

## Original Research Article

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# Assessment of orthodontic treatment awareness among tribal cohort of adolescents: a cross-sectional questionnaire survey

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## ABSTRACT

**Background:** Marginalized communities of India mostly live in isolation and have limited access to healthcare service. the aim of the study is to evaluate the level of awareness regarding orthodontic treatment among adolescents residing in tribal Bangalore, as there is very high prevalence of malocclusion.

**Methods:** A cross-sectional questionnaire survey was conducted among 119 adolescents aged (13-17 years) from the Soliga tribe of Bangalore rural area. With prior authorization from the panchayat development officer and the respective school authorities within the tribal community, a survey was be organized across all selected schools.

**Results:** Significant gaps in orthodontic awareness were identified among 118 adolescents in tribal Bangalore, with 43.2% recognizing orthodontists and 80.5% perceiving treatment as expensive, highlighting the need for education and affordability.

**Conclusions:** There is a significant gap in orthodontic awareness among tribal adolescents, particularly regarding the functional and long-term health benefits of treatment.

**Keywords:** Awareness, Malocclusion, Adolescents, Questionnaire, Survey, Tribal, Bangalore

## INTRODUCTION

The oral health of children plays a crucial role in their overall health, well-being, education, and development. Malocclusion ranks alongside dental caries, gingival disease, and dental fluorosis as one of the most prevalent dental issues affecting mankind.<sup>1</sup> Malocclusion adversely impacts oral health, elevates the risk of dental caries, and may contribute to temporomandibular disorders. Orthodontic treatment offers advantages such as preventing tissue damage, enhancing aesthetics, and optimizing physical function.<sup>2</sup>

India, a developing country, faces numerous hurdles in delivering oral care to the rural population due to the unequal distribution of dental health professionals in

urban and rural areas. When it comes to the tribal population, the issue of dental health is especially significant as these marginalized communities mostly live in isolation and have limited access to healthcare service. Malocclusion is an oral defect that doesn't seem to get much importance in these communities. It could be due to lack of awareness among the rural Indian population, less concern with regard to aesthetics, low educational background. The low importance and awareness given to oral health care in the marginalised communities is the pressing cause for low knowledge regarding orthodontic treatment.

To address the low awareness of orthodontic treatment in tribal areas, targeted educational campaigns can be implemented. Affordable or subsidized orthodontic treatment tailored to the economic realities of rural

population can help increase access and awareness. Age groups ranging from 12 to 15 years stand to gain valuable insights into orthodontic treatment, as early intervention can help prevent complications associated with malocclusion. Additionally, this knowledge may aid Orthodontists in educating both patients and their parents, offering guidance and advice for optimal dental health.

Orthodontic treatment goes beyond enhancing quality of life; it can also lead to physical, psychological, and social transformations.<sup>3</sup> The primary advantages include enhancing physical function, preventing tissue damage, and addressing aesthetic concerns.<sup>4</sup> To date, there is limited research assessing adolescents' awareness of orthodontic treatment. Thus, this study was initiated to fill this gap in knowledge.

There is a paucity of data about the awareness of orthodontic treatment among village population in the Indian context. Thus, the aim of the study is to evaluate the level of awareness regarding orthodontic treatment among adolescents residing in Tribal Bangalore, as there is very high prevalence of malocclusion.

## METHODS

A cross-sectional questionnaire survey was conducted among 119 adolescents aged (13-17 years) from the Soliga tribe of Bangalore rural area. Ethical clearance for the study was issued by the ethical committee of the institution. With prior authorization from the panchayat development officer (Annexure III) and the respective school authorities within the tribal community, a survey was organized across all selected schools. The study encompassed children aged between 13 and 17 years, forming the target demographic for the research.

### ***Inclusion criteria***

All tribal adolescents aged 13-17 years in the selected school were included.

### ***Exclusion criteria***

History of previous orthodontic treatment, syndromes or systemic diseases, cleft lip and palate patients and rampant caries, multiple missing teeth, mutilated teeth were excluded.

A pilot study was conducted to authenticate and validate the questionnaire. Initially, it underwent evaluation by practicing orthodontists, after which it was assessed for comprehension among patients visiting the outpatient department of MRADC, Bangalore.

The purpose of this study was informed and explained to the students. Those who voluntarily agreed to participate in the survey were asked to answer the questionnaire after obtaining their informed consent.

The validated and reliable questionnaire written in English consisting of 15 questions with multiple answers was translated to the native language of study participants and was asked to the children to assess their knowledge and attitude [awareness] towards Orthodontic treatment. The responses of children to the questions was recorded on a 3-point Likert scale [a. yes, b. no, c. don't know].<sup>5</sup>

The student's t test and ANOVA test along with stepwise multiple linear regression was applied for the statistical evaluation of means. Level of significance is set at  $p<0.05$ .

## RESULTS

A total of 118 children were examined, out of which, there were equal ratio of boys and girls. Among them, 53 belonged to age group of 13-14 years and 65 children belonged to the age groups of 15-16 years (Table 1).

**Table 1: Age and gender distribution among study participants.**

Variables	Category	N	Percentages (%)
Age (in years)	13-14	53	44.9
	15-16	65	55.1
Gender	Males	59	50.0
	Females	59	50.0

The results highlighted significant gaps in awareness. Only 43.2% of participants were familiar with the term "Orthodontist," and a mere 11.9% had visited one. However, 81.4% of respondents were aware that orthodontists align teeth, indicating some understanding of the purpose of orthodontic treatment.

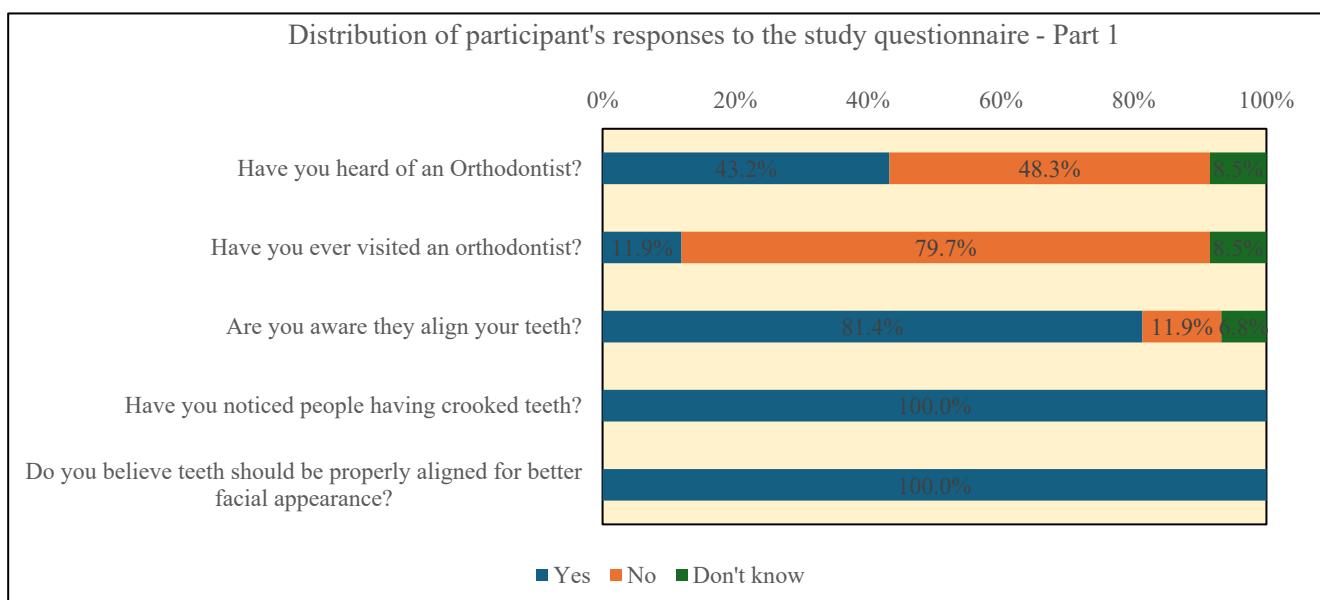
All participants (100%) acknowledged aesthetic importance of properly aligned teeth, and 98.3% had seen individuals wearing braces. Despite this visual familiarity, only 54.2% of participants believed that early orthodontic intervention could improve facial aesthetics. Additionally, while 76.3% recognized that crooked teeth could affect facial appearance, only 35.6% associated malocclusion with functional issues, such as impaired chewing ability.

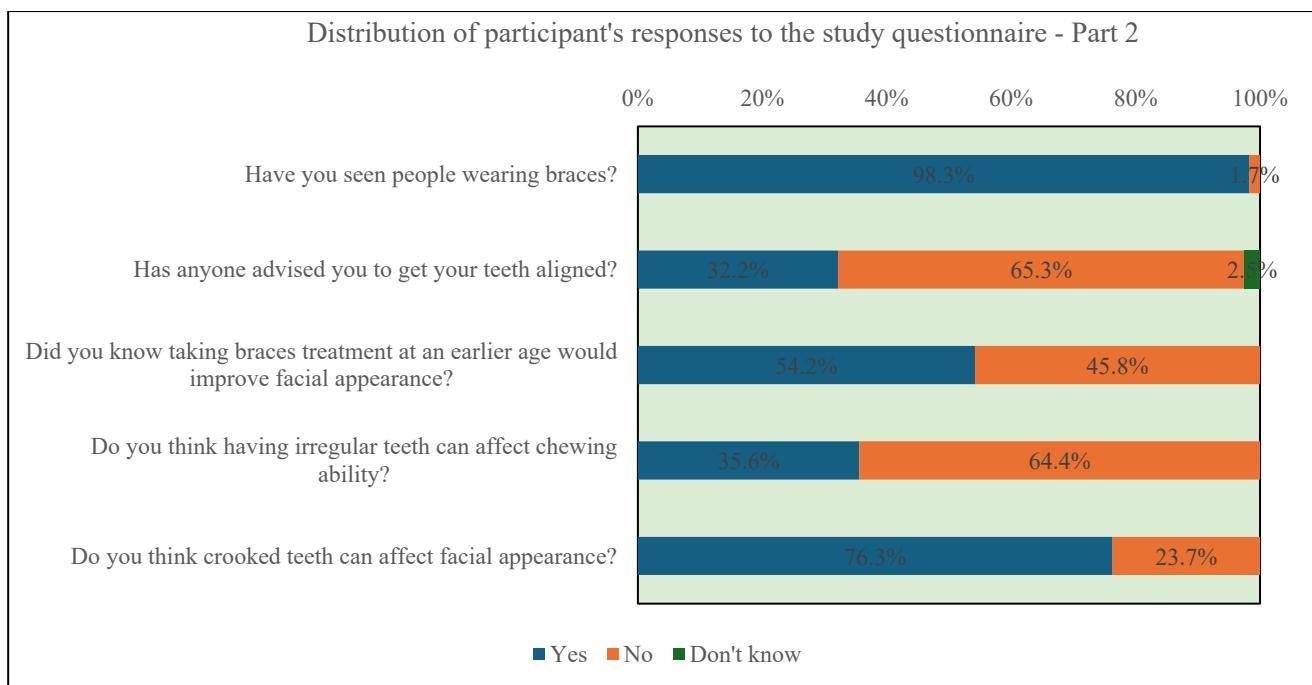
Participants demonstrated limited knowledge about the nature of orthodontic procedures. Only 65.3% were aware that tooth extraction might be necessary for proper alignment, and 59.4% understood that orthodontic treatments often take longer than general dental procedures. Surprisingly, all participants believed that orthodontic treatment is only viable after puberty, specifically for individuals over 15 years old.

Cost was identified as a significant barrier, with 80.5% of participants perceiving orthodontic treatment as expensive. Graphical representation of the response distribution is shown in Figure 1-3.

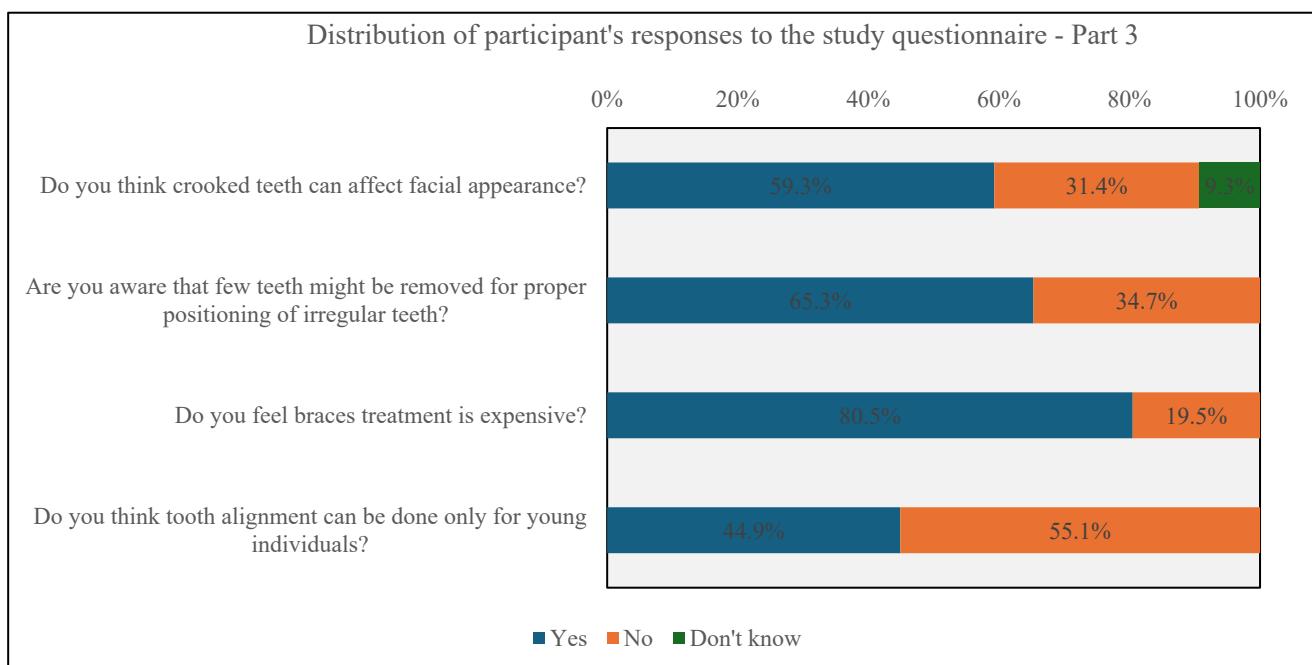
**Table 2: Distribution of participants responses to the study questionnaire.**

Variables	Category	N	Percentages (%)
<b>Have you heard of an orthodontist?</b>	Yes	51	43.2
	No	57	48.3
	Don't know	10	8.5
<b>Have you ever visited an orthodontist?</b>	Yes	14	11.9
	No	94	79.7
	Don't know	10	8.5
<b>Are you aware they align your teeth?</b>	Yes	96	81.4
	No	14	11.9
	Don't know	8	6.8
<b>Have you noticed people having crooked teeth?</b>	Yes	118	100
	No	0	0.0
<b>Do you believe teeth should be properly aligned for better facial appearance?</b>	Yes	118	100
	No	0	0.0
<b>Have you seen people wearing braces?</b>	Yes	116	98.3
	No	2	1.7
<b>Has anyone advised you to get your teeth aligned?</b>	Yes	38	32.2
	No	77	65.3
	Don't know	3	2.5
<b>Did you know taking braces treatment at an earlier age would improve facial appearance?</b>	Yes	64	54.2
	No	54	45.8
<b>Do you think having irregular teeth can affect chewing ability?</b>	Yes	42	35.6
	No	76	64.4
<b>Do you think crooked teeth can affect facial appearance?</b>	Yes	90	76.3
	No	28	23.7
<b>Are you aware that few teeth might be removed for proper positioning of irregular teeth?</b>	Yes	77	65.3
	No	41	34.7
<b>Do you feel braces treatment is expensive?</b>	Yes	95	80.5
	No	23	19.5
<b>Do you think tooth alignment can be done only for young individuals?</b>	Yes	53	44.9
	No	65	55.1
<b>Do you know at what age orthodontic treatment should be started? (in years)</b>	<15	0	0.0
	15-20	118	100

**Figure 1: Distribution of participants responses to study questionnaire with questions on the Y-axis and percentage of response on the X-axis part 1.**



**Figure 2: Distribution of participants responses to study questionnaire with questions on the Y-axis and percentage of response on the X-axis part 2.**



**Figure 3: Distribution of participants responses to study questionnaire with questions on the Y-axis and percentage of response on the X-axis part 3.**

## DISCUSSION

The present study assessed the awareness and perceptions regarding orthodontic treatment among adolescents in rural Bangalore. Given the high prevalence of malocclusion in India, understanding this population's knowledge level is crucial for early interventions that may prevent associated complications.

Our findings indicate that only 43.2% of respondents were familiar with the term "orthodontist," and a mere 11.9% had visited one, highlighting a general lack of awareness in this rural demographic. This aligns with studies in similar settings, such as by Siddegowda which observed low orthodontic awareness among rural Indian children.<sup>5</sup> However, a relatively high proportion of participants (81.4%) were aware that orthodontists align

teeth, suggesting that while terminology may be unfamiliar, there is some understanding of the treatment's purpose.

Additionally, 100% of participants recognized the aesthetic importance of well-aligned teeth, and 98.3% had seen people with braces, underscoring that visual familiarity with orthodontics does exist. This contrasts with the findings by Jing et al who noted lower levels of aesthetic awareness in a comparable population.<sup>10</sup>

Despite a high awareness of braces, fewer than half (54.2%) believed that early treatment could enhance appearance, which is contrary to the results found by Gavic et al who with the help of IOTN index found that there is an association between self-perception of smile aesthetics and self-esteem during adolescence.<sup>11</sup> However, some studies did not provide evidence that there is a connection between orthodontic treatment and changes in self-esteem during adolescence.<sup>12</sup> In this study, 74.6% of the adolescents felt that crooked teeth can affect their facial appearance. Also, only 35.6% associated malocclusion with chewing issues. This suggests a gap in understanding the functional benefits of orthodontic treatment beyond aesthetics. As chewing ability and overall oral health are affected by malocclusion, this knowledge gap underscores the need for targeted educational initiatives focusing on the holistic benefits of orthodontic intervention.

Although there is awareness about braces and orthodontic treatments, less than half of the participants had a clear understanding of the nature of these treatments. Only 65.3% of respondents were aware that orthodontic procedures often involve tooth extraction to achieve proper alignment and create an ideal smile. Additionally, just 59.4% recognized that orthodontic treatments typically take longer than other dental procedures. Surprisingly, all participants (100%) believed that orthodontic treatment is only possible after puberty, specifically for individuals over 15 years old. Through an epidemiological survey, Siddegowda and Rani determined that Indian school children have a moderate level of knowledge and awareness regarding orthodontists and irregular teeth, but a low level of awareness regarding orthodontic treatment.<sup>5</sup> The concept of early orthodontic intervention is virtually unknown among the rural population, highlighting the urgent need to educate them on this topic.

Additionally, 80.5% of respondents perceived orthodontic treatment as expensive, which likely deters many from seeking necessary care. This highlights the socioeconomic barriers to accessing orthodontic services, particularly in underserved communities. To address this, government policies should focus on providing orthodontic treatment at subsidized or nominal rates, making it accessible to all. Deploying orthodontists to rural areas can help raise awareness, provide timely interventions, and reduce the long-term impacts of

untreated dental issues. Moreover, introducing dental insurance schemes specifically designed to cover orthodontic treatments could further alleviate financial barriers and promote better oral health outcomes across all socioeconomic groups.

Our study revealed no significant differences between male and female participants regarding orthodontic awareness, though previous studies, like that of Bhavneet Kaur, reported higher dental awareness among females.<sup>4</sup> The age distribution of our sample (with the majority aged 15-16) may also play a role, as older adolescents are more likely to be cognizant of aesthetic and health-related issues, suggesting that age-targeted awareness campaigns could be beneficial.

While this study provides valuable insights into orthodontic awareness among rural adolescents, the findings are based on self-reported data, which may be subject to biases. Future studies should explore longitudinal data to understand how awareness evolves over time and assess intervention strategies that could improve knowledge and access to orthodontic services in rural areas.

## CONCLUSION

In conclusion, this study highlights significant gaps in orthodontic awareness among tribal adolescents, particularly regarding the functional and long-term health benefits of treatment. To bridge this gap, public health initiatives focusing on early dental education and accessible orthodontic services are essential, potentially improving both oral health and quality of life in these communities.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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## APPENDIX

### Questionnaire format to analyze the Awareness of children towards orthodontic treatment.<sup>5-7</sup>

1. Have you heard of an Orthodontist?

a) Yes      b) No      c) don't know

2. Have you ever visited an orthodontist?

a) Yes      b) No      c) don't know

3. Are you aware they align your teeth?

a) Yes      b) No      c) don't know

4. Have you noticed people having crooked teeth?

a) Yes      b) No      c) don't know

5. Do you believe teeth should be properly aligned for better facial appearance?

a) Yes      b) No      c) don't know

6. Have you seen people wearing braces?

a) Yes      b) No      c) don't know

7. Has anyone advised you to get your teeth aligned?

a) Yes      b) No      c) don't know

8. Did you know taking braces treatment at an earlier age would improve facial appearance?

a) Yes      b) No      c) don't know

9. Do you think having irregular teeth can affect chewing ability?

a) Yes      b) No      c) don't know

10. Do you think crooked teeth can affect facial appearance?

a) Yes      b) No      c) don't know

11. Do you know the duration of your braces treatment is longer than your dental procedure

a) Yes      b) No      c) don't know

12. Are you aware that few teeth might be removed for proper positioning of irregular teeth?

a) Yes      b) No      c) don't know

13. Do you feel braces treatment is expensive?

a) Yes      b) No      c) don't know

14. Do you think tooth alignment can be done only for young individuals?

a) Yes      b) No      c) don't know

15. Do you know at what age orthodontic treatment should be started? (years)

a) below 15      b) 15-20      c) >25