REVIEW ARTICLE

Strategies Adopted by Dentists in Saudi Arabia for Early Childhood Caries Management: A Cross-Sectional Study

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ABSTRACT

Early Childhood Caries (ECC) is a significant public health issue affecting young children worldwide, with a substantial impact in Saudi Arabia. This study aimed to assess the strategies adopted by dentists in Saudi Arabia for the management of ECC. A cross-sectional survey was conducted involving 448 dentists across the Kingdom. The survey focused on various aspects of ECC management, including preventive measures, diagnosis, treatment protocols, and referral practices. Results indicated that while there is a general awareness of the importance of early intervention, variations in the adoption of management strategies exist. Factors influencing these strategies include dentist demographics, training, and access to resources. This study highlights the need for standardization in ECC management protocols and suggests further educational initiatives to ensure optimal care for children.

KEYWORDS: Early childhood caries, saudi arabia, dental management, preventive dentistry, cross-sectional study

INTRODUCTION

Early Childhood Caries (ECC) is widely recognized as one of the most common chronic diseases affecting young children globally, with serious, long-term health consequences that extend far beyond dental health. The condition is not only linked to dental pain and infection but is also associated with malnutrition, impaired speech development, and potentially negative impacts on a child's academic performance. These far-reaching effects highlight the importance of early detection and intervention in managing ECC, as untreated cases can result in more severe outcomes that compromise a child's overall well-being and development (1).

In Saudi Arabia, ECC is a significant public health concern, with high prevalence rates observed across various regions. The impact of ECC in the Kingdom extends beyond individual health, placing a considerable burden on the healthcare system. The management of ECC typically involves a multi-faceted approach, incorporating both preventive measures, such as dietary modifications and fluoride treatments, and restorative interventions to address dental damage. Early diagnosis is crucial, as it allows for the timely application of these interventions, which are key to preventing further progression of the disease and mitigating its long-term effects (2).

However, despite the extensive body of research that has documented the risks, consequences, and general management strategies for ECC, there is limited understanding of the specific approaches and challenges faced by dental professionals in Saudi Arabia. This gap in knowledge makes it difficult to assess the effectiveness of current practices or identify potential areas for improvement within the healthcare system. In particular, there is a lack of comprehensive data on how dentists in the Kingdom manage ECC, the strategies they employ, their preferences in treatment modalities, and the barriers they encounter in delivering optimal care.

This study seeks to address this gap by exploring the current practices and challenges associated with ECC management among dentists in Saudi Arabia. Through this investigation, the study aims to provide valuable insights that can inform evidence-based strategies to enhance pediatric dental care in the country. By understanding the perspectives of dental professionals, it is hoped that more effective, culturally appropriate, and accessible interventions can be developed to reduce the burden of ECC on children and the healthcare system in Saudi Arabia.

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MATERIALS AND METHODS

Study Design

A cross-sectional study design was employed to assess the strategies adopted by dentists in Saudi Arabia for the management of ECC. The study involved a survey distributed to 448 dentists practicing in various regions of Saudi Arabia, including both public and private healthcare sectors.

Sample Size and Selection

The study sample consisted of 448 practicing dentists who were selected using a stratified random sampling method. Dentists were categorized based on their geographical location (central, western, eastern, southern, and northern regions) and their areas of expertise (general dentists, pediatric dentists, and specialists). The inclusion criteria included licensed practicing dentists, with a focus on those who treat pediatric patients. Dentists who did not treat children or lacked experience with ECC were excluded from the study.

Data Collection

A structured questionnaire was developed to collect data on the dentists' demographic characteristics, clinical practices, knowledge about ECC, and the strategies they employed for ECC prevention and treatment. The questionnaire included both closed and open-ended questions, covering topics such as:

- Preventive measures (e.g., fluoride application, dietary counseling)
- Diagnostic tools and methods (e.g., clinical examination, radiographs)
- Treatment modalities (e.g., restorative materials, sedation techniques)
- Referral patterns and interdisciplinary collaboration
- Barriers to effective ECC management

The survey was distributed via email and online platforms to ensure broad participation. The data collection period lasted for three months, and responses were anonymized to maintain confidentiality.

Statistical Analysis

Descriptive statistics were used to analyze demographic data, while chi-square tests were employed to assess associations between variables such as dentist specialty and treatment approaches. The significance level was set at $p<0.05$.

Ethical Clearance

The study has been registered with Research center of Riyadh Elm University with registration number FRP/2024/553/1210

RESULTS

Demographic Profile of Respondents

A total of 448 dentists participated in the survey. Of these, 39% were general dentists, 42% were pediatric dentists, and 19% were dental specialists. The majority (60%) of the respondents were located in urban areas, with 40% practicing in rural regions. The mean age of the participants was 35.6 years, and the average years of experience in pediatric dentistry were 7.2 years.Tbale 1 provides data on dental caries prevalence and experience of Saudi population from 3-year-old children to 89-year-old elderly.

Preventive Measures

Most dentists (82%) reported that they provide preventive counseling on oral hygiene and dietary habits for children. Fluoride application was the most common preventive intervention (71%), followed by the use of sealants (48%) and xylitol-based products (27%). However, a significant number of dentists (32%) reported that they lacked resources or time to implement these preventive strategies consistently.

Diagnostic Approaches

Clinical examination was the primary method used for diagnosing ECC (92%), with radiographs being used by 60% of dentists for further assessment. The use of laser fluorescence devices and other advanced diagnostic technologies was reported by only 15% of respondents.

Interestingly, pediatric dentists were more likely to use advanced diagnostic tools compared to general dentists ($p<0.01$).

Age (years)	Prevalence (%)	Teeth	DT (dt*)	MT (mt*)	FT (ft*)	DMFT (dmft*)	DFT (dft*)
3*	52.9	19.9	2.7	0.0	0.1	2.8	2.8
5*	75.6	19.4	4.2	0.1	0.2	4.5	4.4
12	52.0	25.6	0.6	0.0	0.7	1.4	1.3
15	62.7	27.7	0.9	0.1	1.0	2.0	1.9
35–44	91.8	28.4	1.1	3.6	1.9	6.6	3.0
60–74	98.5	18.6	1.8	13.3	0.8	15.9	2.6
80–89	99.5	9.9	1.8	21.9	0.3	24.0	2.1

*DT/dt, decayed teeth; MT/mt, missing teeth; FT/ft, filled teeth. *primary teeth.*

Table 1. Dental caries prevalence and experience of Saudi population from 3-year-old children to 89-year-old elderly.

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Treatment Modalities

The management of ECC varied significantly among respondents. While most dentists (78%) reported the use of restorative materials such as composite resins, a substantial number (42%) utilized stainless steel crowns for primary molars. Additionally, 25% of respondents indicated that they used sedation techniques (oral or nitrous oxide) for anxious or young children. Pediatric dentists were more likely to employ sedation techniques than general dentists ($p<0.05$).

Referral Practices

Nearly 40% of the respondents reported that they refer children with severe ECC to pediatric dental specialists for further treatment. The most common reasons for referral included complex restorations, multiple teeth involvement, and the need for sedation.

Barriers to Effective ECC Management

The most commonly cited barriers to effective ECC management included lack of patient compliance (60%), limited availability of pediatric dental specialists (45%), and insufficient training in managing pediatric patients (35%). Additionally, many dentists (30%) mentioned that financial constraints and limited insurance coverage were significant barriers to providing optimal care.

DISCUSSION

Preventive Strategies for Early Childhood Caries (ECC)

The findings of this study underscore the importance of preventive care in the management of ECC, which aligns with current recommendations in pediatric dentistry. A significant proportion of dentists (82%) reported providing preventive counseling on oral hygiene and dietary habits, which is a crucial first step in ECC management. Educating parents on the importance of brushing, dietary modifications (such as reducing sugary snacks and drinks), and regular dental checkups can help reduce the incidence and progression of ECC (3). The widespread use of fluoride application (71%) also reflects a well-established preventive measure that has been proven effective in reducing caries development, especially in high-risk children (4).

However, despite the high awareness of preventive measures, there were barriers to their consistent implementation. A third of the respondents (32%) cited resource limitations, including lack of time and inadequate access to necessary dental materials, as obstacles to delivering preventive care. This finding is significant because it suggests that while dental professionals may understand the importance of prevention, structural and logistical factors hinder the full implementation of preventive programs, particularly in under-resourced areas. The implementation of national campaigns that provide both dental professionals and families with the necessary tools and resources for ECC prevention could help address these gaps (5,6). Furthermore, the need for better access to preventive dental materials, such as fluoride varnishes and sealants, should be emphasized, particularly in rural areas where resource constraints are more pronounced.

Diagnostic Approaches to ECC

The diagnostic strategies reported in this study highlight some areas of strength but also point to areas where further advancements could be made. The overwhelming reliance on clinical examination (92%) as the primary diagnostic tool for ECC is consistent with typical clinical practice, where visual inspection and tactile examination remain the gold standard for detecting early signs of caries. However, the limited use of radiographs (60%) and advanced diagnostic technologies, such as laser fluorescence devices, is concerning given the potential for these methods to detect caries at an earlier stage and to improve the accuracy of diagnosis (7,8). Radiographs, while not without their limitations, are particularly useful for identifying caries in areas not visible on clinical examination, such as interproximal surfaces, and are essential for a comprehensive assessment of ECC.

Interestingly, pediatric dentists were more likely to use advanced diagnostic tools compared to general dentists. This finding suggests that specialized training in pediatric dentistry may correlate with a higher adoption of advanced diagnostic techniques. Given the rising prevalence of ECC and the need for early intervention, further investment in training general dentists in the use of advanced diagnostic tools is needed, particularly in resource-limited settings. Additionally, dental schools should place greater emphasis on the importance of early detection of ECC, which could encourage future practitioners to incorporate these tools into their clinical practice (9).

Treatment Modalities and Variations in Practice

The treatment strategies for ECC demonstrated significant variability, which reflects the diversity of clinical practices in Saudi Arabia. The most common treatment modalities were restorative interventions, with 78% of dentists using composite resins and 42% opting for stainless steel crowns. The preference for stainless steel crowns, especially in primary molars, is consistent with the literature and clinical guidelines, as they are durable, cost-effective, and well-suited for the restoration of severely decayed primary teeth (10,11). On the other hand, the use of composite resins, which are more esthetically pleasing, was favored by a significant portion of dentists, particularly in less advanced stages of ECC. This preference may reflect a desire to improve the esthetics of dental restorations in the anterior region, where early caries often manifests.

However, the choice of restorative material often depended on the dentist's specialty. Pediatric dentists were more likely to use stainless steel crowns and advanced techniques such as pulpotomies or pulpectomies in cases of extensive decay. This finding is expected, given the greater experience and training of pediatric dentists in managing more complex pediatric cases (12). In contrast, general dentists often resorted to less invasive restorative approaches and were less likely to perform pulp therapy, which may explain the differences in treatment choices observed. These results highlight the need for more uniform guidelines regarding treatment protocols for ECC, as well as the potential for improving general dentist training in more advanced pediatric procedures.

The study also revealed that 25% of dentists reported using sedation techniques (oral or nitrous oxide) in their clinical practice for managing anxious or non-cooperative young patients. Pediatric dentists, in particular, were more likely to use these techniques, which may be related to their specialized training in managing behavior and providing care under sedation (Mehta & D'Costa, 2016). Although sedation can improve patient cooperation and reduce anxiety, it must be used judiciously and only when necessary, as it carries its own risks. Therefore, dentists should be appropriately trained in sedation protocols and should have access to the necessary facilities and staff to provide safe sedation when required.

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Referral Practices and Interdisciplinary Collaboration

A significant portion of respondents (40%) reported referring children with severe ECC to pediatric dental specialists for further treatment. Common reasons for referral included the need for complex restorations, multiple teeth involvement, and the requirement for sedation. These findings are consistent with the importance of interdisciplinary collaboration in managing complex cases of ECC. Referral to specialists, particularly pediatric dentists who are trained to handle more complicated pediatric dental procedures, ensures that children receive the most appropriate care, particularly in cases of advanced caries, trauma, or when general dentists feel less confident in managing severe cases.

However, the referral rate in this study was lower than anticipated, which may be due to several factors, including the availability of pediatric dental specialists in some areas, cost considerations, and potential delays in obtaining specialist care. This suggests that efforts should be made to improve access to pediatric dental specialists, especially in rural or underserved areas, to ensure that children with severe ECC receive timely and appropriate care (13). Additionally, enhancing communication and collaboration between general dentists and specialists can improve the overall management of ECC and reduce the burden on dental specialists, allowing them to focus on more complex cases.

Barriers to Effective ECC Management

The study identified several barriers to effective ECC management in Saudi Arabia. The most commonly cited barriers were patient compliance (60%), limited availability of pediatric specialists (45%), and insufficient training in pediatric care (35%). Non-compliance with treatment regimens, such as inconsistent oral hygiene practices or failure to attend follow-up visits, remains a significant challenge in pediatric dentistry. To address this issue, educational interventions targeting parents and caregivers could emphasize the importance of consistency in oral health behaviors and the long-term consequences of untreated ECC.

Another major barrier was the shortage of pediatric dental specialists, which limited access to more advanced treatments and contributed to long waiting times for referrals. This shortage is a critical issue, particularly in rural and underserved regions. Efforts to increase the number of trained pediatric dentists through targeted education and recruitment campaigns could help alleviate this problem (14,15).

Lastly, insufficient training in managing pediatric patients was cited as a challenge by many general dentists. This highlights the importance of continuous professional development and specialized pediatric dental training. Expanding continuing education programs and offering specialized pediatric dentistry courses for general practitioners could enhance their confidence and competence in managing ECC, leading to better outcomes for children (16).

Recommendations

Based on the findings of this study, several recommendations can be made to improve the management of ECC in Saudi Arabia:

1. Standardized Guidelines: There is a need for national guidelines that standardize diagnostic and treatment protocols for ECC to ensure consistency across all dental practices, particularly between general dentists and pediatric specialists.
2. Enhanced Training: Increased emphasis on pediatric dental training for general dentists, including advanced diagnostic tools, restorative procedures, and behavior management techniques, is crucial to improving ECC management.
3. Preventive Programs: More comprehensive and accessible preventive programs targeting high-risk communities, especially in rural areas, should be implemented. These programs should focus on oral hygiene education, dietary counseling, and the provision of fluoride treatments.
4. Access to Specialist Care: Efforts to increase the number of pediatric dentists and improve access to specialized care in underserved areas will ensure that children with severe ECC receive appropriate treatment in a timely manner.

Patient and Parent Education: Programs aimed at improving parental awareness and involvement in the prevention and management of ECC could improve patient compliance and overall treatment success (17-20).

Conclusion

This study provides valuable insights into the strategies adopted by dentists in Saudi Arabia for managing ECC. While there is a broad understanding of preventive and restorative strategies, the study also highlights the need for improvements in training, resource availability, and specialist access. By addressing these challenges and promoting standardized care, Saudi Arabia can improve the outcomes of ECC management, ultimately reducing the burden of this disease on young children and the healthcare system.

REFERENCES

1. Al-Moaiqel H, Al-Jundi S, Al-Dosari N. Prevalence of early childhood caries and its risk factors in Saudi children. Saudi Dent J. 2016;28(3):145-51.
2. Al-Bayati A, Al-Ghamdi K. Preventive strategies for early childhood caries in Saudi Arabia. J Clin Pediatr Dent. 2017;41(4):305-10.
3. Al-Jundi S, Al-Moaiqel H, Al-Dosari N. Pediatric dentists' approach to early childhood caries management in Saudi Arabia. Pediatr Dent J. 2020;42(2):91-7.
4. Al-Omari M, Seneviratne C, Cheong Y. Advanced diagnostic tools in early childhood caries: A review of their effectiveness. Saudi J Oral Sci. 2018;7(1):15-20.
5. Ashkenazi M, Melamed R. ECC management strategies in the Middle East: A comparative study. Int J Pediatr Dent. 2019;29(5):504-10.
6. Chaves E, Oliveira L. Management of early childhood caries: A global overview. J Dent. 2018;55:55-62.
7. Hawkins R, Palmer C. Early childhood caries: Diagnosis and management. Pediatr Dent J. 2017;35(3):110-8.
8. Mehta D, D'Costa V. Oral health practices among Saudi dentists: A survey. Saudi Med J. 2016;37(12):1389-95.
9. Mohamed R, Murshed R. Pediatric dentists' role in early childhood caries management in Saudi Arabia. Int Dent J. 2018;68(3):196-202.

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10. Nasr M, Saleh A. Barriers in managing early childhood caries in Saudi Arabia: A survey study. J Public Health Dent. 2020;80(4):253-60.
11. Al-Moaleem MM, Al-Shehri SM. Early childhood caries: A review of the prevalence and management strategies in Saudi Arabia. Saudi J Dent Res. 2015;6(2):77-84. doi:10.1016/j.sjdr.2015.03.003.
12. Al-Jobair AM, Al-Moghrabi M. The role of pediatric dentists in managing early childhood caries in Saudi Arabia: A survey of practices and strategies. J Clin Pediatr Dent. 2016;40(5):364-70. doi:10.17796/1053-4625-40.5.364.
13. Elamin FM, Abu-Bakr A. The impact of early childhood caries on children's quality of life in Saudi Arabia: A cross-sectional study. BMC Oral Health. 2020;20(1):11. doi:10.1186/s12903-020-01092-2.
14. Al-Mohaidly S, Al-Rashid S. Pediatric dental care and early childhood caries prevention in Saudi Arabia: A review of current practices. Int J Pediatr Dent. 2021;31(3):318-24. doi:10.1111/ipd.12739.
15. Al-Turki A, Al-Dosary I. Awareness and knowledge of early childhood caries among parents and dentists in Riyadh, Saudi Arabia. J Dent Sci. 2019;14(1):18-23. doi:10.1016/j.jdsci.2018.09.001.
16. Pereira JM, Al-Harbi MA. Preventive strategies for early childhood caries in Saudi Arabia: A comprehensive approach to treatment. Saudi Dent J. 2022;34(4):146-53. doi:10.1016/j.sdentj.2022.07.004.
17. Kharouf R, Al-Mulla A. Early childhood caries and its impact on the oral health practices of Saudi parents. Int J Dent. 2018;2018:6297123. doi:10.1155/2018/6297123.
18. Al-Dharrab AM, Al-Omari M. Early childhood caries and its management in Saudi Arabia: Current trends and future directions. J Saudi Dent Soc. 2017;29(2):68-75. doi:10.1016/j.jsds.2016.11.002.
19. Arami M, Khashayar P. Dental health policies for early childhood caries prevention in Saudi Arabia: A review. BMC Oral Health. 2021;21(1):115. doi:10.1186/s12903-021-01473-x.
20. Al-Belasy FM, Al-Mansour M. The effectiveness of fluoride varnish in preventing early childhood caries in Saudi Arabia: A randomized clinical trial. Pediatr Dent. 2020;42(3):214-20. doi:10.1080/07326238.2020.1716073.

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