ORIGINAL ARTICLE

Knowledge and Awareness Level of the Saudi Population about Early Orthodontic Intervention

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Abstract

Introduction: As early orthodontic intervention plays a crucial role in preventing many malocclusion problems, this cross-sectional study aims to assess the level of knowledge and awareness of the importance of early orthodontic treatment among the Saudi population. **Objectives:** This study aimed to assess the level of knowledge and awareness about the importance of early orthodontic intervention among Saudi people. **Materials and Methods:** A cross-sectional survey was conducted in Saudi Arabia between July and December 2025 using a questionnaire distributed through social media. Saudi residents aged ≥18 years who provided consent were included. The instrument captured sociodemographic data and seven awareness items (score range 0–7), categorized as low (0–3), moderate (4–5), or high (6–7). Descriptive statistics summarized responses, and associations between awareness level and participant characteristics were tested ($P \leq 0.05$). **Results:** A total of 561 participants completed the questionnaire; 74.7% were female, and the mean age was 32.3 ± 12.6 years. Most respondents considered a beautiful smile important for a child's personality development (96.8%). Regarding malocclusion etiology, 64.9% correctly identified both heredity and deleterious oral habits. Only 43.7% recognized the need to assess space maintenance after premature primary tooth loss, while 39.6% believed no intervention was required. An orthodontist was selected as the preferred first consultant by 62.6%. Knowledge of the recommended timing of first orthodontic consultation was moderate; 41.2% selected age 7, and 10.0% were unsure. Most also agreed that age affects outcomes (72.2%) and growth-treatment possible (59.7%). Overall awareness was moderate in 43.7%, low in 29.2%, and high in 27.1%. Higher awareness was significantly associated with age ($P = 0.0001$), residential region ($P = 0.004$), and education level ($P = 0.014$), but not with gender, marital status, employment, or previous orthodontic treatment. **Conclusion:** Awareness of early orthodontic intervention among Saudi adults was predominantly moderate, with important misconceptions about space maintenance and consultation timing. Targeted public education and region-sensitive outreach are needed, particularly for younger and less educated groups.

Key words: Awareness, knowledge, orthodontic intervention, orthodontic treatment, Saudi Arabia

INTRODUCTION

Orthodontic problems, if left untreated during early childhood, can lead to more complex dental and skeletal issues later in life. Early orthodontic intervention plays a crucial role in guiding proper jaw development.[1] Preventing malocclusions and reducing the need for more invasive treatments in adolescence or adulthood.[2]

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Received: 20-02-2026
Revised: 21-03-2026
Accepted: 29-03-2026

Despite the proven benefits, awareness and understanding of early orthodontic intervention remain limited among many parents, caregivers, and even some primary healthcare providers.[3] Lack of knowledge regarding the ideal timing, benefits, and implications of early treatment can lead to delayed diagnosis and suboptimal oral health outcomes.[4] Moreover, cultural, socioeconomic, and educational factors may influence perceptions and practices surrounding early orthodontic care.

These studies aim to assess the current level of knowledge and awareness about early orthodontic intervention.[5] With a focus on identifying gaps, misconceptions, and potential barriers to timely treatment.[6] Understanding these aspects is essential for developing effective educational strategies and public health initiatives that promote early orthodontic assessments and improve overall oral health outcomes.[7]

The American Association of Orthodontists recommends that youngsters receive their first orthodontic consultation no later than age 7.[8] A study of 1459 children aged 9–17 conducted in Saudi Arabia found that the majority of subjects (92%) feel that correct occlusion is critical.[9]

A cross-sectional study conducted by Zakirulla *et al*. evaluated the awareness of mothers in Aseer region regarding early orthodontic treatment. The study involved 385 participants and revealed that a significant proportion of the mothers lacked sufficient awareness about the importance of initiating orthodontic care at an early age. The findings highlighted the necessity for increasing public knowledge to ensure timely and effective orthodontic interventions.[10]

In Saudi Arabia, 2021, of the 1344 respondents in the survey, 75.8% were female, and only 12.4% were male; over half were between the ages of 25 and 44, and 69.3% had a bachelor's degree. The average awareness score was 4.30 ± 1.26 (high level). The average knowledge score was 6.25 ± 1.91/high level. Pro awareness and knowledge had a statistically moderately positive association (r = 0.495, $P < 0.05$), meaning that those with more knowledge also had higher awareness.[11]

In 2022, at Al-Madinah, Saudi Arabia, parental knowledge and practice had respective overall mean scores of 0.44 and 0.49. Compared to men, women were more conscious of how malocclusion affected their kids' self-esteem (P = 0.004). The higher risk of trauma associated with prominent incisors (P = 0.001) and different kinds of orthodontic appliances (P = 0.004) was less well-known among lower- and middle-income groups. However, compared to 18% of the higher-income group, 40.5 and 34% of the lower- and middle-income groups would choose to wait for public-funded therapies even if their child had a high need for treatment (P <0.000).[12]

Gap in knowledge

Although previous studies have addressed awareness levels in specific regions or among certain groups, such as mothers or parents, there is still limited comprehensive research targeting the general Saudi population across different regions. As none of the previous studies[1-3] assessed the awareness levels across the broader Saudi society, this study aims to bridge this gap by evaluating nationwide knowledge and awareness regarding the importance of early orthodontic intervention.

Despite the increasing prevalence of malocclusion and orthodontic problems among children in Saudi Arabia, there is a limited understanding among the general population – particularly parents and caregivers – about the importance of early orthodontic intervention. Early treatment can prevent the progression of dental problems, reduce treatment complexity, and improve oral health outcomes. However, a noticeable gap exists in public knowledge and awareness regarding the ideal age for orthodontic screening, early signs that require intervention, and the long-term benefits of timely treatment. This lack of awareness often leads to delayed consultations, missed early treatment opportunities, and increased burden on orthodontic services. Therefore, this study is crucial to assess the current knowledge and awareness levels among the Saudi population and to identify educational needs.

Objectives

The main objective of this study was to assess the level of knowledge and awareness about the importance of early orthodontic intervention (treatment) among Saudi people.

MATERIALS AND METHODS

Study design and setting

This cross-sectional study was conducted between July 2025 and December 2025 to assess Saudi Arabian residents' knowledge and awareness regarding early orthodontic intervention. Data were collected using a questionnaire developed by the authors. Participants were recruited via social media platforms, including Twitter, Snapchat, Instagram, WhatsApp, and Facebook, to reach individuals from across Saudi Arabia.

Participants, recruitment, and sampling procedure

The study population comprised Saudi adults aged 18 years and above. Participants were recruited in July 2025 from those who received the electronic questionnaire.

Sample size

The required sample size was calculated to ensure representativeness of the population. Using the Raosoft

sample size calculator, with an assumed response distribution of 50%, a margin of error of 5%, and a 95% confidence interval, the minimum sample size was determined to be 384 respondents.

Inclusion and exclusion criteria

Inclusion criteria were adults aged 18 years or older residing in Saudi Arabia. Individuals younger than 18 years were excluded from the study.

Data collection and instrument

An electronic questionnaire was developed to evaluate parents' awareness of malocclusion and the importance of early orthodontic consultation for children. The questionnaire's clarity, content validity, and reliability were confirmed through pilot testing with selected parents and review by experts, including statisticians and dental professionals. Participation was voluntary and anonymous, with informed consent implied through completion of the questionnaire.

The questionnaire consisted of two sections:

1. Demographic information: Parents' age, gender, marital status, employment status, educational level, and number of children.
2. Knowledge and awareness Assessment: Parents' knowledge regarding malocclusion causes, the need for orthodontic consultation, the appropriate age for the first consultation, and the impact of treatment timing.

Parents' awareness was scored by assigning one point for each correct response to seven key questions, resulting in a total score ranging from 0 to 7. Awareness levels were categorized as low (0–3), moderate (4–5), or high (6–7).[11]

Scoring system

Awareness was assessed using seven items, with responses such as "Yes," "No," or "I don't know." Some questions were multiple-choice with a single correct answer. Each correct response received one point. Total awareness scores were categorized as follows:

- High awareness: 5–7 points
- Moderate awareness: 3–5 points
- Low awareness: 0–3 points.

Pilot test

The questionnaire was pilot-tested on 20 participants to evaluate its clarity, feasibility, and ease of use. Data from the pilot study were not included in the final analysis.

Data entry and analysis

Collected data were initially entered into Microsoft Excel (2016) and subsequently transferred to the Statistical Package for the Social Sciences, version 20, for statistical analysis.

RESULTS

Table 1 displays various demographic parameters of the participants with a total number of 561. Most of the participants are aged 26–40 years (27.8%) or 41 or more (26.2%), with younger ages 20 and below and 22–25 years each comprising 23%. Females formed the majority (74.7%). Almost one-half of them were single (49.9%), and then married participants (45.5%). Most of the respondents resided in the southern area (62.6%), and the percentage in the western area (17.3%), as well as the central area (14.4%) were lower. The sample was well educated, with 58.6% and 24.8% before and after bachelor's degree, respectively. There was employment fluctuation, with most students (35.5%) and unemployed individuals (31.4%) being the major ones. It is important to note that 57.8% did not receive any orthodontic treatment before, while 42.2% had received orthodontic treatment.

As shown in Figure 1, most participants identified both heredity and bad oral habits as causes of malocclusion (364; 64.9%). Fewer participants said it was due to bad habits (80; 14.3%) or heredity (33; 5.9%), while 84 participants (15.0%) reported not knowing the cause.

Table 2 shows that the level of awareness on malocclusion and orthodontic consultation among the participants was generally high. Almost the respondents (96.8) believed a beautiful smile is significant in terms of personality development of a child. Most of the participants (64.9) identified the heredity and pernicious oral habits as etiological factors of malocclusion. Nevertheless, only 43.7% correctly found the necessity to evaluate a need of a space maintainer following premature loss of teeth, and 39.6% thought that no interventions are required. The choices of preferred consultant were 62.6% orthodontist. Knowledge on the age of the first consultation was moderate, with 41.2% of the respondents selecting 7 years. Besides, 72.2% admitted that the outcomes of treatment are dependent on age, and 59.7% realized that children can obtain orthodontic treatment as they grow.

As shown in Figure 2 that discussed the age at which the child should have his first orthodontic consultation, most participants correctly selected 7 years for the first orthodontic consultation (231; 41.2%). Others chose 13 years (133; 23.7%) or 10 years (100; 17.8%). Fewer selected 18 years (41; 7.3%), while 56 respondents (10.0%) were unsure.

Table 1: Sociodemographic characteristics of participants (*n*=561)

Parameter	No.	Percentage
Age (mean: 32.3, standard deviation: 12.6)		
21 or less	129	23.0
22–25	129	23.0
26–40	156	27.8
41 or more	147	26.2
Gender		
Female	419	74.7
Male	142	25.3
Marital status		
Single	280	49.9
Married	255	45.5
Divorced	18	3.2
Widowed	8	1.4
Residential region		
Northern region	6	1.1
Southern region	351	62.6
Central region	81	14.4
Eastern region	26	4.6
Western region	97	17.3
Level of education		
Primary school	5	0.9
Middle school	17	3.0
High school	139	24.8
Bachelor	329	58.6
Diploma	52	9.3
Postgrad	16	2.9
No formal education	3	0.5
Employment status		
Student	199	35.5
Employed	125	22.3
Unemployed	176	31.4
Retired	44	7.8
Freelancing	17	3.0
Have you had previous or current orthodontic treatment?		
No	324	57.8
Yes	237	42.2

Table 3 shows that moderate awareness regarding malocclusion and orthodontic consultation was most common (43.7%), followed by low awareness (29.2%). Only 27.1% demonstrated a high awareness level.

Table 4 shows that awareness of malocclusion and orthodontic consultation has a statistically significant relation to age (P = 0.0001), residential region (P = 0.004), and level of education (P = 0.014). It also shows a statistically insignificant relation to gender, marital status, employment status, and previous or current orthodontic treatment.

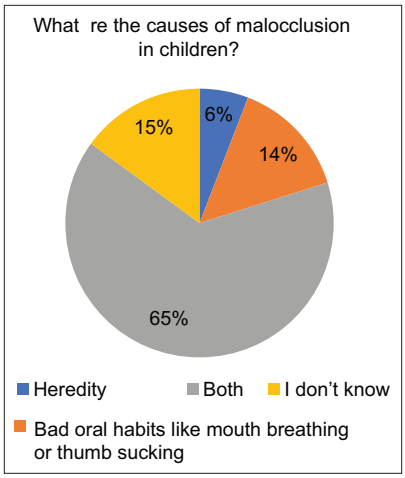

Figure 1: Illustrates causes of malocclusion in children among participants

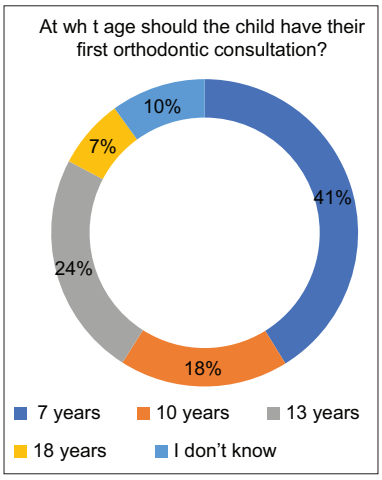

Figure 2: Illustrates the age at which the child should have their first orthodontic consultation among participants

DISCUSSION

The present cross-sectional study intended to evaluate the level of knowledge and awareness of importance of early orthodontic intervention among the Saudi population in different regions. The results of this study hold important knowledge about the current situation of public awareness of treatment of orthodontic treatment and early intervention, with significant implications in the development of specific educational and public health programs.

The study showed that the vast majority (96.8%) of the participants understood the importance of the healthy development of a child's personality through a beautiful smile which agrees with the existing literature that stresses the psychological and social benefits of proper dental alignment. This finding is consistent with the research

Table 2: Parameters related to awareness level of malocclusion and orthodontic consultation (*n*=561)

Parameter	No.	Percentage
Do you think a beautiful smile is important for the healthy development of a child's personality		
No	18	3.2
Yes	543	96.8
What are the causes of malocclusion in children?		
Heredity	33	5.9
Bad oral habits like mouth breathing or thumb sucking	80	14.3
Both	364	64.9
I don't know	84	15.0
If a primary tooth was lost prematurely due to decay, what should be done?		
Check if a space maintainer is needed	245	43.7
Nothing. The permanent tooth will replace it	222	39.6
I don't know	94	16.8
Who would you first consult regarding orthodontic treatment for The child?		
General dentist	115	20.5
General physician/pediatrician	78	13.9
Orthodontist	351	62.6
I don't know	17	3.0
At what age should the child have their first orthodontic consultation?		
7 years	231	41.2
10 years	100	17.8
13 years	133	23.7
18 years	41	7.3
I don't know	56	10.0
Do you think the age of a person starting orthodontic treatment can affect the treatment outcome?		
No	72	12.8
Yes	405	72.2
I don't know	84	15.0
Do you think children can have orthodontic treatment during their growth period?		
No	147	26.2
Yes	335	59.7
I don't know	79	14.1

Table 3: Awareness of malocclusion and orthodontic consultation score results

Awareness level	Frequency	Percentage
High level of awareness	152	27.1
Moderate awareness level	245	43.7
Low awareness level	164	29.2
Total	561	100.0

conducted in Saudi Arabia previously by Alshammari *et al*.[9] who found that aesthetic considerations about the appearance of teeth in the child is a significant factor in deciding whether to perform orthodontic treatment on a child or not. The high degree of aesthetic awareness in the present study is indicative that the Saudi population has a basic understanding about the psychosocial implications of malocclusion, and this is important for motivating participation in preventive orthodontic interventions.[9]

Regarding the etiology of malocclusion, in the present study, 64.9% of the participants correctly mentioned both heredity and bad oral habits as etiological factors of malocclusion, but only 15.0% reported inadequate knowledge on this issue. This finding is a significant improvement from past regional studies. A cross-sectional study by Alwusaybie *et al*.[14] conducted among Saudi parents showed that although most of the parents had shown awareness of the etiology of malocclusion, there were still important knowledge gaps with respect to specific risk factors, as well as prevention measures. The higher percentage of participants correctly informed in the present nationwide study point to possible level of evolving public awareness over the period of time which may be due to increased access to health information via digital media and social platforms.

However, worrying results were obtained in terms of knowledge for space maintainers after premature loss of primary teeth. Only 43.7% of the participants correctly answered that it is necessary to evaluate the need for a space maintainer: 39.6% incorrectly answered that it was not necessary to intervene in any way. This represents a critical knowledge gap because dental space maintainers are crucial, interceptive orthodontic appliances that are designed to preserve space in a dental arch, and to prevent undesirable tooth migration after early loss of primary dentition.[15] The underutilization of space maintainers in clinical practice due to lack of public knowledge can lead to serious occlusal consequences, such as crowding, rotation and ectopic eruption of the permanent teeth, which may necessitate more complex and costly orthodontic treatment in later stages.[16]

The present study found that 62.6% of participants correctly recognized a consultant for orthodontic treatment concerns to be an orthodontist which shows substantially improved referral awareness compared to previous investigations. In a previous study carried out by Almarhoumi *et al*.[18] in Al-Madinah region of Saudi Arabia in 2022, only 48.0% of the participants correctly identified orthodontists as the primary consultants, meaning there is improvement in the knowledge of appropriate dental specialist consultation. This improvement is of note since consultation with qualified orthodontists rather than general practitioners is fundamental

Table 4: Relation between awareness of malocclusion, orthodontic consultation, and sociodemographic characteristics

Parameters	Awareness level		Total (n = 561)	*P*-value
	High or moderate awareness	Low awareness level		
Gender				
Female	302	117	419	0.241
	76.1%	71.3%	74.7%	
Male	95	47	142	
	23.9%	28.7%	25.3%	
Age				
21 or less	73	56	129	0.0001
	18.4%	34.1%	23.0%	
22–25	107	22	129	
	27.0%	13.4%	23.0%	
26–40	107	49	156	
	27.0%	29.9%	27.8%	
41 or more	110	37	147	
	27.7%	22.6%	26.2%	
Marital status				
Single	199	81	280	0.199
	50.1%	49.4%	49.9%	
Married	178	77	255	
	44.8%	47.0%	45.5%	
Divorced	16	2	18	
	4.0%	1.2%	3.2%	
Widowed	4	4	8	
	1.0%	2.4%	1.4%	
Residential region				
Northern region	3	3	6	0.004
	0.8%	1.8%	1.1%	
Southern region	244	107	351	
	61.5%	65.2%	62.6%	
Central region	48	33	81	
	12.1%	20.1%	14.4%	
Eastern region	21	5	26	
	5.3%	3.0%	4.6%	
Western region	81	16	97	
	20.4%	9.8%	17.3%	
Level of education				
Primary school	4	1	5	0.014
	1.0%	0.6%	0.9%	
Middle school	8	9	17	
	2.0%	5.5%	3.0%	
High school	91	48	139	
	22.9%	29.3%	24.8%	

(Contd...)

Table 4: *(Continued)*

Parameters	Awareness level		Total (n = 561)	*P*-value
	High or moderate awareness	Low awareness level		
Bachelor	250	79	329	
	63.0%	48.2%	58.6%	
Diploma	31	21	52	
	7.8%	12.8%	9.3%	
Postgrad	10	6	16	
	2.5%	3.7%	2.9%	
No formal education	3	0	3	
	0.8%	0.0%	0.5%	
Employment status				
Student	139	60	199	0.335
	35.0%	36.6%	35.5%	
Employed	97	28	125	
	24.4%	17.1%	22.3%	
Unemployed	121	55	176	
	30.5%	33.5%	31.4%	
Freelancing	10	7	17	
	2.5%	4.3%	3.0%	
Retired	30	14	44	
	7.6%	8.5%	7.8%	
Have you had previous or current orthodontic treatment?				
No	219	105	324	0.053
	55.2%	64.0%	57.8%	
Yes	178	59	237	
	44.8%	36.0%	42.2%	

*P-value was considered significant if ≤ 0.05

for the securing of accurate diagnosis, appropriate treatment planning and optimal clinical outcomes.[17]

As for the optimal age for the first orthodontic appointment, 41.2% of the participants in the present study correctly stated that 7 years is the recommended age, which is consistent with recommendations set by the American Association of Orthodontists.[18] However, 23.7% chose 13 years, 17.8% picked 10 years, and 10.0% were uncertain on this critical parameter. This distributed response pattern suggests that public understanding of best timing of early orthodontic assessment is incomplete. The results of the study highlight the need for focused public education campaigns as early evaluation at age 7 years and earlier offers key opportunities to detect developing malocclusions, guide eruptive patterns by interceptive procedures and prevent progression to more severe skeletal and dental malocclusions.[19] The importance of early intervention is especially relevant in the Saudi population where epidemiological studies have found high prevalence rates of malocclusion with Class I malocclusions being found in 66.51%, Class II in 17.70%, and Class III in 15.79% of the population.[20]

A significant proportion of them (72.2%) correctly stated that the initiation age of the treatment impacts the result of the treatment, which shows that they are aware of a basic principle in orthodontics. This finding is an encouraging one, as it indicates that the Saudi population is aware of the time-sensitive nature of orthodontic treatment and its association with skeletal growth and development. In addition, a suitable knowledge in terms of growth modulation therapies and interceptive orthodontics was shown by 59.7% of the participants who recognized that orthodontic treatment can be initiated during the growing period of children.

The overall awareness assessment found that moderate awareness was most common (43.7%) followed by low awareness (29.2%) and high awareness (27.1%). These results show that although a good percentage of the Saudi population has basic knowledge about early orthodontic intervention, large gaps exist that may affect optimal timing and uptake of treatment. Notably, younger participants (21 years or less) had significantly lower levels of awareness as compared to older age groups (P=0.0001) suggesting that educational initiatives should especially focus on younger demographics.

Similarly, reduced awareness levels were demonstrated by participants with lower educational attainment (P=0.014) suggesting that educational disparity is a major obstacle to public knowledge on orthodontic intervention.[10]

Geographic variations were also evident with the western region showing significantly higher levels of awareness than other regions (P=0.004), which may represent differences in the infrastructure of healthcare services, access to orthodontic services and regional educational initiatives. This geographical diversity has significant implications for developing region-specific awareness and educational programs to overcome region-specific knowledge gaps in various Saudi regions.

Interestingly, past experience of orthodontic treatment was marginally correlated with levels of awareness (P=0.053), suggesting that personal experience of treatment may offer opportunities for knowledge acquisition of early intervention principles. The high numbers of participants (42.2%) describing previous or current orthodontic treatment was suggestive of high engagement with orthodontic treatment within the population, however this was not reflected in significantly improved population-level awareness, highlighting the importance of improving patient education during the treatment course.The findings of the present study align with and extend previous investigations conducted in Saudi Arabia. A 2021 survey study[11] involving 1344 respondents reported average awareness and knowledge scores of 4.30±1.26 and 6.25±1.91 respectively, classified as high levels, demonstrating variable awareness patterns across different studies and populations. The present nationwide study, encompassing diverse regions and demographic characteristics, provides contemporary data regarding the current state of public knowledge and awareness regarding early orthodontic intervention, identifying specific content areas requiring enhanced educational focus.

Several limitations should be acknowledged in interpreting the findings of this cross-sectional investigation. First, the convenience sampling methodology employed for participant recruitment through social media platforms may introduce selection bias, as individuals with greater digital engagement and higher socioeconomic status may be preferentially represented. Second, the reliance on self-reported questionnaire responses without clinical or objective verification may result in reporting bias or inadequate understanding of terminology. Third, the cross-sectional design precludes establishing causal relationships between demographic variables and awareness levels.

CONCLUSION

The present study demonstrates that while the Saudi population possesses substantial foundational knowledge regarding the psychological importance of dental esthetics and overall awareness of malocclusion etiology, critical knowledge gaps exist regarding specific aspects of early orthodontic intervention, including optimal consultation age, space maintainer necessity, and interceptive treatment principles. These findings underscore the urgent need for comprehensive, targeted public health education campaigns addressing identified knowledge gaps, with particular emphasis on younger and less educated demographics. Healthcare providers, dental educators, and policymakers should collaborate to develop evidence-based awareness initiatives that promote early orthodontic screening and intervention, ultimately reducing the burden of severe malocclusion and improving oral health outcomes for the Saudi population.

ACKNOWLEDGMENT

We acknowledge all volunteers who provided samples for this research.

ETHICAL APPROVAL

The study was fully explained to all participants, and it was emphasized that participation was voluntary. Written informed consent was obtained from each participant before enrollment. All collected information was securely stored and used exclusively for research purposes.

INFORMED CONSENT

Written informed consent was obtained from all study participants.

DATA AND MATERIALS AVAILABILITY

All data generated or analyzed during this study are included in this published article.

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Source of Support: Nil. **Conflicts of Interest:** None declared.