



Pediatricians' Awareness and Approach of Orthodontic Issues and Associated Conditions in Children: A Comprehensive Statewide Survey

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ABSTRACT:

Background: Pediatricians play a crucial role in early detection and referral of orthodontic problems in children, yet their awareness and knowledge in this domain remain underexplored.

Objective: This study aimed to assess pediatricians' awareness, knowledge, and practices regarding orthodontic problems and parafunctional oral habits in children.

Methods: A cross-sectional online survey was conducted among pediatricians attending the 47th Annual Conference of the Indian Academy of Pediatrics Tamil Nadu State Chapter. The survey included questions on demographic characteristics, examination protocols, referral patterns, and training related to orthodontic issues. Statistical analysis was performed using descriptive statistics and the Chi-Square Test.

Results: A total of 194 pediatricians completed the survey, with varying levels of awareness and practices regarding orthodontic problems. Referrals for orthodontic issues were infrequent and primarily prompted by specific complaints related to the oral cavity. Limited knowledge and confidence in conducting oral examinations were reported, with lack of training cited as a common barrier. Despite demographic variations, no significant associations were found between pediatricians' characteristics and their knowledge and practices regarding orthodontic problems.

Conclusion: Pediatricians demonstrated limited knowledge and practices related to orthodontic issues, highlighting the need for enhanced education and training in oral health within pediatric curriculum. Improving interdisciplinary collaboration between pediatricians and dental specialists, alongside educational initiatives such as seminars and symposiums, can help in addressing this gap and improve patient care in pediatric orthodontics.

1. Introduction

Pediatricians serve as the primary healthcare providers for children, often being the first point of contact for parents seeking medical advice, even in cases involving oral health issues. Given their pivotal role in safeguarding children's overall well-being, it's imperative to recognize that oral health constitutes an integral component of overall healthcare. Orthodontic problems and associated conditions present significant challenges for pediatric patients, impacting their oral health, overall well-being, and even psychosocial development. While orthodontic treatment often begins in adolescence, early identification and intervention are crucial for optimal outcomes. Pediatricians play a pivotal

role in identifying orthodontic issues during routine examinations and referring patients to orthodontic specialists as needed.

According to WHO health is defined as “a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity” [1]. As such oral health plays a vital role in a person's mental and social wellbeing, oral health cannot be separated from the overall health, as it is considered as fundamental to the quality of life [2].

Dentofacial deformities not only have impact on aesthetics but also have broader implications for speech, periodontal health, oral hygiene maintenance and overall quality of life. Orthodontic interventions play a crucial



role in addressing these deformities, not only enhancing aesthetics but also promoting optimal oral function, periodontal health and enhances the overall health. [3]

Malocclusion is an imbalance between skeletal, muscular and dental structures that can lead to impaired function and aesthetics [4]. Dental malformations are one of the most common dental developmental disorders that cause aesthetic and functional disharmony [5]. Orthodontic correction of dental facial deformities is an integral part of oral health because it promotes optimal function, periodontal health, aesthetics and general oral health [6]

Pediatricians are in a position to facilitate early detection and intervention in orthodontic problems, as they are frequently consulted by parents at the onset of any health concerns during a child's formative years. Timely diagnosis and management of dentofacial deformities and orthodontic conditions during childhood are paramount, given the significantly higher success rates and stability associated with early intervention.

Moreover, orthodontic treatment has been shown to have positive effects on speech disorders, with individuals who have undergone orthodontic treatment experienced improvements in speech clarity and the ability to maintain proper oral hygiene. Consequently, orthodontic correction not only addresses dentofacial abnormalities but also contributes to reducing the prevalence of dental caries and periodontal diseases.[7]

In light of these considerations, it is evident that the collaboration between pediatricians and orthodontists is indispensable for ensuring comprehensive oral healthcare for children. However, the extent of pediatricians' awareness and knowledge concerning orthodontic problems and related conditions remains understudied. Existing researches primarily focuses on specific aspects of pediatric oral health, with limited attention given to pediatricians' perspectives and practices concerning orthodontic issues comprehensively. Therefore, this study aims to address this research gap by conducting a statewide survey to assess pediatricians' awareness of orthodontic problems and related conditions, thereby contributing valuable insights to pediatric healthcare delivery and interdisciplinary collaboration in the management of pediatric orthodontic care.

2. Methodology

Survey Design and Recruitment

The study targeted pediatricians practicing in Tamil Nadu, India, based on the Indian Academy of Pediatrics, Tamil Nadu Directory, which estimated approximately 4,000 pediatricians in the state. A cross-sectional online survey was conducted using Google Forms among attendees of the 47th Annual Conference of the Indian Academy of Pediatrics Tamil Nadu State Chapter, held in Kanyakumari. Roughly 2,000 pediatricians were registered for the conference, from which a sample of 250 participants was required to achieve a confidence interval of 95% with a 10% margin of error.

Convenience sampling methods were employed for survey recruitment, with invitations sent via email and WhatsApp to a list of 500 pediatricians attending the conference from across Tamil Nadu. Despite efforts to enhance participation, only 245 participants accepted the invitation due to reasons such as busy schedules or perceived lack of relevance. Of these, only 192 surveys were properly completed and returned, yielding a response rate of 77.6%. Non-response errors were primarily attributed to item non-response, with some respondents indicating familiarity only with general dentition, associated syndromes with oral manifestations, or basic management of dental trauma and referral.

Questionnaire

The survey instrument was designed using Google Forms, with piloting conducted to ensure construct validity (Average congruency percentage - 92%) and reliability ($r = 0.82$) among 20 pediatricians. The survey followed the CHERRIES guideline (Checklist for Reporting Results of Internet E-Surveys) for online surveys, with collaborators providing feedback on content and functionality prior to distribution.[8]

Participants were informed about the survey's duration, data storage practices, investigator identity, and study purpose at the outset. The questionnaire comprised demographic inquiries (e.g., age, gender, work sector, years of practice) and adaptive questioning to streamline complexity. It assessed participants' examination protocols regarding the oral cavity, teeth, jaws, and dentofacial abnormalities, as well as their practices and attitudes towards the referral for orthodontic problems.



A review step allowed respondents to review and revise their answers, and duplicate entries were prevented to ensure data integrity.

Statistical Analysis

The statistical analyses were conducted using the SPSS software (version 26.0, Chicago, IL, USA). Descriptive statistics were utilized to present percentage frequencies. The Chi-Square test was employed to examine the relationship between various factors, including pediatricians' age, gender, work sector, years of experience, patient load, orthodontic treatment history in children and their awareness related to parafunctional oral habits and orthodontic issues, with their knowledge, attitudes, and practices concerning orthodontic problems and parafunctional oral habits in children. Descriptive statistics were utilized to present percentage frequencies. A significance level of $p < 0.05$ was considered statistically significant.

3. Results

A total of 194 pediatricians completed and submitted the online questionnaire. Table 1 presents the demographic details, with respondents aged between 25 and 64 years, with a mean age of 38.1 ± 12.06 years. Female participants ($n = 106$, 54.6%) outnumbered male participants ($n = 88$, 45.4%). Private practitioners comprised 37.6% of the sample, public practitioners 29.9%, and 32.5% practiced in both sectors.

Regarding the examination of oral cavity components (including tongue, oral mucosa, teeth, and jaw deviation), respondents were given three options: never, occasionally, and regularly. The majority (58.8%) reported examining their patients' oral cavity occasionally, while 11.3% did so regularly, and 29.9% never performed oral examinations. (Table 2).

Examination and referral patterns for common orthodontic conditions varied, where referral rates for conditions like crowding, spacing, open bite, and deep bite were minimal, higher referral rates were observed for conditions like premature tooth loss and delayed eruption (66.0% and 72.7%) possibly due to patient/parental chief complaints (Table 3).

The referral rate for habits like mouth breathing and bruxism were relatively higher (30.4% and 31.4%) respectively, while for conditions such as TMJ problems

(3.6%), facial asymmetry (4.1%) and other malocclusions had lower referral rate (table 3)

Examination and referral patterns were analyzed based on gender, age, work sector, and years of experience. Overall, no significant associations were found (Table 4). Notably, regardless of demographic factors, respondents tended to conduct oral examinations occasionally, often driven by patient complaints such as oral ulcers and delayed tooth eruption, etc.

When pediatricians asked whether oral examination should be included in overall examination protocol, most of them opted that occasional examination as suffice one (50%), only a few responded that oral examination should be done regularly (24.7%).

In summary, pediatricians exhibited varied examination and referral patterns for orthodontic conditions, with chief complaints playing a significant role in referral decisions. Demographic factors had minimal influence on examination practices, highlighting the need for standardized protocols and increased awareness of orthodontic issues among pediatricians.

4. Discussion

Referrals from pediatricians concerning orthodontic problems appear to be infrequent, often occurring only when prompted by a chief complaint related to the oral cavity. However, given that parents principally approach pediatricians as the primary healthcare providers for their children's early health concerns, pediatricians possess an opportunity to identify oral cavity conditions at an early stage. Examination of the oral cavity and its components in children and infants is crucial, as it can impact systemic health by influencing functions such as speech and mastication. Pediatricians, with their established rapport with patients and parents, can provide valuable advice, consultation, and referrals to specialists regarding oral health.

Despite efforts to explore associations between various demographic factors and pediatricians' knowledge, attitudes, and practices regarding orthodontic problems, no significant results were found. This could be attributed to deficiencies in pediatricians' curriculum regarding oral health or a tendency to focus solely on patient chief complaints. Lack of training emerged as a common reason for not performing oral examinations.[9]



Early diagnosis is crucial in orthodontics, yet referrals for orthodontic problems remain low, with slightly higher rates observed for conditions such as mouth breathing, bruxism, and premature tooth loss. This suggests that pediatricians may have limited education and knowledge in dental matters, leading to reduced confidence in oral examinations. [10]

In Albania, a study was conducted to assess the prevalence of malocclusion and oral habits in school children and concluded that there is a need to improve public health plans for orthodontic prevention and screening. [11]

A study was conducted by Ashima Goyal et al in 2020 to assess the oral health-related knowledge and attitudes among young paediatricians' which stated that the majority of the population knew dental caries and bottle feeding, but about two-thirds of the population did not have correct knowledge about the recommended age to start tooth brushing [12].

To assess the knowledge, attitudes and perceptions of pediatricians towards oral health as well as the treatment needs of their patients, a study was conducted which have highlighted pediatricians' destitute information on dental wellbeing and different treatment needs in children [13]

A study was conducted in Italy by Di Giuseppe et al regarding the knowledge, attitude and practices of paediatricians regarding the prevention of oral diseases in which about 91% of participants were aware of the malposed tooth and almost 94.8% believed that they are responsible for preventing and conducting oral examinations. There was also a positive attitude of that caries can be prevented by 95% but 28.6% and 44.8% were uncertain or disagreed about the preventability of gingivitis and malocclusion. [14]

According to a study by Kurt Demirsoy et al., 84% of pediatricians referred patients to plastic and reconstructive surgeons, but the majority of them were unaware of the NAM therapy/appliance. The study evaluated the pediatricians' knowledge and awareness of presurgical orthopaedics in newborns with cleft lip and palate. [15]

While numerous studies have focused on pediatricians' awareness of dental caries and oral hygiene, limited attention has been given to their awareness on

orthodontic conditions. Our study reveals a need for increased education and exposure in the field of dental health among pediatricians, particularly regarding orthodontic conditions and their implications on overall health.

Our findings suggest that most pediatricians consider occasional oral cavity examination sufficient, highlighting a limited understanding of orthodontic conditions. To address this, symposiums or conferences on oral examination and its impact on overall health should be organized. Incorporating oral examination as a protocol in general examinations could facilitate early diagnosis and management, ultimately benefiting patients and physicians alike with improved outcomes and stability.[16]

5. Conclusion

In conclusion, our research sheds light on the current state of pediatricians' awareness, knowledge, and practices regarding orthodontic problems and parafunctional oral habits in children. Despite being the primary healthcare providers for children, pediatricians' referrals for orthodontic issues remain relatively low, often prompted only by specific complaints related to the oral cavity. Our findings also reveal a discrepancy between pediatricians' perceived importance of oral examination and their actual practices, with most favoring occasional examinations over regular assessments. Initiatives such as symposiums or conferences focusing on oral examination protocols and the role of orthodontics in overall health could help bridge this gap. Additionally, integrating oral examination into routine pediatric assessments can facilitate early diagnosis and intervention, leading to improved patient outcomes.

In conclusion, it is evident that pediatricians possess limited knowledge regarding the oral cavity elements and orthodontic conditions. Addressing this issue requires fostering a strong collaboration between pediatricians and dental specialists for the benefit of the patient. This can be achieved through enhancements in dental education within pediatric curricula and the organization of seminars and symposiums focusing on general oral health conditions and their impact on overall patient well-being. By strengthening interdisciplinary communication and education, we can ensure that pediatricians are better equipped to address the oral



health needs of their patients, ultimately enhancing patient care and outcomes.

Limitations of this study include the limited sample size and lack of formal assessment of respondent differences. Additionally, our study lacks inter-area comparisons, self-reporting bias and response bias is common in questionnaire studies, these should be considered when interpreting the results and planning future research.

Table 1: Demographic characteristics of Paediatricians

Variables		N	%
Gender	Female	106	54.6
	Male	88	45.4
Age	28-35	72	37.1
	36-45	91	46.9
	46-55	26	13.4
	over 55	5	2.6
Work sector	Both	63	32.5
	Private	73	37.6
	Public	58	29.9
Years of experience	1-5	69	35.6
	16-25	28	14.4
	6-15	92	47.4
	over 25	5	2.6
Patients per day	1-10	63	32.5
	11-20	81	41.8
	21-30	31	16.0
	over 30	19	9.8

Table 2: Responses of Paediatricians in examination of oral cavity and its elements

Variable	never % (n)	Occasionally % (n)	Regularly % (n)
oral cavity	29.9 (58)	58.8 (114)	11.3 (22)
Tongue	32.0 (62)	59.8 (116)	8.2 (16)

oral mucosa	25.8 (50)	63.9 (124)	10.3 (20)
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Table 3: Responses of Paediatricians based on examination and referral for different orthodontic problems

Condition	No % (n)	Yes % (n)
Premature loss of tooth	34.0 (66)	66.0 (128)
delayed eruption	27.3 (53)	72.7 (141)
TMJ problems	96.4 (187)	3.6 (7)
facial asymmetry	95.9 (186)	4.1 (8)
Crowding	91.8 (178)	8.2 (16)
Spacing	95.9 (186)	4.1 (8)
open bite	92.8 (180)	7.2 (14)
deep bite	99.0 (192)	1.0 (2)
cross bite	97.4 (189)	2.6 (5)
Prognathism	97.4 (189)	2.6 (5)
Retrognathism	99.0 (192)	1.0 (2)
mouth breathing	69.6 (135)	30.4 (59)
Bruxism	68.6 (133)	31.4 (61)
thumb sucking and tongue thrusting	89.7 (174)	10.3 (20)

Table 4: Examination of oral cavity based on demographic data

	Examination of oral cavity			p value
	Never	Occasionally	Regularly	
Age (yrs)				
28-35	16 (22.2%)	46 (63.9%)	10 (13.9%)	0.488
36-45	30 (33.0%)	51 (56.0%)	10 (11.0%)	
46-55	9 (34.6%)	15 (57.7%)	2 (7.7%)	
over 55	3 (60.0%)	2 (40.0%)	0 (0.0%)	
Gender				
Male	30 (34.1%)	47 (53.4%)	11 (12.5%)	0.382
Female	28 (26.4%)	67 (63.2%)	11 (10.4)	
Work sector				
Public	14 (24.1%)	39 (67.2%)	5 (8.6%)	0.362



Private	20 (27.4%)	43 (58.9%)	10 (13.7%)	
Both	24 (38.1%)	32 (50.8%)	79 (11.1%)	
Years of experience				0.544
1 to 5	16 (23.2%)	43 (62.3%)	10 (14.5%)	
6 to 15	30 (32.6%)	52 (56.5%)	10 (14.5%)	
16 to 25	9 (32.1%)	17 (60.7%)	2 (7.1%)	
Over 25	3 (60.0%)	2 (40.0%)	0	

Chisquare test;*($p < 0.05$)

References:

- World Health Organization. Constitution. 2019. <https://www.who.int/about/who-we-are/constitution>.
- Piovesan C., Batista A., Ferreira F., Ardenghi T. Oral health-related quality of life in children: conceptual issues. *Revista Odonto Ciência*. 2009;24(1):81–85.
- Cunningham SJ, Hunt NP. Quality of life and its importance in orthodontics. *JO*. 2001;28(2):152–8.
- Prevention of malocclusion and the importance of early diagnosis in the Italian young population, September 2022, DOI:10.23804/ejpd.2022.23.03.02.
- Mtaya M, Brudvik P, Astrom AN. Prevention of malocclusion and its relationship with socio demographic factors, dental caries and oral hygiene in 12 to 14-year-old Tanzanian schoolchildren. *Eur J Orthod*. 2009 Oct;31(5):467–76.
- Abanto J, Carvalho TS, Mendes FM, Wanderley MT, Bönecker M, Raggio DP. Impact of oral diseases and disorders on oral health-related quality of life of preschool children. *Community Dent Oral Epidemiol*. 2011 Apr;39(2):105-14. doi: 10.1111/j.1600-0528.2010.00580.x. Epub 2010 Oct 5. PMID: 21029148.
- Orlagh Hunt, Peter Hepper, Chris Johnston, Mike Stevenson, Donald Burden, Professional perceptions of the benefits of orthodontic treatment, *European Journal of Orthodontics*, Volume 23, Issue 3, June 2001, Pages 315–323, <https://doi.org/10.1093/ejo/23.3.315>
- Eysenbach G Improving the Quality of Web Surveys: The Checklist for Reporting Results of Internet E-Surveys (CHERRIES), *J Med Internet Res* 2004;6(3):e34, <https://www.jmir.org/2004/3/e34>, DOI: 10.2196/jmir.6.3.e34
- Charlotte W. Lewis, Suzanne Boulter, Martha Ann Keels, David M. Krol, Wendy E. Mouradian, Karen G. O'Connor, Rocio B. Quinonez. Oral Health and Pediatricians: Results of a National Survey, *Academic Pediatrics*, Volume 9, Issue 6, 2009, Pages 457-461, ISSN 1876-2859, <https://doi.org/10.1016/j.acap.2009.09.016>.
- Brickhouse TH, Unke JH, Kacitis I, Best AM, Davis RD. Infant oral health care: a survey of general dentists, pediatric dentists and pediatricians in Virginia. *Pediatr Dent*. 2008; 30(2):147–53.
- Laganà, G., Masucci, C., Fabi, F. et al. Prevalence of malocclusions, oral habits and orthodontic treatment need in a 7- to 15-year-old schoolchildren population in Tirana. *Prog Orthod*. 14, 12 (2013). <https://doi.org/10.1186/2196-1042-14-12>
- Goyal A, Nishant, Morankar R, Gauba K, Jaiswal M. Awareness among pediatricians regarding oral health care in children including those with special health care needs: A cross-sectional survey. *J Family Med Prim Care*. 2020 Aug 25;9(8):4151-4155. doi: 10.4103/jfmpc.jfmpc_539_20. PMID: 33110824; PMCID: PMC7586525.
- Shetty RM, Dixit UB. Paediatricians' views on dental and oral health and treatment needs in children. *Oral Health Prev Dent*. 2011;9(4):315-22. PMID: 22238729.
- Di Giuseppe G, Nobile CG, Marinelli A, Angelillo IF. Knowledge, attitude and practices of pediatricians regarding the prevention of oral diseases in Italy. *BMC Public Health*. 2006 Jul 5;6:176. doi: 10.1186/1471-2458-6-176. PMID: 16822318; PMCID: PMC1543635.
- Kurt Demirsoy K, Kutalmış Büyük S, Alpaydın T. Pediatricians' Knowledge and Awareness on Pre-surgical Orthopedics in Newborns with Cleft Lip and Palate. *J Pediatr Res* 2022;9:31-37.
- Koufatzidou M, Koletsi D, Basdeki EI, et al. Paediatricians' awareness on orthodontic problems and related conditions—a national survey. *Prog Orthod*. 2019;20:33. doi:10.1186/s40510-019-0285-4.