imperative for clear aligner treatment.

Conclusion. The study revealed a moderate level of knowledge and a favorable attitude towards clear aligner treatment among both general dentists and non-orthodontic postgraduates. Equipping these professionals with the requisite knowledge and competencies holds the potential to enhance their ability to deliver efficient orthodontic options to their patients down the line.

Keywords: knowledge, attitude, clear aligner, general dentists, post graduates

INTRODUCTION

Orthodontics has witnessed not only an exponential rise in demand from the adult population but accompanying this the emergence of alternative aesthetic treatment options to the more traditional fixed labial appliance. The concept of using a clear aligner as a means of achieving tooth movement has increased in popularity among both patients and clinicians alike [1].

Aligner therapy brings a host of advantages to patients, including enhanced comfort, convenience,

and a subtler aesthetic. Nevertheless, it wasn't until the 1990s that Invisalign, the first clear aligner system, was launched, marking the advent of contemporary aligner therapy in Orthodontics [2]. Research has indicated that 18% to 20% of general dentists now offer routine comprehensive orthodontic treatment, and a significant proportion, ranging from 32% to 57%, provide various forms of limited orthodontic treatment [3]. Notably, there has also been a surge in the number of these practitioners offering clear aligner therapy [4].

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Hence, the primary objective of this study is to evaluate the knowledge, attitude, and practices of clear aligners in orthodontic treatment among general dentists and non-orthodontic postgraduates.

MATERIALS AND METHODS

Study Design

A Google Form was created for general dentists and non-orthodontic postgraduates to respond to questions regarding orthodontic Treatment with clear aligner. The study was carried out on March 2023, during which the questionnaire was distributed. The Content Validity Index (CVI) was calculated with a panel of 5 expert orthodontists and it was found to be 0.98. The questionnaire was altered based on their feedback, and final variations were made according to the assessment.

Sample Size

A descriptive cross-sectional study was conducted on 156 dentists who participated from different areas of Tamil Nadu, Karnataka, Kerala, Maharashtra, and Andhra Pradesh to study their Knowledge, attitudes and practice of the basics of Aligner treatment. The sample size was calculated using the estimated correlation coefficient, and the minimum sample size needed was 85.

Questionnaire Design

The study was conducted using a questionnaire containing 25 questions, as illustrated in (Table 1). There were 11 questions assessing knowledge and 9 attitude questions and 5 practice questions.

First Section:

Designed to collect demographic details, years of experience, speciality and the location of their work.

Second Section:

Survey for the knowledge of clear aligner treatment:

In total, 11 queries were asked to general dental practitioners and non-orthodontic postgraduates to evaluate their knowledge based on aligner material, case selection, records taken, duration of wear, instruction given to patients, force delivery, role of attachments, number of aligners prescribed, retention followed.

Survey for the attitude of clear aligner treatment:

A set of 9 questions was administered to gauge the attitudes of participants towards orthodontic treatment involving clear aligners. These questions delved into aspects like the demand for aligner treatment, participants' viewpoints on case selection, considerations about patient compliance, and their inclination towards Orthodontists' involvement in such treatments.

TABLE 1. The questionnaire used for this study is depicted

Knowledge:	
1	How many hours do you think patients should wear aligners per day?
2	Force delivery of clear aligners depends on?
3	The material commonly used to manufacture the aligners?
4	What is the use of composite attachment in aligners?
5	The number of trays in clear aligners is determined by?
6	The technology used in clear aligners?
7	The tooth movement which is easier with aligners is?
8	How long will you ask the patient to wear the retainer after the aligner treatment?
9	Do you think that different shapes and positions of attachment induce different forces for tooth movement?
10	Methods by which impression is taken in aligner treatment?
11	Aligners must be removed during meals especially while drinking hot drinks, because..?
Attitude:	
1	Do you think that the use of clear dental aligners has significantly grown in popularity over the years?
2	Do you think all orthodontic cases can be treated with aligners alone?
3	For the orthodontically relapsed patients, what would be your treatment of preference?
4	Do you think the strict requirement for patient compliance is needed for the successful outcome
5	Appliance preference for severe crowding?
6	Do you think fixed orthodontic treatment can cause more trauma to periodontal tissues when compared to aligners
7	Which appliance will you prefer for mild to moderate spacing
8	Do you prefer that aligner chewies can be used to help seat your aligner
9	Do you prefer an orthodontist
Practice:	
1	Do you practice clear aligner therapy with Auxiliary features, if needed
2	Do you practice clear aligner therapy
3	Do you check for fit of the previous aligner during each appointment
4	Do you check for attachment breakage in each appointment
5	Have you practiced virtual care during aligner therapy?

Survey for the practice of clear aligner treatment:

A series of 5 queries was directed at general practitioners to assess their practices regarding aligner treatment. These inquiries pertained to the fit of the aligners, occurrences of attachment breakage, utilization of virtual care, and the auxiliary elements employed in the treatment.

Statistical Analysis

Descriptive statistics were used to analyse the data, expressing mean scores and standard deviation. Scores were calculated based on the responses given by participants, and individual scores were summed up. Based on gender, females showed more interest than males, with 75.8% of responses (Figure 1).

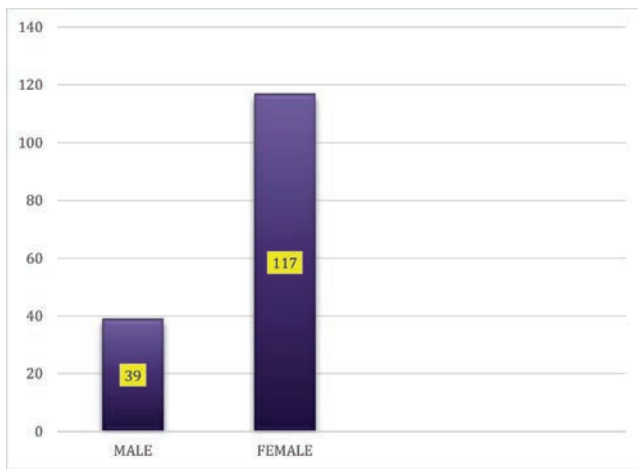


FIGURE 1. Distribution of participants according to gender

Within the knowledge section, a notable 48% of participants exhibited a lack of awareness regarding the material employed in aligner manufacturing. Additionally, 54% of dentists remained unfamiliar with the specific type of tooth movements facilitated more easily by aligners. Interestingly, a substantial 81% provided accurate instructions regarding the duration of wear and when to remove aligners, yet merely 26% comprehended the underlying rationale for this action. A significant 56% of participants were unaware of the use of composite attachments, while only 52% possessed knowledge concerning the prescribed retention protocols (Figure 2).

Shifting to the attitude segment, an overwhelming 70% of participants perceived a surge in demand for clear aligner treatments in recent years, emphasizing the necessity for stringent patient compliance. Three-quarters (75%) believed that hybrid mechanics were essential, with aligners alone deemed insufficient for comprehensive treatment. In terms of treatment preference, 48% indicated that aligner treatment was preferable for conditions like severe

crowding, relapse, and periodontally compromised patients. Conversely, 62% viewed aligner treatment as more favorable for cases involving spacing. Meanwhile, a mere 56% acknowledged the significance of Orthodontists in the context of clear aligner treatment (Figure 3).

In the realm of practice, a substantial 75% of dentists conducted routine assessments to ensure proper aligner fit and attachment integrity. In terms of virtual care, 41% of practitioners incorporated this approach. Notably, only 32% integrated auxiliary features in their implementation of clear aligners (Figure 4).

DISCUSSION

Clear aligners have emerged as a prominent sub-field within orthodontics, with the knowledge, attitude, and practice pertaining to them being of utmost significance, especially among general dental practitioners who have incorporated clear aligner treatments into their practice.

The material used in the fabrication such as Polyethylene terephthalate glycol (PET-G), Polyurethane (PU), polyvinyl chloride significantly influences the colour stability, mechanical properties and resiliency of the aligner. 48% of participants exhibited a lack of awareness regarding the material employed in aligner manufacturing and a significant 56% of participants were unaware of the use of composite as attachments. Clear aligner are effective in controlling anterior intrusion compared to anterior extrusion; it is effective in controlling posterior buccolingual inclination than anterior buccolingual inclination; it is effective in controlling upper molar bodily movements of about 1.5 mm; and it is not effective in controlling rotation of rounded teeth in particular [5]. But, 54% of dentists remained unfamiliar with the specific type of tooth

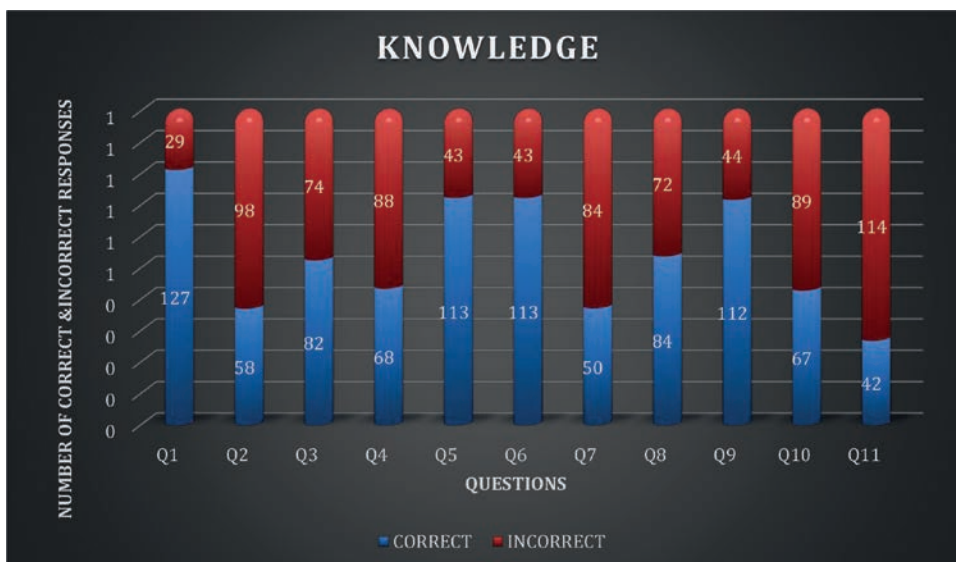


FIGURE 2. Responses to questions related to knowledge about the use of Aligner therapy in dentistry

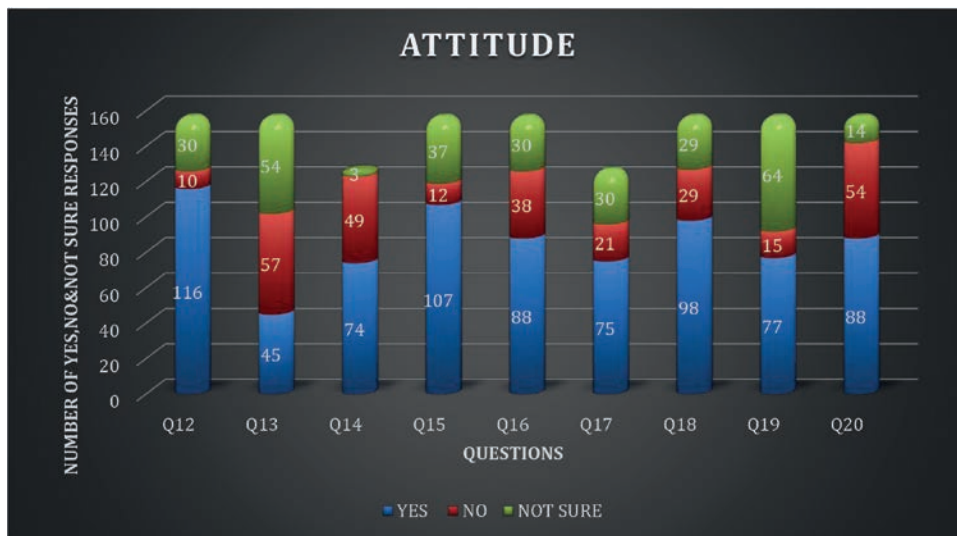


FIGURE 3. Responses to questions related to the attitude about the concepts of Aligner therapy in dentistry has been depicted below

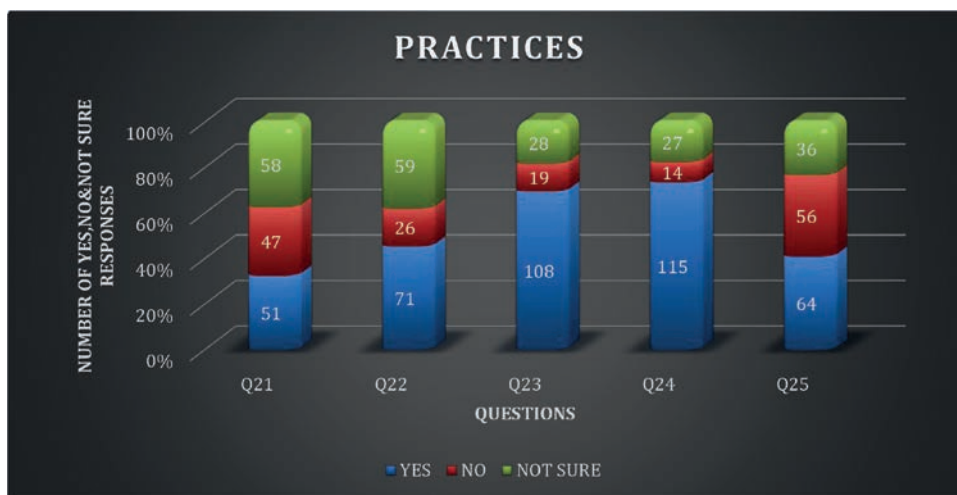


FIGURE 4. Responses to questions related to the practices of aligner therapy in dentistry has been depicted below:

movements facilitated more easily by aligners. Invisalign aligners are designed to achieve a tooth movement of approximately 0.25-0.33 mm over a period of 14 days. However, in 2016, Invisalign updated its protocol, transitioning from a 14-day wear schedule to a 7-day one, effectively cutting treatment time in half. To maximize their effectiveness, it is crucial for patients to wear these aligners consistently, typically for 20-22 hours per day [6]. Interestingly, a substantial 81% provided accurate instructions regarding the duration of wear and when to remove aligners, yet merely 26% comprehended the underlying rationale for this action. While only 52% possessed knowledge concerning the prescribed retention protocols indicating that 48% of general practitioners may not be familiar with what guidance to provide regarding retention protocols to their patients. Temporary anchorage device, intraoral elastics, and power arms are frequently incorporated as adjuncts to facilitate various movements when using aligners [7]. A notable three-

quarters (75%) of practitioners considered hybrid mechanics essential, believing that aligners alone are insufficient for comprehensive treatment. Surprisingly, only 32% integrated auxiliary features in their clear aligner treatment approach.

Aligner fit can be a critical determinant for the success of clear aligner therapy and establishment of effective anchorage [8]. In practice, a significant 75% of dentists conducted routine assessments to ensure the proper fit and secure attachment of aligners. Clear aligner therapy, particularly with dental monitoring, offers the significant advantage of reducing the number of appointments by 3.5 visits (33.1%) throughout the treatment duration [9]. Virtual care has been integrated into the practices of 49% of practitioners.

Clear aligners are considered convenient for addressing mild to moderate crowding, diastema, posterior expansion, intrusion of one or two teeth, lower incisor extraction cases, and distal tipping of molars. However, challenges are noted in movements

such as extrusion, correction of severe rotations, molar uprighting, and closure of extraction spaces [10]. Approximately 48% of respondents prefer aligner treatment for cases involving severe crowding, relapse, and patients with periodontal issues, while 62% find it more suitable for cases characterized by spacing concerns. There is a recognized need for enhanced knowledge in selecting appropriate cases for aligner treatment. Interestingly, only 56% of participants recognized the crucial role of orthodontists in the context of clear aligner treatment.

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CONCLUSION

Overall, this study found that both general dentist and non-orthodontic postgraduates had a moderate level of knowledge and positive attitude towards clear aligner treatment. By providing dentists with the necessary knowledge and skills, they can provide more effective orthodontic solutions for their patients. Additionally this will improve patient satisfaction.

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