RESEARCH ARTICLE

Factors influencing the desire for orthodontic treatment among patients and parents – A cross-sectional study

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Abstract

Objective: To assess treatment preferences and perceived barriers related to orthodontic care among children, adolescents, adults and parents.

Method: The cross-sectional study was conducted at the Aga Khan University Hospital, Karachi, from April to September 2024, and comprised participants who were allocated to children, adolescents, adults and parents groups. A validated questionnaire was used to survey the motivation for and barriers to initiating orthodontic treatment. The participants rated their pre-treatment pictures and severity of perceived need on a visual analogue scale. Index of orthodontic treatment need comprising dental health and aesthetic components, was used to clinically assess the patient's orthodontic treatment need. The association of different factors with the severity of treatment need was assessed. Data was analysed using SPSS 23.

Results: Of the 136 subjects, 83(61%) were females and 53(39%) were males. There were 34(25%) subjects in each of the four groups with varying age groups. Aesthetic appearance emerged as the primary motivation for initiating orthodontic treatment among 26(76.5%) children, 20(58.8%) adolescents, 27(79.4%) adults and 22(64.7%) parents. The most cited expectation from treatment was improvement of overall facial aesthetics, reported by 20(58.8%) children, 19(55.9%) adolescents, 25(73.5%) adults and 19(55.9%) parents. The most reported barrier to initiating treatment was the anticipated duration of treatment, cited by 14(41.2%) adults and 9(26.5%) adolescents, while fear of anticipated pain was reported by 12 (35.3%) children. All the groups rated the pre-treatment appearance at a median score of 50, and the treatment needed as severe (80-85%). Binomial logistic regression analysis revealed no significant association. However, the odds of having severe treatment need were 1.5 times higher in adults compared to children, 4.9 times higher for functional needs than aesthetic, and 8.3 times higher for forward-positioned teeth than to enhance facial appearance.

Conclusions: The aesthetic component was found to be the primary motivation for seeking orthodontic treatment across all the study groups, reflecting a strong treatment desire, while key barriers included treatment duration, fear of anticipated pain.

Key Words: Treatment need, Orthodontics, Malocclusion, Treatment expectations.

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Introduction

In today's society, where there is an increased awareness and emphasis placed on facial aesthetics, oral health and functional wellbeing, the demand for orthodontic treatment is steadily rising.[1] This increased need is attributed to its pivotal role in enhancing dental health, facial aesthetics and functional bites in patients of all age groups.[2] The decision to pursue orthodontic treatment is influenced by a range of motivations that involve the patients as well as their parents or guardians, highlighting the importance of understanding these underlying factors.[3] The reasons to get orthodontic treatment may be a social, psychological, aesthetic or functional concern.[4]

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For patients, the motivation to seek orthodontic treatment may be rooted in the desire to improve self-esteem and confidence.[5,6] For parents, on the other hand, their deepest concern originates from their child's better health and development as well as better prospects for the future.[6] To understand the motivations of not only the patients, but also the people surrounding them is imperative for the orthodontist.[7] This ensures that the treatment goals not only align teeth, but also align with the unique aspirations and goals of the people involved.[8]

A study[9] in Saudi Arabia found that the main reason for having orthodontic treatment was aesthetic concerns, while the availability and cost of orthodontists were the commonly faced barriers. These aesthetic concerns may include an increased overjet, the presence of diastema, crowding, spacing and/or missing teeth.[10] Tuncer et al.[11] exhibited similar results with greater emphasis on

aesthetics as a reason for orthodontic treatment in Turkiye, with an increased demand for better occlusal function in class III patients.

Prabakaran et al.[12] in the United Kingdom found consistent results for the patients, but reported prevention of future problems for their children as the main motivation for the parents. Though parents' motivation significantly affects the orthodontic treatment, it does not correlate with patients' cooperation.[13] As for the adult population, occlusal function followed by dental aesthetics may be the principal motive for availing orthodontic treatment.[14]

Gender, age, education, severity of malocclusion, social media, functional difficulties, self-perception of facial appearance, bullying, recommendation from a general dentist/paediatric dentist, and influence of the parents/guardians or relatives are all factors that may prompt one to go for orthodontic treatment.[15,16] These factors may influence the orthodontic treatment plan. Therefore, the orthodontist should tailor the goals of the treatment to cater to these aspirations for better patient cooperation and a satisfactory treatment outcome.

Understanding the patients and their parents' aspirations and desire behind receiving orthodontic treatment is crucial for the orthodontist to provide personalised, effective and patient-centred care. Furthermore, educating the patients in case of unattainable expectations and managing these expectations before starting the treatment help avoid future complications.

The current study was planned to assess treatment preferences and perceived barriers related to orthodontic care among children and adolescent patients, their parents, and adult patients.

Subjects and Methods

The cross-sectional study was conducted at the Aga Khan University Hospital (AKUH), Karachi, from April to September 2024. After obtaining approval from the institutional ethics review committee, the sample size was calculated using OpenEpi software.[17] The total number of patients visiting the AKUH orthodontic clinics was calculated to be 209 in one year's time. Keeping the hypothesised frequency of the main reason for the need for orthodontic treatment as 50%, with design effect 1.0, alpha (α) 0.05, power 90% and confidence level 95%, the sample size was calculated for children, adolescents, adults and parents groups. The sample was raised using non-probability, consecutive sampling technique from among patients and parents of children and adolescent patients visiting the AKUH orthodontic clinics. Those included were children orthodontic patients aged between 7 years and <13 years, adolescent patients aged between 13 years to <18 years, adult patients aged 18 years and above, and parents of both children and adolescent patients. Patients and parents of underage patients just starting the orthodontic treatment were included. Individuals with a previous history of any orthopaedic or orthodontic treatment, those with the presence of any craniofacial syndromes or dental anomaly, any temporomandibular disorder, history of trauma, and with uncontrolled periodontal disease were excluded.

After obtaining informed consent, the participants were asked to fill in a validated questionnaire, that was also translated in Urdu, assessing the reasons for orthodontic treatment need, source of information, barriers faced in attaining it, and expectations from it.[9] Using the questionnaire, the most frequently selected factor by the participants were sorted as a qualitative assessment. For participants aged 7-13 years, both parental consent and child assent were obtained prior to inclusion. The questionnaire was administered by the primary investigator in the presence of parents. In cases where the child was unable to fully comprehend a question, clarification was provided by the investigator, and parents could assist to ensure accurate understanding and response. Children, adolescent and adult patients were then asked to rate their current malocclusion on a Visual Analogue Scale (VAS) built on a 100mm uninterrupted scale, with the most attractive profile rating at 100 and least attractive profile at 0. They were then asked to score their severity of orthodontic treatment need on a 100mm uninterrupted scale, with the no-need rating at 0-30, moderate need at 31-70 and severe need at 71-100.

The Index of Orthodontic Treatment Need (IOTN) was used to clinically assess the patient's orthodontic treatment need.[18] It consisted of two components: a clinical component Dental Health Component (DHC), and an Aesthetic Component (AC). The DHC was determined using a scale of 1-5, with 1 = no need, 2 = little need, 3 = moderate need, 4 = great need and 5 = extreme need. For comparison between patients perceived orthodontic treatment need and clinically assessed need, the severity of treatment need was further divided into mild (DHC 1-2), moderate (DHC 3) and severe (DHC 4-5). AC was determined using a scale of 1-10, with 1-4 = no need, 5-7 = moderate need, and 8-10 = great need. A group of 20 participants was randomly selected from the original sample, 5 from each group, after two weeks, and the IOTN components were measured again by the same examiner for intra-examiner reliability. All the recorded data was

anonymised, and access was provided to no one except the investigators.

Data was analysed using SPSS 23. Data normality was assessed using the Shapiro-Wilk test, which showed a non-normal distribution. Median and interquartile range (IQR) were reported for age, VAS score and treatment need rating of the participants. Frequencies with percentages were reported for gender, questionnaire items, DHC and AC. Binomial logistic regression analysis was used to assess the association of different factors with the severity of treatment need. $P<0.05$ was considered statistically significant.

Results

Of the 136 subjects, 83(61%) were females and 53(39%) were males. There were 34(25%) subjects in each of the four groups with varying age groups (Table 1).

When the participants were asked who brought the need for orthodontic treatment to their attention, the most common response across the groups was "myself", reported by 17(50%) children, 12(35.3%) adolescents, 24(70.6%) adults and 15(44.1%) parents. In contrast, the most prevalent reason was "family and friends", reported by 20(58.8%) adolescents. Across all groups, "aesthetic appearance" emerged as the primary motivation for initiating orthodontic treatment, reported by 26(76.5%) children, 20(58.8%) adolescents, 27(79.4%) adults and 22(64.7%) parents. Functional concerns were consistently the second most common reason across the groups (Table 2).

Within the domain of aesthetic concerns, "crowding of the teeth" was identified as the most frequent issue by 13(38.2%) children, 14(41.2%) adolescents, 11(32.4%) adults and 14(41.2%) parents. Regarding functional concerns, "teeth malocclusion" was the most frequently reported issue across all groups (Table 2).

When asked about the source of information regarding orthodontic treatment, "family and friends" emerged as the most frequently reported source among adults and parents, while the second most common source varied, with adults identifying orthodontists and parents citing general or paediatric dentists (Table 3).

The most frequently reported barrier to initiating treatment among adults was the perceived duration of

Table-1: Descriptive statistics for age and gender across the groups.

Variables	Children (n = 34)	Adolescents (n = 34)	Adults (n = 34)	Parents (n = 34)
Age (years) (Median IQR)	11.29 (10.47, 12.47)	15.33 (14.0, 16.04)	23.17 (20.79, 27.47)	42.13 (40.0, 46.91)
Gender	Male = 17 Female = 17	Male = 14 Female = 20	Male = 7 Female = 27	Male = 15 Female = 19

IQR: Interquartile range.

Table-2: Factors influencing the decision to initiate orthodontic treatment and expectations from the treatment.

Question	Answers	Children(n) (%)	Adolescents (n) (%)	Adults(n) (%)	Parents(n) (%)
Who brought to your attention that (you/your child) need orthodontic treatment?					
	Myself	17 (50)	12 (35.3)	24 (70.6)	15 (44.1)
	My Child	-	-	-	14 (41.2)
	Family or Friends	14 (41.2)	20 (58.8)	7 (20.6)	5 (14.7)
	General/Paediatric Dentist	3 (8.8)	2 (5.9)	3 (8.8)	0
What were the main reasons that made (you/your child) start orthodontic treatment?					
	Esthetic appearance	26 (76.5)	20 (58.8)	27 (79.4)	22 (64.7)
	Functional concerns	7 (20.6)	10 (29.4)	6 (17.6)	12 (35.3)
	Media	0	2 (5.9)	1 (2.9)	0
	Others (Genetics, Peers)	1 (2.9)	2 (5.9)	0	0
What were the aesthetic factors that led (you/your child) to start orthodontic treatment?					
	To enhance the look of my face	3 (8.8)	3 (8.8)	3 (8.8)	3 (8.8)
	Crowding of teeth	13 (38.2)	14 (41.2)	11 (32.4)	14 (41.2)
	To get the perfect smile	7 (20.6)	8 (23.5)	5 (14.7)	6 (17.6)
	Spacing between teeth	2 (5.9)	2 (5.9)	6 (17.6)	4 (11.8)
	Teeth are Forward	7 (20.6)	6 (17.6)	7 (20.6)	6 (17.6)

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Teeth are Backward	1 (2.9)	0	1 (2.9)	1 (2.9)
Smile shift	1 (2.9)	1 (2.9)	1 (2.9)	0
What were the functional problems that led (you/your child) to start orthodontic treatment?				
Teeth malocclusion	15 (44.1)	16 (47.1)	16 (47.1)	16 (47.1)
Class III	2 (5.9)	3 (8.8)	3 (8.8)	3 (8.8)
Class II	11 (32.4)	4 (11.8)	5 (14.7)	6 (17.6)
Temporomandibular joint	2 (5.9)	2 (5.9)	2 (5.9)	1 (2.9)
Pronunciation difficulty	1 (2.9)	2 (5.9)	5 (14.7)	2 (5.9)
Eating & chewing difficulty	2 (5.9)	4 (11.8)	1 (2.9)	6 (17.6)
Others	1 (2.9)	3 (8.8)	2 (5.9)	0
What are your expectations from orthodontic treatment?				
Better alignment of teeth	11 (32.4)	14 (41.2)	6 (17.6)	6 (17.6)
Improvement of facialaesthetics	20 (58.8)	19 (55.9)	25 (73.5)	19 (55.9)
Achieve better oral functioning	3 (8.8)	1 (2.9)	3 (8.8)	9 (26.5)

treatment, (Table 3). Among children, fear was the most frequently reported barrier to initiating treatment, while the reputation of the orthodontist was the most significant factor influencing the selection of the current orthodontist, cited by 21(61.8%) adults and 16(47.1%) parents (Table 3).

Table-3: Factors influencing choice of adults and children's parents regarding orthodontic treatment.

Question	Answers	Adults (n) (%)	Parents (n) (%)
What were your sources of information about orthodontic treatment choices?			
	Orthodontist	11 (32.4)	5 (14.7)
	General Dentist/Paediatric Dentist	6 (17.6)	13 (38.2)
	Family or Friends	13 (38.2)	14 (41.2)
	Medical/Dental websites	1 (2.9)	0
	Social Media	3 (8.8)	2 (5.9)
What were the barriers before starting orthodontic treatment?			
	Availability of Orthodontist	1 (2.9)	2 (5.9)
	Cost	5 (14.7)	7 (20.6)
	Duration of Treatment	14 (41.2)	8 (23.5)
	Orthodontic treatment is not covered by insurance	1 (2.9)	0
	Transportation	1 (2.9)	1 (2.9)
	Fear	6 (17.6)	4 (11.8)
	None	6 (17.6)	12 (35.3)
What encouraged you to choose your current Orthodontist?			
	Orthodontist reputation	21 (61.8)	16 (47.1)
	Orthodontist experience	6 (17.6)	9 (26.5)
	The location	7 (20.6)	9 (26.5)

When asked about their expectations from ongoing orthodontic treatment, the most frequently cited goal across all groups was the improvement of overall facial aesthetics (Table 3).

All the four groups reported a median score of 50 with varying IQR values on VAS when evaluating their appearance prior to treatment (Table 4). Perception of the need for orthodontic treatment was reflected in higher median scores, with adolescents and adults scoring 80, and children and parents scoring 85 (Table 4). Clinical assessment of the treatment need using DHC revealed that the most prevalent malocclusions were 5a among children, 4d and 5a among adolescents, and 4a and 4d among adults (Figure 1). For AC, children predominantly received scores of 7 and 8, indicating a severe need for treatment, adolescents were primarily assigned scores of 8 and 9, also indicating severe need, and adults most frequently received a score of 5, reflecting moderate treatment need (Figure 2). No significant differences were observed between the perceived need for orthodontic treatment across the groups and the clinical assessment of treatment need based on DHC (Table 5).

Binomial logistic regression analysis revealed no significant association between the severity of treatment need and the groups, but the odds of having severe treatment need were 1.5 times higher in adult patients compared to children (Table 6). Similarly, no significant association was found between the severity of treatment need and gender, although male patients demonstrated

Table-4: Comparison of perceived malocclusion and treatment need.

Variable	Children (n)Median IQR	Adolescents (n)Median IQR	Adults (n)Median IQR	Parents (n)Median IQR
Visual Analogue Scale	50 (40, 61.25)	50 (30, 72.5)	50 (33.75, 62.5)	50 (37.5, 70)
Treatment Need	85 (70, 100)	80 (68.75, 90)	80 (57.5, 90)	85 (60, 90)

IQR: Interquartile range.

Table-5: Comparison of severity of treatment need between patients and orthodontists.

Variable		Children (n)	Orthodontist	P-value
Severity of Need	Mild	2	0	0.899
	Moderate	10	3	
	Severe	22	31	
Variable		**Adolescents (n)**	**Orthodontist**	**P-value**
Severity of Need	Mild	1	3	0.731
	Moderate	14	3	
	Severe	19	28	
Variable		**Adults (n)**	**Orthodontist**	**P-value**
Severity of Need	Mild	4	1	0.829
	Moderate	10	1	
	Severe	20	32	
Variable		**Parents (n)**	**Orthodontist**	**P-value**
Severity of Need	Mild	2	0	0.132
	Moderate	9	4	
	Severe	23	30	

Table 6: Influence of different factors on orthodontic treatment need.

Variable	Odds Ratio	95% CI	p-value
Groups			
Children		Reference	
Adolescents	0.5	0.10, 3.0	0.292
Adults	1.5	0.24, 4.9	0.644
Parents	0.7	0.14,	0.691
Gender			
Female		Reference	
Male	1.87	0.	0.306
Main reason for Orthodontic treatment			
Aesthetic appearance		Reference	
Functional concerns	4.9	0.61, 39.2	0.133
Media	0.3	0.02, 3.43	0.326
Aesthetic factors that led orthodontic treatment			
To enhance the look of my face		Reference	
Crowding of teeth	2.1	0.46, 9.89	0.329
Teeth are Forward	8.3	0.77, 90.76	0.082
Functional factors that led orthodontic treatment			
Teeth malocclusion		Reference	
Class II	3.6	0.43, 30.65	0.235
Eating and chewing difficulty	1.7	0.19, 15.29	0.615
Severity of orthodontic treatment need as perceived by participant			
Mild		Reference	
Moderate	1.0	0.10, 9.27	0.965
Severe	1.0	0.12, 9.32	0.971

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1.87 times higher odds of severe treatment need compared to female patients (Table 6).

There was no significant association between the severity of treatment need and the primary reason for seeking orthodontic treatment, but the odds of severe treatment need were 4.9 times higher for patients citing functional concerns compared to those with aesthetic concerns (Table 6). Among the aesthetic factors, patients with forward-positioned teeth had 8.3 times higher odds of severe treatment need compared to those seeking treatment to enhance facial appearance (Table 6).

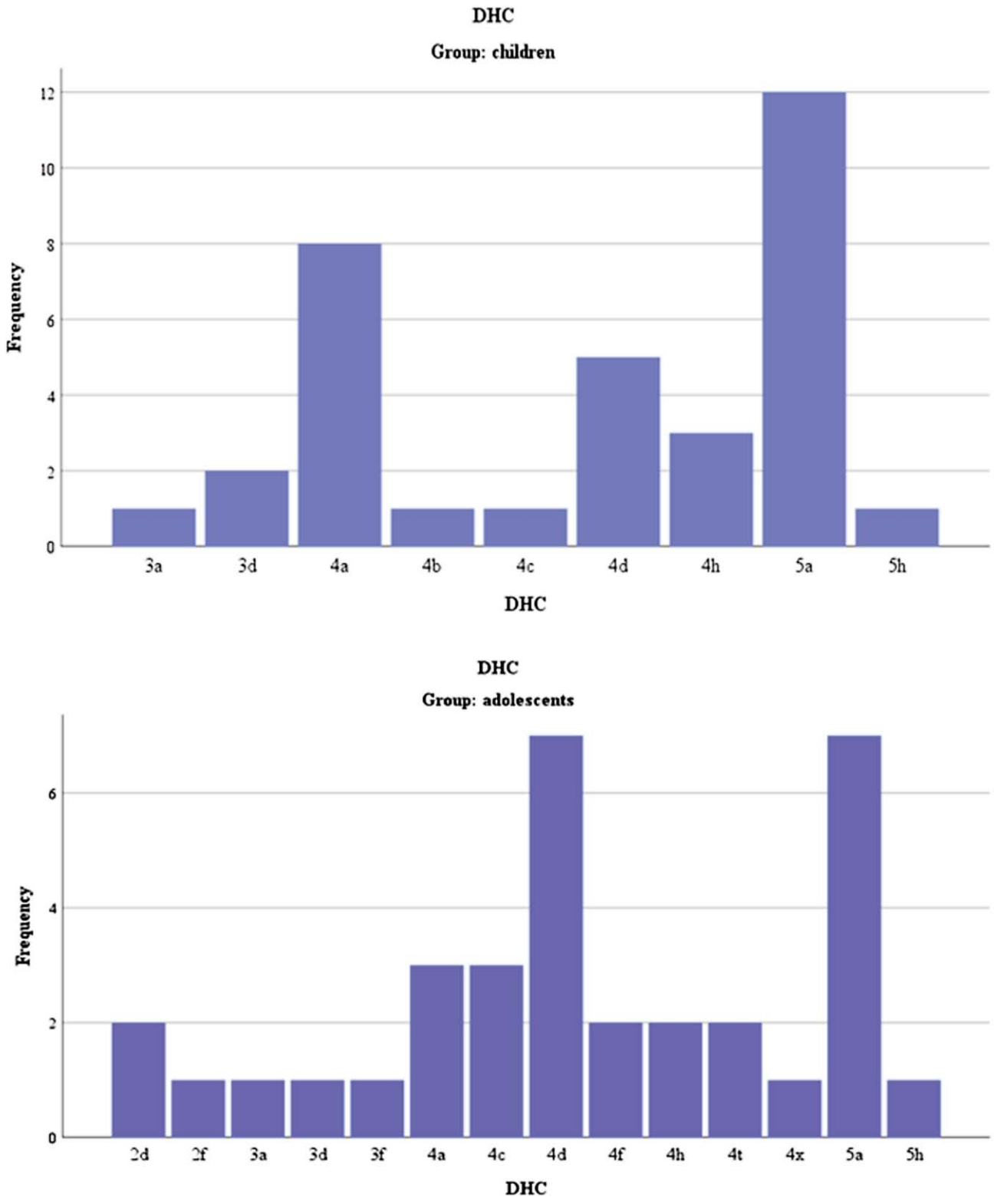

Figure-1: Comparison of dental health components that influenced the decision to begin orthodontic treatment.

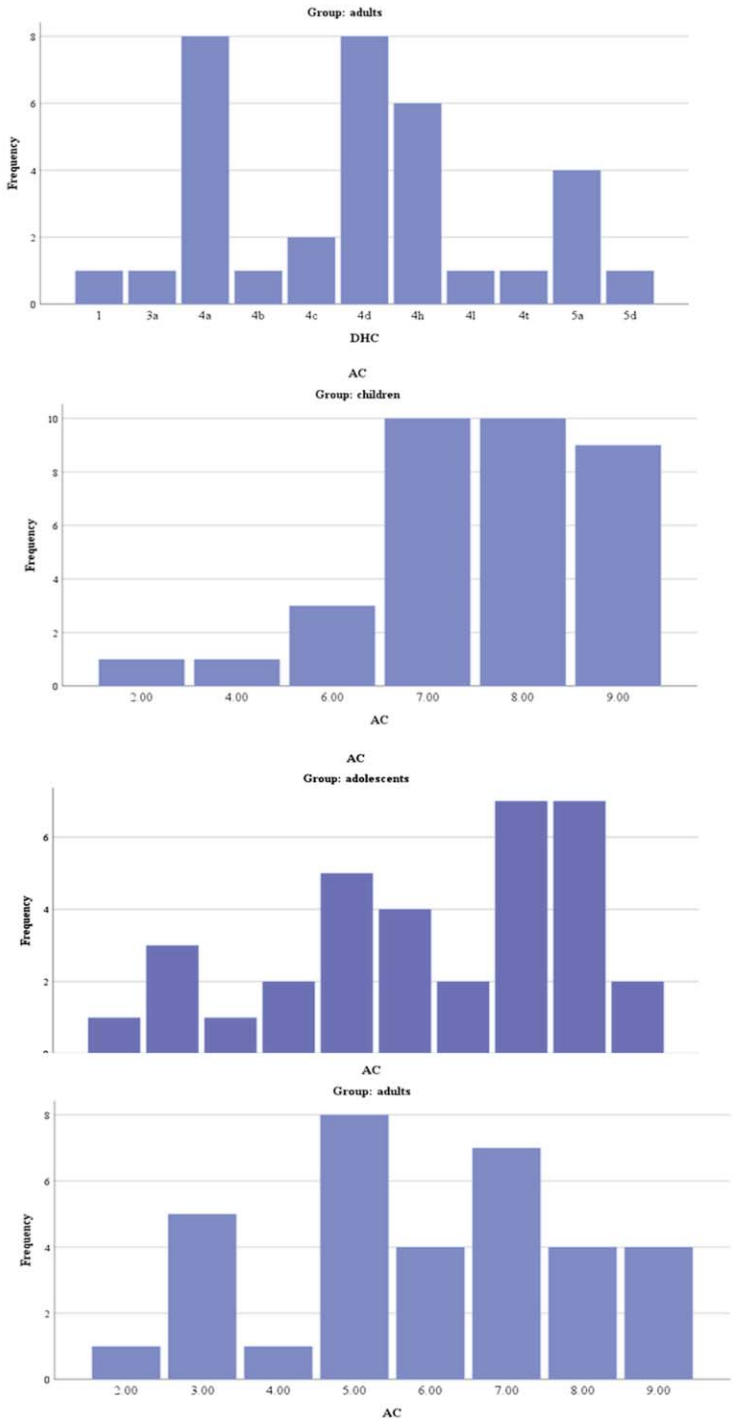

Figure-2: Comparison of aesthetic components that influenced the decision to begin orthodontic treatment.

Discussion

The current study examined the varying perceptions and motivations of orthodontic patients across different age groups, as well as the perspectives of parents of children and adolescents. Previous research has demonstrated that patients' views, desires and concerns are associated with their compliance during orthodontic treatment.[19] Understanding patients' motivations and expectations, in conjunction with essential clinical parameters, enhances the ability to address their needs, deliver quality care, and meet their expectations. In the current study, aesthetic concerns emerged as the primary motivation, with malaligned teeth identified as the most significant issue driving the decision to pursue orthodontic treatment across all age groups.

Previous studies have reported that young children often perceive their teeth and appearance as aesthetically pleasing, with a low desire for orthodontic treatment.[20] In early childhood, self-concept is still developing and is subject to parental and peer influences. However, the current study revealed contrasting findings, showing that children recognise orthodontic treatment as a definite need, and exhibit greater motivation for treatment compared to their parents. This discrepancy may be attributed to differences in study populations, cultural contexts and levels of exposure to social and digital media, which can significantly influence children's self-perception and aesthetic expectations. Additionally, methodological variations, such as age range, setting (school vs. clinic), or the method of motivation assessment may also account for the divergent results. Similar to the results of Josan et al.[13] the current study identified aesthetics as the primary concern driving children to seek orthodontic treatment. The improvement of facial aesthetics was the most stated expectation among the children, reflecting their heightened awareness of and concern for facial and dental appearance. Clinical assessment revealed that DHC grades 4a and 5a and AC scores of 7, 8 and 9 were most prevalent, indicating a severe need for treatment, with overjet as the most frequently identified malocclusion. This aligns with their high perceived treatment need scores (85%) and the frequent reporting of crowded and forward-positioned teeth as significant concerns. These findings highlight an increasing understanding among children regarding their aesthetic needs. It underscores the importance of orthodontists understanding and addressing these concerns to deliver effective and satisfactory care.

Adolescence is a developmental stage characterised by heightened self-awareness of physical appearance, where aesthetic concerns and the psychosocial impact of malocclusion often outweigh its functional implications.[21,22] A study[15] in Brazil similarly identified aesthetics as the primary concern motivating adolescents to seek orthodontic treatment, aligning with the current findings. Consistent with the current results, malaligned or crooked teeth were cited as the primary reason for pursuing treatment.[15] This psychological shift from childhood to adolescence drives this increased motivation for orthodontic treatment in adolescents, who often equate improved dental appearance with increased self-esteem and social acceptance. Feldens et al.[10] reported spacing and increased overjet as the most prevalent malocclusions among Brazilian adolescents based on the Dental Aesthetic Index (DAI). In the current study, clinical assessments using the IOTN identified DHC grades 4d and 5a, indicating severe displacement of teeth and increased overjet as the most common malocclusions among adolescent patients. High AC scores of 8 and 9 also indicated a severe treatment need. These clinical findings correspond to a significant need for orthodontic treatment, which adolescents acknowledged through high ratings of malocclusion severity on VAS. This alignment suggests no significant difference between adolescents' perceived treatment needs and their clinically assessed requirements.

The findings highlight the awareness among adolescents regarding their appearance, which is further reflected in their expectations from orthodontic treatment. Improvement in facial aesthetics and the alignment of teeth emerged as their primary expectations, emphasising the importance of addressing these concerns in orthodontic care.

Studies have indicated that parents often exhibit greater concern for their children's appearance and a stronger desire for orthodontic treatment compared to the children themselves.[9,11] The current findings align with these observations, with aesthetics and crowded teeth identified as the primary concerns of parents, followed by functional occlusion as the second most common concern. The parents rated their children's facial appearance as moderately pleasing, but acknowledged a severe need for treatment. These findings accentuate the importance parents place on their children's appearance, perceiving orthodontic treatment as a means to mitigate potential future challenges.

Concerns such as pain, social teasing and the appearance of braces have been reported as barriers for both parents and children when considering orthodontic treatment.[23] In the current study, fear of the treatment process and its duration were identified as the main barriers for children and adolescents. Among the parents, the majority reported no significant barriers, but some of them cited the cost and duration of treatment as concerns.

Studies have highlighted the significant psychosocial impact of orthodontic treatment on adults, often providing a sense of accomplishment and improved self-esteem.[24] Adults may approach aesthetics and treatment differently, often weighing the benefits of treatment against practical concerns, such as time, cost or discomfort. Their motivations may be rooted in functional needs or long-term oral health outcomes rather than purely aesthetic concerns. Zhang et al.[14] identified functional occlusion as the primary concern among adults in China seeking orthodontic treatment, whereas Felemban et al.[9] reported facial aesthetics as the predominant concern among adults in Saudi Arabia. However in the current study, internal motivation to achieve improved aesthetic appearance emerged as the principal reason for seeking orthodontic treatment. The adults anticipated enhanced facial aesthetics as the primary outcome, with the duration of treatment being the most significant barrier. This reported barrier may stem from the perception that orthodontic treatment requires a significant commitment, potentially disrupting daily routines and professional responsibilities. The adults rated their facial appearance as moderately pleasing while simultaneously reporting a severe treatment need, reflecting a heightened awareness of their physical appearance. Clinically, DHC grades 4a and 4d were the most prevalent malocclusions, and AC scores of 5-7 indicated a moderate to severe need for treatment.

Both the parents and adults demonstrated a reliance on friends and family as their primary source of information for making treatment decisions, which may not be the most reliable source. However, they reported orthodontists and general/paediatric dentists as their second most common and more reliable source of information.

The current study is distinctive in that it not only evaluated the motivations and concerns for orthodontic treatment among children, adolescents, adults and parents, but also compared the perceived treatment need to the clinically assessed need. It further explored the barriers the patients encountered and their expectations from the treatment, as well as assessed the influence of various factors on the severity of treatment needs. Across all groups, DHC and AC scores indicated severe treatment needs, aligning with IOTN principles, which emphasise treating only patients with significant needs while

avoiding overtreatment.[25] The findings also revealed that patients and parents typically sought treatment only when malocclusion was severe enough to be noticeable, with mild to moderate needs being assessed similarly by both patients and orthodontists.

The current study has limitations of single-centre data and limited qualitative analysis. Multicentre studies with larger sample sizes are recommended to qualitatively investigate other factors that may influence the severity of treatment needs.

Conclusion

Aesthetic considerations were identified as the predominant motivation for seeking orthodontic treatment across all age groups. Among children, heightened self-awareness regarding facial aesthetics appears to contribute substantially to the perceived need for treatment. Furthermore, the findings indicate that adults and parents predominantly depend on informal networks, such as family and friends for information related to orthodontic care, rather than consulting professional sources. The anticipated duration of orthodontic treatment emerged as the most frequently reported barrier among adults and parents. Collectively, the findings emphasise the need for targeted educational interventions and greater professional outreach to promote informed decision-making and improve access to orthodontic services.

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