

Concern, Awareness and Decision Towards Different Orthodontic Treatment Modalities - An Questionnaire Survey

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ABSTRACT

Aim: To describe and analyze the awareness, thoughts and values influencing patients decisions to undergo orthodontic treatment with the ultimate aim of getting a deeper insight into decision making and the need to undergo orthodontic treatment.

Material and Methods: All outpatients of the orthodontic department were included in the study. The questionnaire was framed under three categories namely patients concerns for orthodontic treatment, patients knowledge or awareness of different orthodontic treatment modalities and patients preferences or decisions on various orthodontic appliances. Likert type scale for awareness was used to rate the awareness level. Participants were then asked to rank their most preferred orthodontic appliance option. Four listed options included (a. Metal bracket, b. Clear bracket, c. Lingual brackets and d. Clear aligners).

Result: The factors affecting patient's concern for orthodontic treatment are as follows: pain and discomfort, the appearance of braces, cost, changes in diet pattern, being teased by friends, neighbours, peer group etc., long treatment duration, skip work on the day of review, transportation for monthly review, uneasiness during smiling and speech. The mean awareness scale shows Metal braces to be highly recognized, followed by clear braces and lingual appliances while growth modification reported least appraised.

Conclusion: The dentist must educate patients on new technologies available in the market which would address patients concerns about orthodontic treatment. Awareness should be created among all population groups on other orthodontic treatment modalities in particular growth modifiers.

Key Words: Orthodontic Treatment, Concern, Awareness, Decision Making, Survey, Questionnaire

INTRODUCTION

The modern era with emerging and enabling technologies have helped the orthodontic profession progress in various methods of treatment. The profession has seen transitions from traditional braces to self-ligating brackets, lingual braces, removable aligners, and much more advanced technology, which address patients concerns (in particular esthetic and comfort) and the need for a timely efficient care^{1,2}.

Orthodontics deals with the diagnosis, prevention and correction of malocclusion. Malocclusion is not a disease itself, but rather a state of being different from societal norms, which may cause anxiety about one's dentofacial appearance and functional problems³. Sari et al., 2005⁴ have shown that high anxiety levels are seen in patients with malocclusion.

The concern is a cognitive activity that accompanies anxiety about future events⁵.

Increased patient awareness on smile beauty and facial appearance are observed more frequently in daily clinical practice. In recent years there has been an increase in the number of patients-both adults and adolescents seeking orthodontic treatment in addition, patients' expectations on treatment outcomes continue to rise. A desire for more aesthetic materials has resulted in both smaller sized and 'tooth-coloured' appliances.

Long treatment duration and non-aesthetic appearance of metal brackets are the main reasons discouraging adult patients to start orthodontic treatment⁶. Another important aspect of choosing a specific appliance option is its cost. The cost of treatment was reported to hinder their ability to meet

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their demanded treatment and fulfil their needs, and it was rated to be the most significant barrier to receiving dental services.

Hence, it is important to identify factors that may influence patients' treatment uptake decisions. It is also unknown whether patients' aware of orthodontic advancement which may be related to their treatment demands. Therefore, this study aimed to describe and analyze the awareness, thoughts and values influencing patients decisions to undergo orthodontic treatment with the ultimate aim of getting a deeper insight into decision making and the need to undergo orthodontic treatment.

MATERIALS AND METHODS

A cross-sectional epidemiological survey was conducted in the department of orthodontics and dentofacial orthopaedics approved by the institutional ethical committee(678/IHEC/12-19). All the outpatients for orthodontic consultation during the period from March 2019 to 2020 were included in the study. The patient's details like age, gender and educational level were collected. Both Verbal and written information about the study was given to all subjects and written concern was obtained from all the participants. All the participants were asked about their decision to undergo orthodontic treatment and the answers were registered (a. Yes b. No c. Not yet decided) before proceeding with the study questionnaire.

Study Design

A prestructured questionnaire (Fig. 1) was given to random 300 patients (179 girls and 121 boys) aged 18-30 years satisfying the inclusion criteria.

Inclusion criteria

1. Patients undergoing orthodontic consultation for the first time.
2. Patients between 18-30years old.
3. Patients with no history of orthodontic treatment.
4. Patients with no siblings who previously underwent orthodontic treatment.

The questionnaire was framed under three categories namely patients' concern about orthodontic treatment, patients' knowledge or awareness on different orthodontic treatment modalities and patients' preference or decision on various orthodontic appliances. The concern for orthodontic treatment was gathered under the following 10 factors: 1. Pain and discomfort, 2. Change in food style, 3. The appearance of braces, 4. Transportation, 5. Being teased, 6. Cost, 7. Avoiding smiling, 8. Long treatment duration, 9. Speech problems, 10. Time off from work.

Concern, Awareness and Decision towards different orthodontic treatment modalities-An Questionnaire survey				
Demographic information		Give a tick mark (✓) for your respective option		
1. Age(mention your age)		3. Educational Qualification		
2. Gender		Post Graduate		
Male		Graduate		
Female		Higher Secondary(Class 11-12)		
		Secondary(Class 6-10)		
4. Treatment decision				
<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not yet decided				
5. Concerns about Orthodontic Treatment				
<input type="checkbox"/> Pain and discomfort		<input type="checkbox"/> Changes in food style		<input type="checkbox"/> Long treatment duration
<input type="checkbox"/> Appearance of braces		<input type="checkbox"/> Transportation		<input type="checkbox"/> Avoiding smiling
<input type="checkbox"/> Being teased		<input type="checkbox"/> Cost		<input type="checkbox"/> Time off from work
<input type="checkbox"/> Speech problems				
6. Aware of orthodontic options (Check with the images displayed)				
I.Space maintainers				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
II.Arch expanders				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
III. Growth modification Device				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
IV.Metal braces				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
V. Clear braces(Ceramic)				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
VI. Self ligating braces				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
VII. Lingual braces				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
VIII. clear aligners				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
IX. Mini implant or Mini Screw				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
X.combined orthodontic-surgical case				
<input type="checkbox"/> Extremely aware	<input type="checkbox"/> Moderately aware	<input type="checkbox"/> Somewhat aware	<input type="checkbox"/> Slightly aware	<input type="checkbox"/> Not at all aware
7.Preferred Orthodontic appliance				
<input type="checkbox"/> Metal braces	<input type="checkbox"/> Clear braces	<input type="checkbox"/> Lingual braces	<input type="checkbox"/> Clear aligner	

Figure 1: Prestructured Questionnaire.

Ten orthodontic treatment options representing the major therapeutic modalities in daily practices to understand patients' knowledge or awareness on different orthodontic treatment modalities were listed as 1. Space maintainer, 2. Arch Expander, 3. Growth modification devices, 4. Metal braces, 5. Clear braces(Ceramic), 6. Self Ligating Braces, 7. Lingual braces, 8. Clear Aligner, 9. Mini implant or Mini screw, 10. Combined orthodontics and surgical cases. Images for each orthodontic therapy was shown to patients like Nance holding appliance, Maxillary arch expander, Headgear, Twin block, Metal bracket, Ceramic bracket, Lingual bracket, Passive Self ligating bracket with opening a door, Clear aligner partially and completely inserted, a Mini implant placed for anterior retraction and a pre-and posttreatment extra-oral profile of a combined orthodontic and surgical case. Each image was re-sized to the same dimension with better quality images. Likert type scale for awareness was used to rate the awareness level of each therapy. It has five categories as follows: (1) not at all aware, (2) slightly aware (3) somewhat aware, (4) moderately aware, and (5) extremely aware.

Participants were then asked to rank their most preferred orthodontic appliance option. Four listed options include (a. Metal bracket, b. Clear bracket, c. Lingual brackets and d. Clear aligners).

Statistical analysis

Statistical evaluation of the data was performed using the IBM SPSS statistics software. Chi-Squared test was used to detect statistically significant differences between Likert's scale awareness means of the different ten orthodontic modalities with age, gender, level of education and between treatment decisions and Mean ranking of the selected four appliances were found and also a concern for orthodontic treatment according to age, sex and treatment demand was evaluated.

RESULTS

The distribution of patients according to sex, age and treatment decision is shown in table 1. Out of 300 participants, 47(15.67%) were postgraduates, 189(63%) were graduates, 59(19.67%) were educated to higher secondary level (Class 11-12), 5(1.67%) were educated to secondary level(Class 6-10) shown in Table 2. Around 236 participants(78.67%) agreed to undergo orthodontic treatment, whereas 33 participants(11%) do not want to undergo orthodontic treatment while 31 participants(10.37%) had not yet decided whether to undergo orthodontic treatment.

Table 1: Demographic details

Gender	Age group	Treatment Decision			Total
		Yes	No	Not yet decided	
Male	Female				
121 (40.33%)	179 (59.67%)	234 (78%)	33 (11%)	33 (11%)	300 (100%)

Table 2: Education level

Category	Total
Post graduation	47(15.67%)
Graduation	189(63%)
Higher secondary	59(19.67%)
Secondary	5(1.67%)

Patients concern for orthodontic treatment which was gathered under 10 factors mentioned are shown in figure 2. 89(29.67%) participants felt pain and discomfort as their major concern towards orthodontic treatment, 67(22.33%) participants worried about the appearance of braces, 43(14.33%) participants felt cost as their major concern, 26(8.67%) participants were apprehensive about changes in diet pattern,

19(6.33%) participants expressed on being teased from friends, neighbour, peer group etc., 19(6.33%) participants felt that the time off from work on the day of the review was their concern, 15(5%) participants were disturbed about long treatment duration, 8(2.67%) participants bothered about their transportation for monthly review, 7(2.33%) participants felt about uneasiness during smiling due to braces, 7(2.33%) participants were distressed that braces would affect their speech.

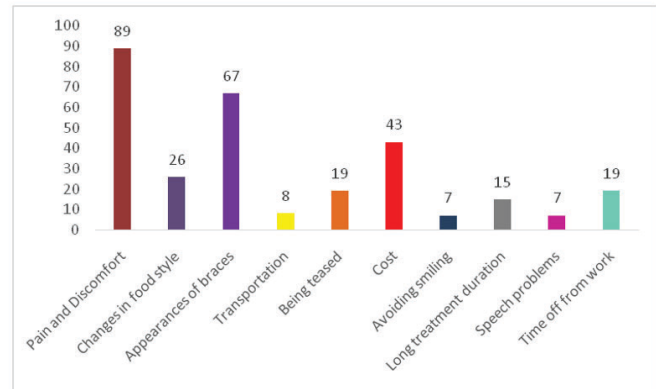


Figure 2: Patient concerns' for orthodontic treatment.

The mean awareness level of each appliance is shown in figure 3. Metal braces(3.96/5) was mostly recognized, similarly, clear braces and clear aligners were among the highly recognized with the mean awareness scale of about 3.18 and 2.92 out of 5 respectively followed by lingual bracket. while growth modification appliances(1.48/5) was as expected reported at least (table 3).

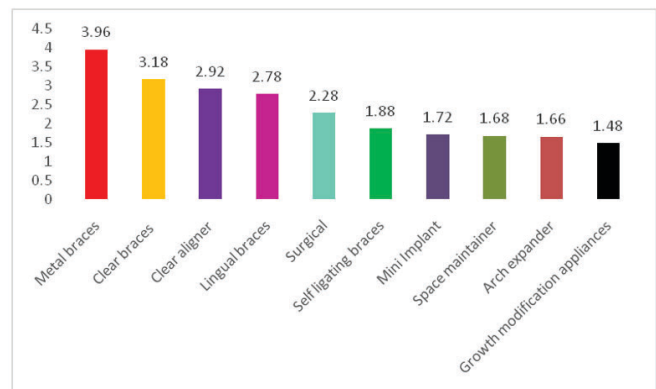
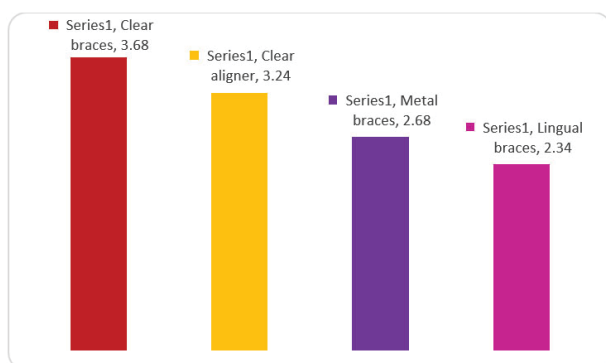


Figure 3: Mean awareness level of each orthodontic treatment modality.

Table 3: Awareness level of each orthodontic treatment modality

Orthodontic Appli- ance	Likes awareness scale	Frequency	Per cent	Orthodontic Appliance	Likes aware- ness scale	Frequency	Per cent
Space maintainer	Not at all aware	151	50.3	Self-ligating braces	Not at all aware	118	39.3
	Slightly aware	93	31.0		Slightly aware	99	33.0
	Somewhat aware	56	18.7		Somewhat aware	83	27.7
Arch expander	Not at all aware	156	52.0	Lingual braces	Not at all aware	17	5.7
	Slightly aware	89	29.7		Slightly aware	110	36.7
	Somewhat aware	55	18.3		Somewhat aware	107	35.7
Growth modification devices	Not at all aware	174	58.0	Clear Aligner	Not at all aware	14	4.7
	Slightly aware	107	35.7		Slightly aware	88	29.3
	Somewhat aware	19	6.3		Somewhat aware	120	40.0
Metal braces	Slightly aware	6	2.0	Mini implant or Mini screw	Not at all aware	110	36.7
	Somewhat aware	43	14.3		Slightly aware	164	54.7
	Moderately aware	207	69.0		Somewhat aware	25	8.3
Clear braces	Extremely aware	44	14.7	Combined or- thodontic and surgical case	Moderately aware	1	.3
	Not at all aware	2	.7		Not at all aware	74	24.7
	Slightly aware	56	18.7		Slightly aware	108	36.0
	Somewhat aware	133	44.3		Somewhat aware	77	25.7
	Moderately aware	103	34.3		Moderately aware	41	13.7
	Extremely aware	6	2.0				

The mean ranking for each one of the four orthodontic appliances selected were shown in figure 4. The ceramic bracket was the most preferred treatment option(3.68/5) and the Lingual bracket was placed the least in the ranking(2.34/5)

**Figure 4:** Mean ranking for each orthodontic appliances.

In our study 72.7% of participants were inadequately aware and 27.3% of participants shows moderate awareness to different orthodontic treatment modalities. (Table 4)

Table 4: Patient's Level of Awareness

Level of Awareness	Frequency	Percent
Inadequate awareness	218	72.7
Moderate awareness	82	27.3
Total	300	100.0

Statistical difference between age and level of awareness were found. Participants with age group of 26-30years had more level of awareness when compared to remaining age group($p=0.02$).(Table 5). and there is a correlation between education and level of awareness with the post graduates showing more awareness when compared to graduates,

higher secondary, and secondary($p=0.000$). No statistical difference were found between gender($p=0.193$), treatment decision($p=0.366$) and level of awareness.

Table 5: Comparisons of patients' level of awareness according to age group and Education

		Level of Awareness		Total
		Inadequate Awareness	Moderate Awareness	
Age Group	<= 20 YEARS	47 87.0%	7 13.0%	54 100.0%
	21 - 25 YEARS	98 76.0%	31 24.0%	129 100.0%
	26 - 30 YEARS	73 62.4%	44 37.6%	117 100.0%
Education	Post Graduate	11 23.4%	36 76.6%	47 100.0%
	Graduate	151 79.9%	38 20.1%	189 100.0%
	Higher secondary	51 86.4%	8 13.6%	59 100.0%
	Secondary	5 100.0%	0 0%	5 100.0%

Correlation was also found between concern and treatment decisions groups, the concern items "Appearances of braces" and "change in food style" were related to the treatment demand group ($p = 0.01$, and $p = 0.043$, respectively). The most frequent concern item among patients who had not yet decided whether to undergo treatment or not and patients who don't want treatment is about "cost" and "pain and discomfort" $p = 0.002$, $p=0.005$ respectively. There was no statistically significant difference in patients' concerns about gender and age group ($p > 0.05$).

DISCUSSION

This survey among patients regarding orthodontic treatment proves to admit the fact that individual concern plays an important factor in making their decisions to undergo treatment. According to our results, future orthodontic patients had concerns mainly on "pain and discomfort", "Appearances of braces", "Cost", "Changes in food style". These findings are similar to those studies by Bennett et al., 1997⁷, Sayer and Newton et al., 2007⁸ and Kazanci et al., 2016⁹. In the present survey, postgraduates felt changes in food style as one of their concerns whereas most graduates and higher secondary and secondary participants felt cost as one of their concerns along with pain and appearance of braces. Almost 14.33% of participants had a concern about cost as hindering

factor for them to undergo orthodontic treatment. a participant who had cost as their concern would certainly accept orthodontic treatment if there is a government-employed health care policy. But in the developing countries where patients cannot avail of insurance policy for orthodontic treatment, the concern of cost factor by patients should be dealt with separately. However, the majority of patients would spare cost factor when compared to other factors like pain and appearance of braces.

In our study, 29.67% of participants felt pain as the main concern in orthodontic treatment. Pain and discomfort are one of the most common and problematic sequelae of orthodontic treatment.¹⁰⁻¹² According to the literature, 70-95% of orthodontic patients experience pain during orthodontic treatment.^{13, 14} According to Banerjee et al., 2018¹⁵, pain is one of the major reasons for patient non-compliance and is a primary reason for missing appointments. To resolve this problem sufficient patient-orthodontist communication about pain management during orthodontic treatment may reduce their fear of pain and discomfort during orthodontic treatment and improve their quality of life and as well their treatment cooperation and satisfaction.

The highest awareness score among orthodontic devices listed was metal brackets (3.96 out of 5) followed by clear braces, clear aligners, lingual brackets (3.18, 2.92 and 2.78 out of 5). On the other hand space maintainer, arch expander and growth modification appliances like facemask, headgear, twin block displayed the lowest level of awareness (1.68, 1.66 and 1.48 out of 5). Mane et al., 2018¹⁶, found that people in rural areas have lack awareness of various techniques and advances in orthodontic treatment. Our result was also similar to the survey by Bindayel et al., 2018¹⁷ where the level of awareness of the stainless steel brackets is high and the least awareness level was found in headgear and functional appliances. A study by Sruthi et al., 2018¹⁸ found that participants knowledge on functional and myofunctional appliances was less and more awareness has to be created. This highlights the lack of specific knowledge on different orthodontic treatment modalities. Therefore a campaign is required to raise public awareness and improve knowledge on different orthodontic treatment modalities. Since growth modification appliance can be rendered only to younger age group population, general population or paediatric as well adult population seeking dental treatment should be educated on growth, modification procedures which can circumvent surgical procedures in future.

In our study, 22.33% of participants felt the appearance of braces as their concern in orthodontic treatment. This concern was about esthetics which attributes to the major requirement for modern society, which caused an increased demand for aesthetic treatment.¹⁹ In our study, the clear(Ceramic) bracket was the most preferred treatment option(3.68 out of

5) followed by a clear aligner (3.24 out of 5) whereas lingual braces were the least preferred treatment option (2.34 out of 5). This result was also similar to the study by Rosvall et al., 2009²⁰ and Bindayel et al., 2018²¹. But the result was in contrast to a study by Ziuchkovski et al., 2008²², where they noticed clear aligner and lingual appliances were the most attractive treatment. The metal bracket which was commonly used in orthodontic practice were considered unattractive while ceramic bracket and orthodontic clear aligners were considered better aesthetic options. According to Feu D et al., 2012²³, socioeconomic status and age play a major role in the decision of aesthetic orthodontic options. Patients with high socioeconomic status and ages between 17 and 26 years are willing to receive aesthetic appliances irrespective of the cost. It is important to include socioeconomic status as one of the factors affecting decision making, hence this study's results cannot be indiscriminately applied to groups with socioeconomic differences and this was considered to be the drawback of this study.

CONCLUSION

1. The mean awareness scale shows Metal braces to be highly recognized, followed by clear braces and lingual appliances while growth modification reported least appraised.
2. The dentist has to educate patients on new technologies available in the market which would address patients concerns about orthodontic treatment. Awareness should be created among all population groups on other orthodontic treatment modalities in particular growth modifiers, which would intercept malocclusion at an earlier stage
3. Futuristic application of orthodontic treatment should be towards prevention and interception of malocclusion. Hence awareness of preventive and interceptive orthodontics should be created among the general public.

Conflict of interest: None

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Authors contribution:

	Authors	Contribution details
1	Dr. Navin.N	Conception or design of the work, Data Collection, Data analysis and Interpretation.
2.	Dr.Prema	Conception or design of the work, Drafting the article.
3.	Dr.Saravana Kumar	Critical revision of the article, Final approval of the version to be published.
4.	Dr.Yamini	Critical revision of the article.
5.	Dr.Sushmitha	Critical revision of the article.

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