



Mapping of Systematic Review Pertaining to Pediatric Dentistry in Cochrane Library

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Abstract

The objective of the study is to identify all the systematic reviews of pediatric dentistry and oral health in the Cochrane database and highlight knowledge and knowledge gaps in various areas of pediatric dentistry. A systematic search was conducted in the Cochrane database by browsing the review by topic. Out of 2680 Cochrane reviews on child health, 91 reviews on child health and dentistry were included. These 91 reviews were thoroughly assessed, and details were documented in an Excel sheet. The number of research has substantially increased over the year from 2002 to 2020. The most researched area was "Dental Caries," involving 38 reviews, and the highest number of researches was 62, which were carried out in the UK. A total of 9 articles were withdrawn, and 5 were empty reviews. There still exists a knowledge gap in many areas of pediatric dentistry, which needs good quality research to be conducted to bridge the gap.

Keywords: Cochrane, knowledge gap, oral health, pediatric dentistry

Introduction

The Cochrane Library is a series of databases containing various high-quality, unbiased evidence to guide health-care decision-making. This library is owned by Cochrane, a non-profitable organization and published by Wiley. It consists of three databases, namely Cochrane Database of Systematic Reviews (CDSR), Cochrane Central Register of Controlled Trials (CENTRAL), and Cochrane Clinical Answers (CCAs) (Cochrane Library). For efficient and timely production of high-quality systematic reviews, the Cochrane groups have been organized into eight Cochrane networks since 2018.[1]

CDSR includes all Cochrane reviews that the Cochrane review group prepares. Each Cochrane Review is a peer-

reviewed systematic review and is the leading resource for systematic reviews in health care. They are further subdivided into five categories: Intervention review, Diagnostic test accuracy review, Methodology review, Qualitative review, and Prognosis review.[1]

A widely centralized database of records of randomized and quasi-randomized clinical trials is the Cochrane National Registry of Controlled Trials (CENTRAL).[1]

CCAs provide Cochrane Reviews with a readable, digestible, clinically focused entry point for comprehensive analysis (Cochrane Library).

Furthermore, three supplementary databases are found for selecting any topic: Cochrane protocol, editorial, and unique collection. Besides that, it also has three

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external databases: Epistemonikos, Health system evidence, and Social system evidence.[1]

Dentistry based on evidence is recognized as a significant contributor to the highest standard of treatment. The Cochrane Database of Systematic Reviews, available in the Cochrane Library, is a valuable and acceptable source of high-quality systematic reviews on dentistry and oral health topics. Dentistry and oral health are categorized into twenty-six sub-topics.

An ongoing need for high-quality research to decrease the proportion of inconclusive data is mainly in the pediatric population. Therefore, this paper was conducted to classify all existing systematic reviews of pediatric dentistry and oral health pertinent to the Cochrane Library.

Methods

A systematic search of the Cochrane database was conducted, including all articles related to Pediatric Dentistry and Oral Health Sections.

Search method

Two authors independently and in duplicate screened all full-text reports. In case of disagreements, it was solved with consensus by a third author. In our study, we chose to browse the reviews by topic. An alternate method to browse systematic reviews in the Cochrane Library can be by browsing the Cochrane review group. The reviews have been divided into thirty-seven topics. One of the enlisted topics was "Child Health." A total of 2680 Cochrane Reviews matching Child Health in "Cochrane Topic" were found. Under "child health," we searched the sub-heading "Dentistry and oral health" and found 91 studies relating to child health and dentistry, as shown in Figure 1. The last database search was conducted on December 15, 2020, yielded the same results.

Criteria for including systematic review

Systematic reviews mentioning the participants as "children" or "adolescents" were included in the study. If this needed to be clarified, full-text data of selected articles were examined, and the age of participants listed as up to 18 years was only included.

Extraction of data

The final set of 91 articles was thoroughly assessed, and for each selected systematic review, the following information was extracted:

The Title, Name of the author, Country according to the affiliation of all the participating authors,

Population, Intervention, Comparison, Outcome, Year of publication, and Number of included articles were documented in an Excel sheet.

Results

The present quest found that research in the years 2015–2020 has doubled compared to the research carried out between the years 2009 and 2014 as described in Figure 2.

The author's countries where the research had taken place are tabulated in Table 1. As per our study, we inferred that maximum research had taken place in the United Kingdom, according to the affiliation of every author who had participated in the research work.

We recorded that most of the publication was on dental caries followed by craniofacial anomalies, as depicted in Figure 3. If any articles were related to two topics, they were included under both topics.

Systematic reviews are generally regarded as "empty reviews" that find no research suitable for inclusion. Five reviews were empty reviews of the ninety-one reviews considered in the present study, as shown in Table 2.

We found that nine articles have been withdrawn on further inspecting the dataset, as demonstrated in Table 3. When we searched the reason for withdrawing the articles, we found that the most common reason cited was "being out of date."

Cochrane protocol and clinical answer comprised twelve articles and forty-two articles on child oral health. Cochrane protocol, editorial, and the unique collection did not contain any articles related to child and oral health.

Discussion

The Cochrane database provides a significant source of systematic reviews about different specialties updated periodically.[2] Pediatric dentistry constitutes around 43% of the total dentistry-related systematic review in the Cochrane database, making it one of the most highly researched domains.

Field of study

Among the various subsets in pediatric dentistry, we deduced in our present study that maximum systematic reviews were related to dental caries followed by craniofacial anomalies and then oral and maxillofacial surgery (Fig. 3). Our finding is in accordance with the study done by Smaïl-Faugeron et al[3].

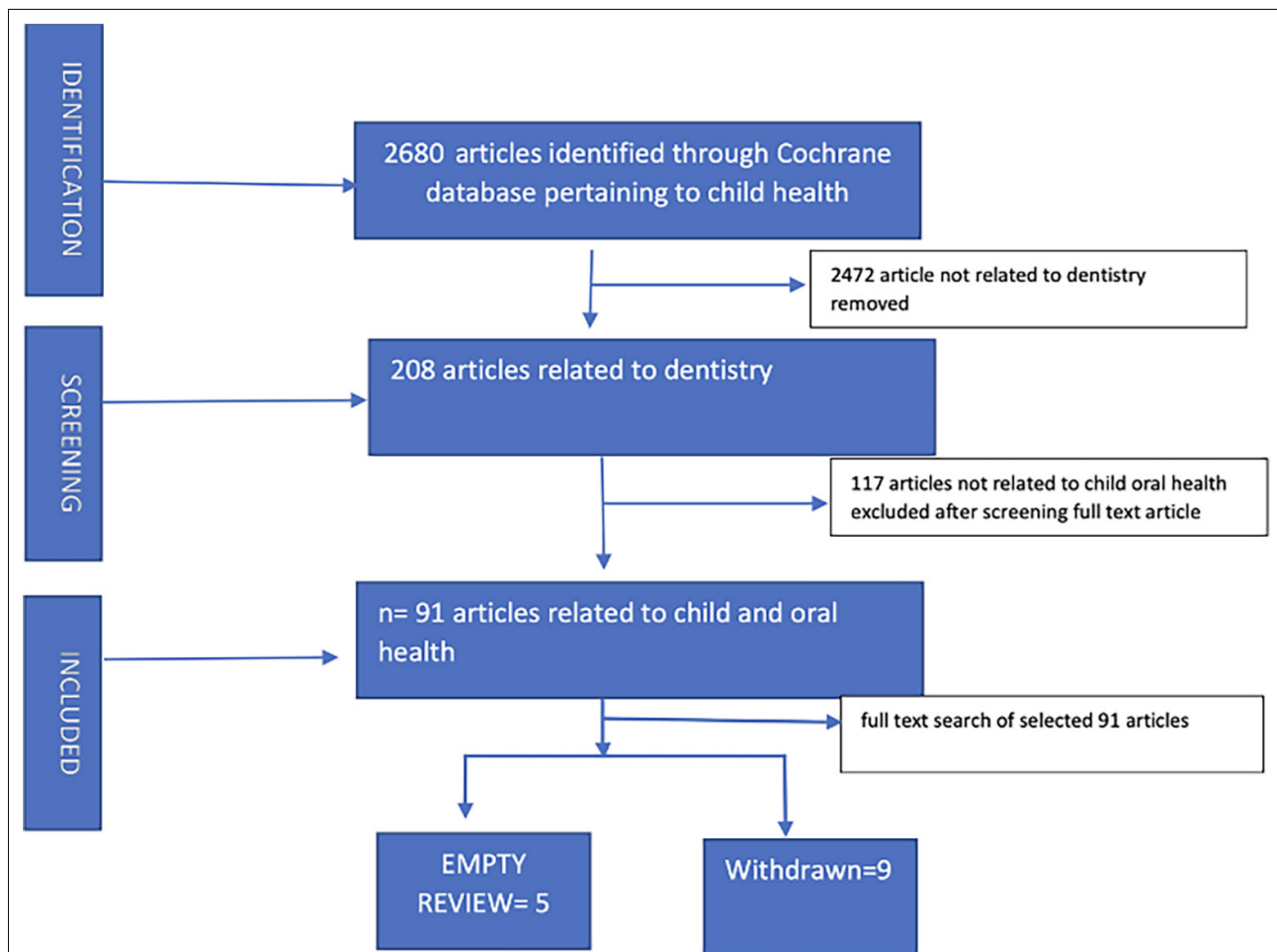


Figure 1. Search strategy

Search strategy used in the research. Final set of 91 articles related to pediatric dentistry was thoroughly searched

The high prevalence of early childhood caries among young children worldwide significantly affects children’s well-being and society’s costs. The first signs of caries are caused by tooth demineralization, which is aided by organic acids produced by bacterial fermentation of dietary substrates, mainly carbohydrates. *Streptococcus mutans*, which ferments carbohydrates in the diet, is thought to be the primary microbe implicated in the onset of carious lesion in children.[4,5] ECC consequentially increases the risk of new carious lesions, acute and chronic pain, hospitalizations and emergency referrals, delays in growth and development, and diminished quality of life.[6] This could be the probable reason for an increase in the number of research being done on dental caries. We also recorded that out of the total 38 reviews on dental caries, stressed on the prevention of caries. To reduce the risk of developing ECC, the American Academy of Pediatric Dentistry promotes professional and at-home preven-

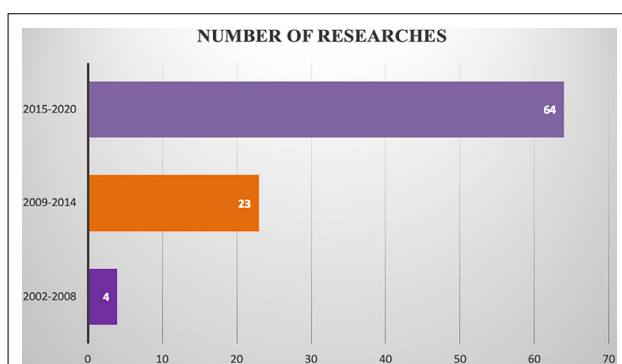


Figure 2. Number of researches conducted

During year 2002-2008, total number of research conducted was 4; in 2009-2014, it was 23; and between 2015 and 2020, it was 64

tive measures that provide evidence-based prevention of ECC, such as establishing dental homes, modifying diets, implementing early oral hygiene measures, fluoride therapy, collaborating with medical providers to ensure all infants are screened, raising awareness, and

Table 1. The affiliation of the author. UK having the highest number followed by China and Brazil

S. no	Country	Number
1	UK	62
2	China	9
3	Brazil	8
4	Switzerland	7
5	Malaysia	7
6	USA	6
7	India	5
8	Bahrain	5
9	Ireland	5
10	Australia	5

advocating for reimbursement systems to ensure access to care for all.[7] Around 15 of the articles emphasized the role of fluoride in the prevention of dental caries as various literature has already proved that fluoride plays an inevitable role in increasing the rate and magnitude of remineralization of initial carious lesions. The mode of action of fluoride can either be systemically or topically. Furthermore, topical fluoride can be applied by a dental professional or self-applied.[8]

Craniofacial abnormalities consisting of around twenty-one papers were the second most researched field. Most of the articles focused on managing skeletal and dental

discrepancies in various kinds of malocclusion using orthodontic, orthopedic, or fixed therapy. Accelerated tooth movement using surgical or non-surgical interventions was discussed in two articles. The most explored area within craniofacial abnormalities was about cleft lip and palate. The major congenital malformation of the craniofacial region is the cleft lip and palate.[9] Reconstruction of cleft lip and palate patients is challenging, and multiple treatment modalities have been sought to achieve cosmetic outcomes.[10]

Oral and maxillofacial surgery is the specialty of dentistry which includes the diagnosis, surgical, and adjunctive treatment of diseases, injuries, and defects involving both the functional and esthetic aspects of the hard and soft tissues of the oral and maxillofacial region according to the definition given by American Dental Association (2016).[11] A total of eleven articles were related to pediatric oral and maxillofacial surgery. The central focus of the research was to control oral bleeding post-surgery or in immunocompromised patients. The present study inferred that out of eleven articles, three articles were regarding the same topic.

Empty review and knowledge gap

A systematic review could also be “empty” when it focuses on an area of science that has not been adequately studied or if the questions are exact.[12] We have found in our analysis that there were five empty

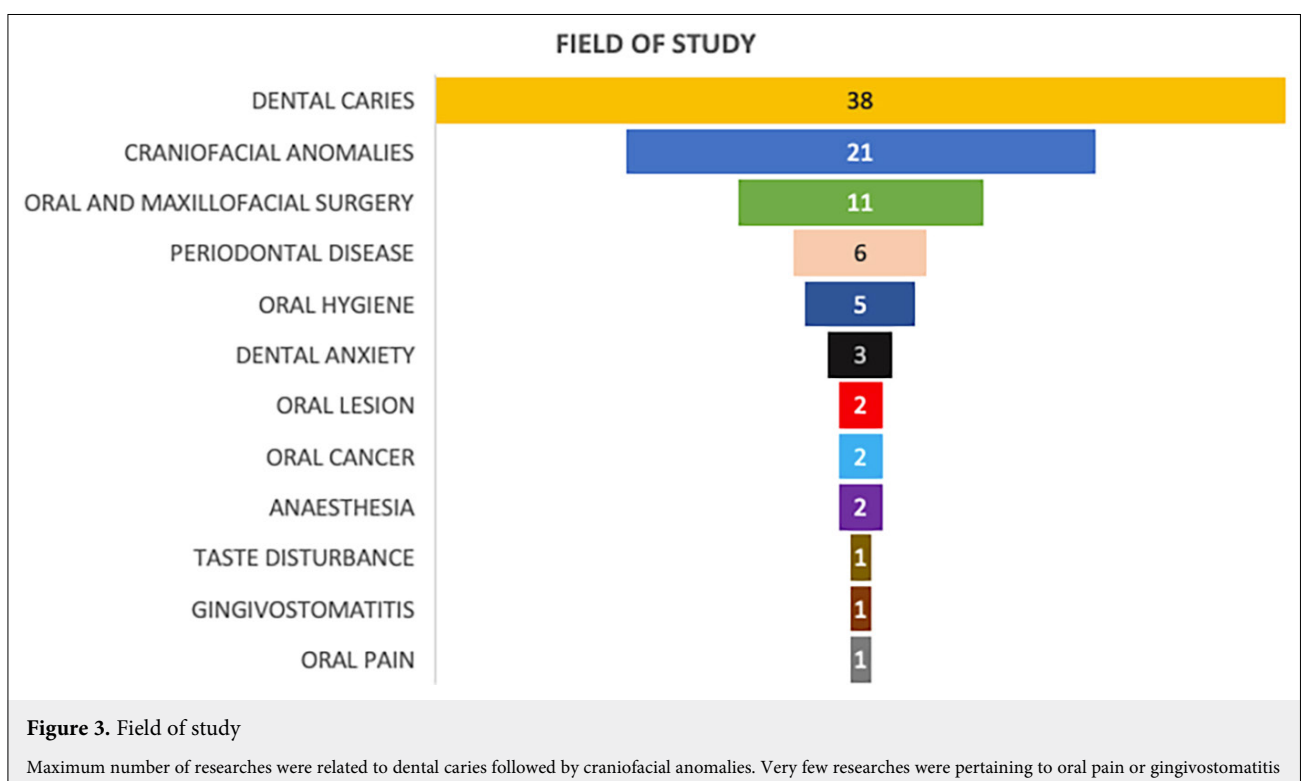


Table 2. List of systematic review listed as empty review

S. no	Empty review	Date
1	Interventions for treating post-extraction bleeding	March 04, 2018
2	Orthodontic treatment for deep bite and retroclined upper front teeth in children	February 01, 2018
3	Interventions for treating traumatized ankylosed permanent front teeth	December 16, 2015
4	Antibacterial agents in composite restorations for the prevention of dental caries	December 17, 2013
5	Interventions for the restorative care of amelogenesis imperfecta in children and adolescents	June 16, 2013

*Details of the five empty review are tabulated in Table 2

Table 3. Withdrawn article

S. no	Article	Date of withdrawn	Reason of withdrawal	Author's affiliation
1	Operative caries management in adults and children	July 24, 2019	Out of date	UK
2	Interventions for replacing missing teeth: Partially absent dentition	July 17, 2019	Out of date	USA, UK
3	Interdental brushing for the prevention and control of periodontal diseases and dental caries in adults	April 24, 2019	Supersede and updated by new review	Croatia Canada UK
4	Ozone therapy for the treatment of dental caries	February 7, 2019	Out of date Low usage and impact	UK
5	Extraction of primary (baby) teeth for unerupted palatally displaced permanent canine teeth in children	March 8, 2018	Replaced, expanded new review published	UK
6	Hypnosis for children undergoing dental treatment	June 20, 2017	Being updated and replaced	Oman UK
7	Dental fillings for the treatment of caries in the primary dentition	October 17, 2016	Updated and being superseded	South Africa
8	Acyclovir for treating primary herpetic gingivostomatitis	January 19, 2016	Out of date Does not meet Cochrane methodological standard	UK Bahrain UK
9	Interventions for the management of submucous cleft palate	January 19, 2016	Out of date Does not meet Cochrane methodological standard	UK Bahrain UK

*Name, date of withdrawal, reason of withdrawal, and author's affiliation are tabulated in Table 3

reviews according to Table 2. This highlights the knowledge gap and the need for further research. The results of our study were dissimilar to the study by Smail-Faugeron et al[3] as he had reported no empty review.

Period of research

In the past decade, scientific research in dentistry has grown exponentially. As per the present study, it can be seen that between 2002 and 2008, only four researches on child oral health were done, which has increased to sixty-four researches between the years 2015 and 2020. This implicates an increased awareness and inquisitiveness. However, supporting next-generation methodologies is a challenge for Cochrane since it requires flexibility in its production tools, standards, and policies to enable the usage and publication of various methodologies and review types while sustaining standards of consistency and quality assurance. To

strike a balance, Cochrane and the methods community must collaborate to facilitate the appraisal and adoption of innovative techniques.[13]

Affiliation of author

On analyzing the patterns, we found that the maximum number of papers were researched or authored in the United Kingdom followed by China and Brazil, as charted in Table 1. There is a significant difference in the number of papers being researched by the leading contributor, the United Kingdom, and the second most contributing Country, China, which is almost seven fold. The most likely explanation for this difference is that the United Kingdom is a highly industrialized country with substantial economic, political, scientific, and cultural influence. China and Brazil, on the other hand, are developing countries that have limited resources.

Withdrawn article

We found in the current analysis that nine out of ninety-one articles were withdrawn (Table 3). All the articles were withdrawn post-2015. The possible explanation for withdrawing these articles was that data needed to be updated and did not agree with the Cochrane methodological standard. Only some articles were removed on the pretext of being revised. In eight of the withdrawn paper, at least one of the authors was from the United Kingdom. One of the credible reasons for this could be that maximum number of papers were researched or authored in the United Kingdom.

Conclusion

The authors would like to conclude that there still exists a knowledge gap in many pediatric patients even though the number of research has substantially increased over the years. To bridge these gaps, new studies should primarily be conducted in that field where there is a dearth of knowledge such as oral pain, gingival diseases, and various types of oral lesions about children. Barring Brazil and China, most contributions are by developed countries. Hence, the developing nations should also be encouraged and aided to carry out the research work.

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Conflict of Interest: None declared.

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