

Assessment of Knowledge, Attitude and Self Perceived Barriers in Accessing Early Intervention for Orthodontic Needs Among Indian Adult Population- A Cross-Sectional Study

Arshi Khanam¹, Divya Shetty^{2*}, Ritu Gupta³, Payal Sharma⁴, Piush Kumar⁵

¹Post Graduate, Department of Orthodontics and Dentofacial Orthopaedics,
I.T.S Centre for Dental Studies & Research, Ghaziabad.

Contact: 9717577947, arshikhanam4@gmail.com, ORCID id: 0009-0004-6408-6082.

^{2*}MDS, Professor, Department of Orthodontics and Dentofacial Orthopaedics,
I.T.S Centre for Dental Studies & Research, Ghaziabad,

Contact: 9758683634, divyashetty@its.edu.in, ORCID id: 0000-0002-2127-7928.

³MDS, Professor and Head, Department of Public Health Dentistry,
I.T.S Centre for Dental Studies & Research, Ghaziabad.

Contact: 9810161504, ritugupta@its.edu.in, ORCID id: 0000-0002-8634-7501.

⁴MDS, Professor and Head, Department of Orthodontics and Dentofacial Orthopaedics,
I.T.S Centre for Dental Studies & Research, Ghaziabad.

Contact: 9212708451, payalsharma@its.edu.in, ORCID id: 0000-0002-0062-3940.

⁵MDS, Professor, Department of Orthodontics and Dentofacial Orthopaedics,
I.T.S Centre for Dental Studies & Research, Ghaziabad.

Contact: 9811307935, piushkumar@its.edu.in, ORCID id: 0000-0002-9667-5672.

ABSTRACT

Background: Orthodontic treatment in adults is increasing, yet early intervention remains underutilized due to limited awareness, negative perceptions, and socioeconomic barriers. This study aims to assess the knowledge, attitude, and self-perceived barriers toward accessing early orthodontic care among the Indian adult population.

Aim: To assess the knowledge, attitude and self perceived barriers in accessing early intervention for orthodontic needs among Indian adult population.

Material and method: A cross-sectional survey was conducted among 500 adults aged 18–40 years in the Delhi-NCR region. A validated, structured questionnaire comprising 28 close-ended questions was administered to evaluate participants' knowledge, attitude, and perceived barriers. Socioeconomic status was assessed using the Modified Kuppuswamy Scale (2024). Data were analyzed using SPSS v25.0 with descriptive statistics, Chi-square tests, and Spearman correlation.

Results: While 91% of participants acknowledged the corrective role of braces, only 8.4% were aware of the benefits of early orthodontic intervention. Major barriers included lack of awareness (99.8%), perceived lack of need during adolescence (96.8%), cost (74.8%), and long treatment duration (71.4%). Rural participants demonstrated lower knowledge but more positive attitudes than urban counterparts. Knowledge correlated positively with age ($r = 0.105$, $p = 0.019$), while attitude declined slightly with age ($r = -0.142$, $p = 0.001$). Socioeconomic status significantly influenced knowledge and attitude scores ($p < 0.001$).

Conclusion:

The findings highlight substantial gaps in awareness and significant socioeconomic barriers preventing timely orthodontic care. Focused public health initiatives are needed to enhance awareness, reduce financial constraints, and promote early intervention, especially among lower SES and rural populations.

Keywords: Orthodontics, early intervention, adult patients, knowledge, attitude, barriers, socioeconomic status, India.

How to cite this article: Khanam A, Shetty D, Gupta R, Sharma P, Kumar P. Assessment of Knowledge, Attitude and Self Perceived Barriers in Accessing Early Intervention for Orthodontic Needs Among Indian Adult Population- A Cross-Sectional Study. Int J Drug Deliv Technol. 2026;16(65s):807-816. DOI: 10.25258/ijddt.16.65s.86

INTRODUCTION

Orthodontic treatment has evolved significantly over the past few decades, transitioning from a service primarily for adolescents to a sought-after intervention among adults. The growing demand for orthodontic care among adults can be attributed to a variety of factors, including increased

awareness of oral health, advancements in orthodontic technologies, and a heightened emphasis on aesthetic appearance in modern society. Despite these trends, a notable disparity exists between adults who seek orthodontic treatment and those who do not, even when they present with similar grades of malocclusion.¹

The causes of malocclusion are complex and multifactorial, with numerous factors contributing to the misalignment of teeth and the disruption of normal skeletal development. Several epidemiological studies have provided valuable tools for exploring these factors, identifying a range of influences that can interfere with the proper positioning of teeth and the typical growth pattern of the jaw.

Malocclusion can lead to various complications, including difficulties in chewing, speech problems, and an increased risk of periodontal disease. Moreover, the psychological impact of malocclusion, particularly its effect on self-esteem and social interactions, cannot be understated. Individuals with noticeable dental irregularities often experience social stigma, which can lead to reduced self-confidence and increased anxiety in social situations.¹ Previous study by Choi et al stated that malocclusion is a key factor associated with poor quality of life caused by limited oral function, pain, and social disability in young adults.²

The psychological effects of malocclusion can extend to broader aspects of a patient's quality of life, influencing their confidence in social and professional interactions. In severe cases, individuals may feel self-conscious about their smile, which can have a lasting impact on their mental well-being and overall happiness. Addressing malocclusion, therefore, not only helps restore normal oral functions but also improves the patient's emotional and social health, contributing to a better quality of life. Earlier study by Grewal et al concluded that orthodontic treatment has a positive psychological impact, as there was a significant improvement in self-esteem and social interaction of the individuals. Significant changes occurred in functional and aesthetic domain measures of quality of life in orthodontically treated cases. The severity of malocclusion has a negative impact on the quality of life and a significant improvement in the quality of life was observed before and after orthodontic treatment with no gender difference.³

Knowledge and awareness among patients regarding orthodontic problems and treatments are crucial for ensuring informed decision-making and effective treatment outcomes. In the previous study conducted by Mathew et al it was found that most patients had good knowledge of orthodontic treatment however the percentage of positive attitude and orthodontic treatment related practices section were lower.⁴ Another study conducted in Saudi Arabia by Alqahtani et al concluded that individuals had limited knowledge and medium perceptions of orthodontic treatment. Female and younger individuals seemed to have better knowledge and perception.⁵

However, the level of understanding can vary greatly depending on the individual's exposure to dental education, personal experience, and the information they receive from dental professionals.

As the demand for orthodontic treatment among adults grows and awareness increases, several barriers have emerged. These barriers often stem from factors such as the patient's financial situation, the duration of the treatment, and lack of awareness regarding early intervention during early age/adolescence. A study conducted by AlAnzan et al in Saudi Arabia concluded that high cost was the most

common cause of refusing orthodontic treatment followed by long treatment duration.⁶ Another study by Goyal et al in India found that barriers such as financial constraints, fear of pain, and lack of awareness continue to prevent a substantial portion of population from accessing the orthodontic care.¹

Socioeconomic status (SES) is another factor that plays a critical role in determining access to and utilization of orthodontic services. Individuals from higher socioeconomic backgrounds are more likely to seek orthodontic treatment due to better access to healthcare, higher levels of education, and greater financial resources. Conversely, those from lower socioeconomic backgrounds may face barriers such as limited access to dental care, financial constraints, and lack of awareness, which contribute to their reluctance to seek treatment.¹ There is paucity of literature regarding self perceived barriers in accessing early orthodontic treatment among adults in Delhi-NCR region.

Therefore the aim of the study is to assess the knowledge, attitude, and self-perceived barriers in accessing early intervention for orthodontic needs among Indian adult population.

MATERIALS AND METHODS

This study was designed as a cross-sectional, observational analysis aimed to assess the knowledge, attitude and self perceived barriers in accessing early intervention for orthodontic needs among Indian adult population.

Study design and setting

The research was conducted by a single calibrated examiner at the Department of Orthodontics and Dentofacial Orthopedics at I.T.S – Centre for Dental Studies and Research, Muradnagar, Uttar Pradesh.

Ethical considerations

The study research protocol was submitted for approval and ethical clearance was obtained from the Institutional Ethical Committee of ITS-CDSR Muradnagar, Ghaziabad. After obtaining approval and ethical clearance, the research protocol study was implemented on scheduled dates.

Informed consent

Voluntary written informed consent was obtained from the study participants after an explanation of the nature of the study.

validation of the questionnaire

1. A self-administered close ended questionnaire comprising of 28 questions was prepared.
2. Then the questionnaire was translated into local language (Hindi) and it was checked for cross cultural sensitivity with the help of bilingual expert. The translated questionnaire was checked for reliability by test- retest method among 20 participants who completed the questionnaire twice with 1 week apart.

Study population

The study population consisted of adult patients aged 18 to 40 years who visited the orthodontic department for consultations and or for ongoing treatment.

Inclusion and exclusion criteria

Inclusion Criteria:

- I. Adults aged 18 to 40 years.
- II. Patients who have provided their written informed consent

Exclusion Criteria:

- I. Patients under the age of 18 or over 40 years.

Method of collection of data

The primary data collection tool was a structured, self-administered questionnaire, which was developed specifically for this study.

The questionnaire was designed to capture the knowledge, attitude and self perceived barriers in accessing early intervention for orthodontic needs among Indian adult population.

The questionnaire was written in English and consisted of 28 questions, which were further divided into four sections comprising

1. First section consisted of demographic variables like age, gender, location, marital status and socioeconomic status which was recorded using modified Kuppuswamy scale

2. Second section consisted of 11 questions used to assess knowledge and awareness towards orthodontic needs,
3. Third section consisted of questions related to attitude of patients towards orthodontic needs, and
4. Fourth section assessed the self perceived barriers in accessing early intervention for orthodontic needs.

The responses provided in the questionnaire were “Yes,” “No,” and “I don’t know” for knowledge and barriers while a 5 point likert scale was used to assess attitude.

Statistical analysis

Data were analyzed using SPSS v25.0. Normality was tested with the Shapiro-Wilk test. Descriptive statistics (mean, standard deviation, percentages) and inferential tests were applied. Chi-square test assessed group differences, and Pearson correlation examined the relationship between knowledge scores and age.

RESULT

A total of 500 participants (mean age = 27.33, SD = 11.98) were included. The sample comprised 42% males and 58% females, with 59.6% from rural and 40.4% from urban areas. Most were unmarried (65.4%). In terms of socioeconomic status, 72.2% belonged to the upper lower class, followed by upper (15%), upper middle (7.2%), lower middle (3.2%), and lower class (2.4%).

Table 1: Demographic details

GENDER	N	%
Male	210	42.0
Female	290	58.0
LOCATION		
Urban	202	40.4
Rural	298	59.6
MARITAL SATUS		
Married	173	34.6
Unmarried	327	65.4
SES		
Lower	12	2.4
Upper lower	361	72.2
Lower middle	16	3.2
Upper middle	36	7.2
Upper	75	15.0

The findings of the current assessment (**Table 2**) reveal a generally adequate level of knowledge. A high proportion of participants (91%) knew that braces correct dental irregularities, and 89.4% recognized that malocclusion can hinder brushing. Awareness was moderate regarding its link

to plaque accumulation (80.6%) and dental caries (59.2%). However, only 25% associated malocclusion with speech problems, and just 8.4% were aware of the benefits of early orthodontic intervention.

Table 2: Assessment of knowledge

Question	Yes		No	
	n	%	n	%
Braces can correct teeth and jaw irregularities?	455	91.0	45	9.0
Do you think malocclusion can cause dental caries?	296	59.2	204	40.8

Do you think malocclusion can cause plaque accumulation?	403	80.6	97	19.4
Do you think malocclusion can cause gingivitis?	234	46.8	266	53.2
Do you think malocclusion can make dental brushing more difficult?	447	89.4	53	10.6
Do you think malocclusion can cause speech problems?	125	25.0	375	75.0
Thumb sucking in childhood can lead to malocclusion?	310	62.0	190	38.0
Early extraction of primary teeth can cause malocclusion.	222	44.4	278	55.6
Genetic can be the reason for malocclusion?	311	62.2	189	37.8
Do you know the suitable age for starting orthodontic treatment?	151	30.2	349	69.8
Do you know the benefit of seeking early orthodontic intervention?	42	8.4	458	91.6

The assessment of participant's attitudes revealed mixed perceptions toward orthodontic treatment (Table 3). Most participants viewed treatment as lengthy (90.8%) and costly (58.4%). Braces were seen as unattractive by 67.4%. While 66.4% felt malocclusion affects self-esteem, only 28.2% linked it to mental health.

Table 3: Assessment of the attitude

Question	Category	n	%
People wearing braces do not look good?	Strongly disagree	0	0
	Disagree	109	21.8
	NAND	54	10.8
	Agree	306	61.2
	Strongly agree	31	6.2
The duration of treatment is too long?	Strongly disagree	0	0
	Disagree	0	0
	NAND	45	9.0
	Agree	454	90.8
	Strongly agree	1	.2
The cost of the orthodontic treatment is expensive?	Strongly disagree	0	0
	Disagree	131	26.2
	NAND	77	15.4
	Agree	215	43.0
	Strongly agree	77	15.4
Malocclusion can impact a person's self-esteem and confidence.	Strongly disagree	0	0
	Disagree	112	22.4
	NAND	25	5.0
	Agree	332	66.4
	Strongly agree	31	6.2
Malocclusion can have an impact on person's mental health.	Strongly disagree	0	0
	Disagree	284	56.8
	NAND	75	15.0
	Agree	140	28.0
	Strongly agree	1	.2

The assessment of self-perceived barriers in accessing early intervention for orthodontic needs revealed a range of factors influencing treatment uptake among the participants (Table 4). The main barriers to early orthodontic intervention were lack of awareness (99.8%) and perceived lack of need in early years (96.8%). Cost (74.8%), long treatment duration (71.4%), and cultural/social factors (53.2%) were also significant. Less common barriers included multiple visits, appearance concerns, access issues, and fear of pain.

Table 4: Assessment of self-perceived barriers in accessing early intervention for orthodontic needs

Barrier	n	%
Cost and affordability?	374	74.8
Multiple dental visits?	149	29.8
Long term treatment?	357	71.4
Unpleasant appearance?	157	31.4
Require good oral hygiene maintenance?	48	9.6
Transportation difficulty?	116	23.2
Lack of awareness regarding early intervention during early age/adolescence?	499	99.8

Fear and anxiety towards the treatment?	51	10.2
Lack of accessibility of orthodontic treatment?	139	27.8
Cultural and social factors?	266	53.2
Orthodontic treatment will lead to pain?	48	9.6
Did not feel the need of orthodontic treatment during early age/adolescence?	484	96.8

A Spearman correlation test was conducted to examine the relationship between age and both knowledge and attitude (Table 5). Spearman's test showed a weak positive correlation between age and knowledge ($r = 0.105$, $p = 0.019$), and a weak negative correlation with attitude ($r = -0.142$, $p = 0.001$), both statistically significant.

Table 5: Correlation of Age with knowledge & attitude

Age v/s	r-value	p-value
Knowledge	0.105	0.019*
Attitude	-0.142	0.001*

The association between socioeconomic status (SES) and knowledge regarding orthodontic needs was assessed using the Kuppaswamy scale and a set of 11 knowledge-based questions (Table 6). A significant association was found between SES and orthodontic knowledge ($p < 0.001$ for all questions). Participants from upper SES groups showed consistently higher awareness across all items. In contrast, knowledge and awareness were markedly lower in the upper lower and lower classes, with greater misconceptions and lower recognition of early intervention benefits.

Table 6: Association between socioeconomic status (SES) and knowledge

Questions		Upper Class N (%)	Upper middle Class N (%)	Lower middle Class N (%)	Upper lower Class N (%)	Lower Class N (%)	Total	Chi-Square p-value
Q1	Yes	75(100)	37(100)	15(100)	317(87.6)	11(100)	445(91)	0.001
	No	0(0)	0(0)	0(0)	45(12.4)	0(0)	45(9)	
Q2	Yes	75(100)	37(100)	12(80)	171(47.2)	1(9.1)	296(59.2)	0.000
	No	0(0)	0(0)	3(20)	191(52.8)	10(90.9)	204(40.8)	
Q3	Yes	75(100)	37(100)	15(100)	265(73.2)	11(100)	403(80.6)	0.000
	No	0(0)	0(0)	0(0)	97(26.8)	0(0)	97(19.4)	
Q4	Yes	75(100)	37(100)	12(80)	109(30.1)	1(9.1)	234(46.8)	0.000
	No	0(0)	0(0)	3(20)	253(69.9)	10(90.9)	266(53.2)	
Q5	Yes	75(100)	37(100)	13(86.7)	319(88.1)	3(27.3)	447(89.4)	0.000
	No	0(0)	0(0)	2(13.3)	43(11.9)	8(72.7)	53(10.6)	
Q6	Yes	75(100)	27(73)	8(53.3)	15(4.1)	0(0)	125(25)	0.000
	No	0(0)	10(27)	7(46.7)	347(95.9)	11(100)	375(75)	
Q7	Yes	75(100)	27(73)	9(60)	196(54.1)	3(27.3)	310(62)	0.000
	No	0(0)	10(27)	6(40)	166(45.9)	8(72.7)	190(38)	
Q8	Yes	45(60)	29(78.4)	7(46.7)	138(38.1)	3(27.3)	222(44.4)	0.000
	No	30(40)	8(21.6)	8(21.6)	224(61.9)	8(72.7)	278(55.6)	
Q9	Yes	75(100)	36(97.3)	15(100)	174(48.1)	11(100)	311(62.2)	0.000
	No	0(0)	1(2.7)	0(0)	188(51.9)	0(0)	189(37.8)	
Q10	Yes	75(100)	22(59.5)	0(0)	53(14.6)	1(9.1)	151(30.2)	0.000
	No	0(0)	15(40.5)	15(100)	309(85.4)	10(90.9)	349(69.8)	
Q11	Yes	0(0)	6(16.2)	8(53.3)	27(7.5)	1(9.1)	42(8.4)	0.000
	No	75(100)	31(83.8)	7(46.7)	335(92.5)	10(90.9)	458(91.6)	

The analysis revealed significant associations between socioeconomic status and attitudes toward orthodontic treatment across all five attitude-related questions (Q12–Q16), with p-values < 0.001 for each (Table 7). Significant associations were found between SES and attitudes toward orthodontic treatment ($p < 0.001$ for all items). Higher SES

groups, especially the upper class, showed more positive attitudes. Lower SES groups more often perceived treatment as costly and were less likely to associate malocclusion with mental health. Misconceptions and neutral responses were more common among lower classes.

Table 7: Association between socioeconomic status and attitude

Questions		Upper Class N (%)	Upper middle Class N (%)	Lower middle Class N (%)	Upper lower Class N (%)	Lower Class N (%)	Total	Chi-Square p-value
Q12	Strongly disagree	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0.000
	disagree	0(0)	6(16.2)	6(40)	96(26.5)	1(9.1)	109(21.8)	
	Neither agree nor disagree	0(0)	1(2.7)	1(6.7)	50(13.8)	2(18.2)	54(10.8)	
	agree	45(60)	30(81.1)	8(53.3)	215(59.4)	8(72.7)	306(61.2)	
	Strongly agree	30(40)	0(0)	0(0)	1(0.3)	0(0)	31(6.2)	
Q13	Strongly disagree	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0.000
	disagree	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	
	Neither agree nor disagree	45(60)	0(0)	0(0)	0(0)	0(0)	45(9)	
	agree	30(40)	37(100)	15(100)	361(99.7)	11(100)	454(90.8)	
	Strongly agree	0(0)	0(0)	0(0)	1(0.3)	0(0)	1(0.2)	
Q14	Strongly disagree	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0.000
	disagree	45(60)	27(73)	6(40)	53(14.6)	0(0)	131(26.2)	
	Neither agree nor disagree	30(40)	8(21.6)	4(26.7)	35(9.7)	0(0)	77(15.4)	
	agree	0(0)	2(5.4)	5(33.3)	197(54.4)	11(100)	215(43)	
	Strongly agree	0(0)	0(0)	0(0)	77(21.3)	0(0)	77(15.4)	
Q15	Strongly disagree	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0.000
	disagree	0(0)	14(37.8)	12(80)	77(21.3)	9(81.8)	112(22.4)	
	Neither agree nor disagree	0(0)	0(0)	3(20)	20(5.5)	2(16.2)	25(5)	
	agree	45(60)	23(62.2)	0(0)	264(72.9)	0(0)	332(66.4)	
	Strongly agree	30(40)	0(0)	0(0)	1(0.3)	0(0)	31(6.2)	
Q16	Strongly disagree	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0.000
	disagree	0(0)	8(21.6)	7(46.7)	258(71.3)	11(100)	284(56.8)	
	Neither agree nor disagree	0(0)	23(62.2)	2(13.3)	50(13.8)	0(0)	75(15)	
	agree	75(100)	6(16.2)	6(40)	53(14.6)	0(0)	140(28)	
	Strongly agree	0(0)	0(0)	0(0)	1(0.3)	0(0)	1(0.2)	

A statistically significant association was observed between socioeconomic status and most of the perceived barriers to early orthodontic intervention (**Table 8**). A significant association was found between SES and most perceived barriers to early orthodontic care ($p < 0.001$), except for

appearance concerns (Q20) and pain perception (Q28). Lack of awareness (99.8%) and perceived lack of need (96.8%) were nearly universal. Cost, treatment duration, and accessibility were major concerns in lower SES groups, while not reported at all by the upper class.

Table 8: Association between socioeconomic status and barriers

Questions		Upper Class N (%)	Upper middle Class N (%)	Lower middle Class N (%)	Upper lower Class N (%)	Lower Class N (%)	Total	Chi-Square p-value
Q17	Yes	0(0)	10(27)	7(46.7)	346(95.6)	11(100)	375(74.8)	0.000
	No	75(100)	27(73)	8(53.3)	16(4.4)	0(0)	126(25.2)	
Q18	Yes	0(0)	1(2.7)	1(6.7)	145(40.1)	2(18.2)	149(29.8)	0.000
	No	75(100)	36(97.3)	14(93.3)	217(59.9)	9(81.8)	351(70.2)	
Q19	Yes	30(40)	2(5.4)	3(20)	311(85.9)	11(100)	357(71.4)	0.000
	No	45(60)	35(94.6)	12(80)	51(14.1)	0(0)	143(28.6)	
Q20	Yes	30(40)	9(24.3)	6(40)	112(30.9)	0(0)	157(31.4)	0.061
	No	45(60)	28(75.7)	9(60)	250(69.1)	11(100)	343(68.6)	
Q21	Yes	0(0)	8(21.6)	4(26.7)	36(9.9)	0(0)	48(9.6)	0.000
	No	75(100)	29(78.4)	11(73.3)	326(90.1)	11(100)	452(90.4)	
Q22	Yes	0(0)	0(0)	2(13.3)	106(29.3)	8(72.7)	116(23.2)	0.000
	No	75(100)	37(100)	13(86.7)	256(70.7)	3(27.3)	384(76.8)	
Q23	Yes	75(100)	36(97.3)	15(100)	362(100)	11(100)	499(99.8)	0.014
	No	0(0)	1(2.7)	0(0)	0(0)	0(0)	1(0.2)	
Q24	Yes	0(0)	8(21.6)	6(40)	37(10.2)	0(0)	51(10.2)	0.000
	No	75(100)	29(78.4)	9(60)	325(89.8)	11(100)	449(89.8)	
Q25	Yes	0(0)	1(2.7)	2(13.3)	128(35.4)	8(72.7)	139(27.8)	0.000
	No	75(100)	36(97.3)	13(86.7)	234(64.6)	3(27.3)	361(72.2)	
Q26	Yes	30(40)	1(2.7)	3(20)	221(61)	11(100)	266(53.2)	0.000
	No	45(60)	36(97.3)	12(80)	141(39)	0(0)	234(46.8)	
Q27	Yes	0(0)	8(21.6)	4(26.7)	36(9.9)	0(0)	48(9.6)	0.000
	No	75(100)	29(78.4)	11(73.3)	326(90.1)	11(100)	452(90.4)	
Q28	Yes	75(100)	36(97.3)	15(100)	348(96.1)	10(90.9)	484(96.8)	0.313
	No	0(0)	1(2.7)	0(0)	14(3.9)	1(9.1)	16(3.2)	

DISCUSSION

This cross-sectional, questionnaire based study investigated the knowledge and attitude of patients towards orthodontic treatment and also assessed the self perceived barriers in accessing early intervention for orthodontic needs among Indian adult population. This discussion will elaborate on the implications of these findings, compare them with existing literature, and explore potential strategies to address the barriers identified.

The findings of this study reveal a generally adequate level of knowledge among participants regarding orthodontic issues, particularly the mechanical and hygiene-related consequences of malocclusion. A significant majority (91%) correctly acknowledged that braces can correct teeth and jaw irregularities. Additionally, a high percentage of respondents recognized that malocclusion could hinder effective dental hygiene, with 89.4% indicating it may make brushing more difficult, and 80.6% identifying its link to plaque accumulation. These responses reflect a fair understanding of the relationship between malocclusion and basic oral health maintenance.

However, some areas show educational deficiency like there was limited awareness regarding the broader functional and pathological consequences of malocclusion, beyond aesthetic and hygiene concerns. Of particular concern is the low level of awareness regarding the timing and importance of orthodontic intervention which may delay timely orthodontic consultations, potentially resulting

in more complex malocclusions and extended treatment durations in the future. Only 30.2% of respondents reported knowing the appropriate age to initiate orthodontic treatment, and a mere 8.4% understood the benefits of early intervention.

In the study conducted by Mathew et al it was found that most patients had good knowledge of orthodontic treatment however the percentage of positive attitude and orthodontic treatment related practices section were lower.⁴ Another study conducted in Saudi Arabia by Alqahtani et al individuals had limited knowledge and medium perceptions of orthodontic treatment. Female and younger individuals seemed to have better knowledge and perception.⁵

Assessing patients' knowledge, attitudes, and practices regarding orthodontic care plays a crucial role in enhancing the quality of clinical interactions and treatment outcomes. This understanding not only assists clinicians in tailoring communication and care strategies to individual patient needs but also highlights key areas where additional educational efforts are required. By addressing these gaps, orthodontic professionals can foster a more collaborative treatment environment, improve patient compliance, and ultimately contribute to more effective and satisfactory orthodontic outcomes.

The assessment of attitudes toward orthodontic treatment reveals significant perceptions that may influence individuals' decisions to pursue care. A substantial proportion of respondents agreed with the statement that

"people wearing braces do not look good," (61.2%) indicating a persistent social stigma associated with orthodontic appliances. This perception may deter individuals from pursuing necessary orthodontic interventions due to concerns about aesthetic appearance during treatment.

Regarding treatment logistics, an overwhelming majority (90.8%) concurred that the duration of orthodontic treatment is excessively long. Furthermore, 58.4% of participants acknowledged the high cost of orthodontic care, which is consistent with studies indicating that financial considerations are a significant barrier to treatment uptake. A study by Georgescu et al showed that overall the majority of the studied population had a good level of understanding, and high level of knowledge regarding orthodontic treatment. Regarding attitude the majority of the participants considered orthodontic treatment to be expensive and long-lasting.⁷

The psychological impact of malocclusion was also evident, with 66.4% agreeing that it can affect self-esteem and confidence. This is corroborated by research demonstrating that malocclusion negatively influences oral health-related quality of life, particularly in the domains of psychological discomfort and disability. However, a majority (56.8%) disagreed that malocclusion impacts mental health, suggesting a potential underestimation of its broader psychological effects. Literature indicates that malocclusion can contribute to increased levels of depression and anxiety, affecting social functioning and overall quality of life.

In the previous study conducted by Pabari et al showed that Self esteem and facial body image scores were higher in patients who had completed treatment than those who had not, suggesting that orthodontic treatment may impart some psychological benefits to adult patients.⁸ Similar results were found by Ravindranath et al, stating that the participants who were in need of orthodontic treatment were significantly lower in dental self confidence and psychological impact domain when compared to those who had no need of orthodontic treatment.⁹

These findings underscore the need for comprehensive public education to address misconceptions about orthodontic treatment aesthetics, duration, and cost. Additionally, integrating psychological support into orthodontic care may enhance patient outcomes by addressing the emotional and mental health aspects associated with malocclusion.

This study explored self-perceived barriers to accessing early orthodontic intervention and identified a diverse array of factors that influence treatment uptake among participants. The present study underscores a multifaceted array of self-perceived barriers impeding early orthodontic intervention. Foremost among these is the lack of awareness regarding early intervention during adolescence, reported by 99.8% of participants. This finding aligns with a survey conducted in the Kanchipuram district of India by Thirunavukkarasu R et al where 57.6% of parents were unaware that orthodontic treatment could commence during their child's growth period.¹⁰

Closely related, 96.8% of respondents in our study did not

perceive a need for orthodontic treatment during their early years. This may reflect a failure to recognize early signs of malocclusion or a lack of guidance from dental professionals, reinforcing the need for routine dental screenings and referral pathways during pediatric care. The role of general dental practitioners is crucial in identifying early orthodontic needs and educating both parents and patients about the benefits of timely intervention.

Cost and affordability emerged as significant barriers for 74.8% of the respondents, indicating that financial limitations remain a critical impediment to seeking orthodontic care. This finding is in line with prior literature by Abdulrahman K. Alshammari et al where economic burden is often cited as a primary obstacle. The data suggests a need for government-supported or insurance-backed orthodontic programs aimed at reducing out-of-pocket expenditures.¹¹

The *duration of orthodontic treatment* was a concern for 71.4% of participants. Orthodontic procedures often span several months to years, which may discourage individuals who are unwilling or unable to commit to long-term treatment regimens. Furthermore, 53.2% of respondents highlighted *cultural and social factors* as barriers, suggesting that societal attitudes, peer perceptions, and familial beliefs may shape the decision-making process regarding orthodontic care. Similar results were found in the study conducted by AlAnzan et al in Saudi Arabia where they concluded that high cost was the most common cause of refusing orthodontic treatment followed by long treatment duration.⁶ Another study by Goyal et al in India found that barriers such as financial constraints, fear of pain, and lack of awareness continue to prevent a substantial portion of population from accessing the orthodontic care.¹ Several other barriers, while less commonly reported, still warrant attention like *unpleasant appearance during treatment* (31.4%) and *multiple dental visits* (29.8%). Additional logistical challenges such as *lack of accessibility to orthodontic services* (27.8%) and *transportation difficulties* (23.2%) also played a role, particularly in rural or underserved communities. These structural barriers suggest a need for improved geographic distribution of orthodontic clinics and enhanced transport support systems. The findings of this study also revealed statistically significant associations between age and both knowledge and attitude. The results showed a weak positive link between age and knowledge, meaning that knowledge tended to increase slightly as people got older. On the other hand, a weak negative link was found between age and attitude, suggesting that attitudes became slightly less positive with age.

The present study aimed to explore the awareness and barriers related to orthodontic treatment across different socioeconomic classes. The results showed that awareness about the need for orthodontic treatment was highest among the upper and upper-middle socioeconomic groups, while it was significantly lower among the upper-lower and lower classes. This suggests that socioeconomic status has a strong influence on the level of dental awareness. Tickle and colleagues reported that children from deprived

backgrounds were less likely to visit a dentist regularly.¹² A major barrier identified in the study was that most individuals, especially from the lower socioeconomic classes, did not feel the need for orthodontic treatment during their adolescence (96.8% agreed). This indicates a lack of timely awareness regarding the ideal age for starting treatment. This finding is supported by a study conducted in Kanchipuram district by Thirunavukkarasu R et al., where 57.6% of parents were unaware that orthodontic treatment can begin during a child's growth period.¹⁰ Another commonly reported barrier was the perceived high cost of orthodontic treatment (99.8%), highlighting financial concerns as a major factor affecting treatment decisions. This was consistent across almost all socioeconomic categories, including upper classes, showing that cost is a widespread concern even in urban populations. Additionally, 53.2% respondents expressed fear of treatment or dental procedures, indicating psychological factors also play a role in treatment avoidance. Overall, the study highlights the importance of increasing awareness about the ideal timing and benefits of orthodontic treatment, especially among the lower socioeconomic groups. Educational initiatives and affordable treatment options could help bridge the gap in orthodontic care. A combination of educational, financial, cultural, psychological and infrastructural factors hinders the early uptake of orthodontic treatment. Addressing these barriers will require a multidisciplinary approach involving public health policy, clinical practice reform, and targeted

community outreach. Emphasis should be placed on raising awareness, improving access, and reducing the financial burden associated with orthodontic care to promote better oral health outcomes across the population.

CONCLUSION

This study highlights a gap between awareness and actual uptake of early orthodontic care among Indian adults. Although basic knowledge exists, deeper understanding of its benefits remains limited. Key barriers include lack of awareness during adolescence, perceived non-necessity, and financial constraints.

To address this, public health efforts should focus on education, school-based screenings, and improved counseling by general dentists. Making orthodontic care more affordable and accessible—particularly in rural areas—is essential.

An integrated approach targeting educational, economic, and systemic barriers is crucial. Enhancing awareness and access can reduce untreated malocclusion and improve oral health, self-confidence, and overall well-being.

Conflicts of Interest

The authors declare no conflicts of interest related to this work. No financial relationships with any organizations that might have an interest in the submitted work exist, and no other relationships or activities that could appear to have influenced it are present.

Authors' Contributions

Author	Role
Dr. Arshi Khanam	Conceptualization, data curation, formal analysis, investigation, visualization, writing – original draft
Dr. Divya Shetty	Conceptualization, writing – review and editing, supervision
Dr. Ritu Gupta	Validation, supervision
Dr. Payal Sharma	Validation, supervision
Dr. Piush Kumar	Validation, supervision

All authors have read and agreed to the final version of this manuscript.

REFERENCES

- Goyal S, Gupta DK, Singla L, Krishan K. Comparison of motivating factors among adults 'seeking' versus 'not seeking' orthodontic treatment. *J Adv Med Dent Sci Res*. 2024 Sep;12(9):11–7.
- Choi SH, Kim BI, Cha JY, Hwang CJ. Impact of malocclusion and common oral diseases on oral health-related quality of life in young adults. *Am J Orthod Dentofacial Orthop*. 2015 May;147(5):587–95.
- Grewal H, Sapawat P, Modi P, Aggarwal S. Psychological impact of orthodontic treatment on quality of life – A longitudinal study. *IntOrthod*. 2019 Jun;17(2):269–76.
- Mathew R, Sathasivam HP, Mohamednor L, Yugaraj P. Knowledge, attitude and practice of patients towards orthodontic treatment. *BMC Oral Health*. 2023;23(1):132.
- Alqahtani AM, Thirunavukkarasu A. Assessment of patient knowledge and perceptions towards orthodontic treatment in the Aljouf Region, Saudi Arabia: a cross-sectional study. *PeerJ*. 2024;12:e18516.
- AlAnzan ASM, Almosheqah AN, Al-Jutaili RN, Al-hemadani MF, Al-hemadani FF, Almutairy ABH. Barriers in receiving orthodontic treatment; a survey-based study in Riyadh, Saudi Arabia. *Donnish J Dent Oral Hyg*. 2019;5(1):26–30.
- Georgescu RS, Oancea R, Sfeatcu IR. Perceptions and knowledge of orthodontic treatment by an adult group in Romania. *J Clin Med*. 2024 Jun;13(6):1890. doi:10.3390/jcm13061890.

8. Pabari S, Moles DR, Cunningham SJ. Assessment of motivation and psychological characteristics of adult orthodontic patients. *Am J Orthod Dentofacial Orthop.* 2011 Dec;140(6):e263–72.
9. Ravindranath S, Tan Shou En J, Pau KahHeng A. Orthodontic treatment need and self-perceived psychosocial impact of dental esthetics in a university adult population in Malaysia. *J Indian Orthod Soc.* 2017 Jun;51(2):69–74.
10. Thirunavukkarasu R, Muralidharan D, Nirupama C, Prashanth C, Gupta G, Karthikeyan E, Sakthisri V. Awareness of orthodontic treatment among parents of children 5–17 years of age in Kanchipuram district – A survey. *Oral Health Care.* 2019;4(1):1–5.
11. Alshammari AK, Siddiqui AA, Al Shammari NH, Malik YR, Alam MK. Assessment of perception and barriers toward orthodontic treatment needs in the Saudi Arabian adult population. *Healthcare (Basel).* 2022 Dec 9;10(12):2488.
12. Tickle M, Kay EJ, Bearn D. Socio-economic status and orthodontic treatment need. *Community Dent Oral Epidemiol.* 1999 Oct;27(5):413–8.
13. Badran SA, Al-Khateeb SN. Factors influencing the uptake of orthodontic treatment. *J Public Health Dent.* 2013;73(4):339–45. doi:10.1111/jphd.12034
14. Badran SA, Sabrah AH, Hadidi SA, Al-Khateeb S. Effect of socioeconomic status on normative and perceived orthodontic treatment need. *Angle Orthod.* 2014 Jul;84(4):588–93.
15. Romero-Maroto M, Santos-Puerta N, GonzálezOlmo MJ, Peñacoba-Puente C. The impact of dental appearance and anxiety on self-esteem in adult orthodontic patients. *OrthodCraniofac Res.* 2015 Aug;18(3):143–55.
16. Johal A, Joury E. What factors predict the uptake of orthodontic treatment among adults? *Am J Orthod Dentofacial Orthop.* 2015 Jun;147(6):704–10.