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## RESEARCH ARTICLE

### Evaluation of Evidence-based Presentations in a Postgraduate Program at a U.S. Dental Institution: A Retrospective Study

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#### Abstract:

#### Objective:

The objective of this retrospective study was to appraise the level of evidence of presentations gathered from an electronic repository of an advanced postgraduate program in pediatric dentistry at a single U.S.-based dental institute.

#### Methods:

After the ethical approval was obtained, the presentations were assessed, and themes were identified. Using the cited references, the respective level of evidence was collected based on: the year of publication, reference source, choice of journal, journal impact factor, study design, altmetric score of the articles, and h-index of the authors. STATA version 15.1 (College Station, TX, USA) and Microsoft Excel software were used for statistical analysis.

#### Results and Discussion:

A sum of 690 references between the years 2015 to 2020 have been used in a total of 74 presentations. Presentations related to special health care needs accounted for 29.7% (n= 22) of the total presentations; followed by oral diagnosis/pathology/medicine (n= 17; 23%). The median number of references used in each presentation was eight, and the most common study design was unfiltered. The median number of the first author's h-index was 25, and the median number of the altmetric score was four.

#### Conclusion:

This study appraised the level of evidence used in resident presentations in a postgraduate program in pediatric dentistry at a U.S. dental institute. The findings of this study could provide useful data to postgraduate program directors who wish to address the level of evidence used in their programs. Additionally, by using the altmetric scores and h-indexes presented in this study, future studies can compare the level of evidence between similar academic institutions or programs.

**Keywords:** Pediatric dentistry, Dental schools, Evidence-based dentistry, Dental education, Altmetric score.

#### Article History

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## 1. INTRODUCTION

Evidence-based dentistry has become the new standard in clinical dentistry [1]. Healthcare providers are identifying evidence-based answers to clinical questions on a regular basis and participating in evidence-based seminars and meetings [2]. The advanced postgraduate program in pediatric dentistry at the University of Maryland-Baltimore, School of Dentistry

(UMB-SOD) recognizes the importance of engaging postgraduate dental students in regular seminar presentations to discuss clinical cases. These seminars employ active learning techniques that place postgraduate dental students in “real-world” scenarios [3], improving their problem-solving abilities and critical thinking skills [4]. Experienced pediatric dentists join the seminars, facilitating one-to-one mentorship during the preparation of presentations and the application of basic and clinical sciences. These seminars are communication tools that allow participants to share knowledge and foster an informed

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clinical decision-making process [5, 6].

Typically, presentations prepared by the residents include not only clinical cases but also a review of relevant literature and evidence-based data. There are multiple benefits to these rich conversations, but little research exists to demonstrate a standardized format for following or improving the framework of these oral presentations [7]. A previous study has identified the framework of an excellent oral case presentation in an internal medicine clerkship [8]. Additionally, limited data are available on the level of evidence in these presentations. One previous study evaluated the level of evidence in seminar presentations presented by predoctoral dental students between the years of 2014 and 2016 at another dental school [9]. Another study appraised posters presented by pediatric dental residents at the American Academy of Pediatric Dentistry Annual Conferences between 2013 and 2016 [10]. However, the level of evidence in presentations presented by pediatric dental residents throughout their residency at a single institution has never been evaluated. Therefore, the level of evidence and its impact on the presentations of pediatric dental residents need further evaluation. The current postgraduate program in pediatric dentistry has a tradition of over 50 years of educating multiple generations of clinicians practicing successfully not only in the U.S. but other parts of the world. Designing and implementing an educational research study that assesses the knowledge presented by postgraduate dental students is significant for multiple reasons. The current outcomes can serve as a guide for other postgraduate programs in assessing the level of evidence at their programs. Furthermore, the method can be used as an educational framework that can be personalized to different programs and adapted with the evolution of new metrics and scores for assessments. Thus, the proposed research question is: "What is the level of evidence of the presentations compiled in the library of an advanced postgraduate program in pediatric dentistry at a U.S.-based dental institution?"

## 2. MATERIALS AND METHODS

Institutional ethical approval was received for this retrospective study design from the University of Maryland-Baltimore (UMB) (# HP-00095618). The presentations library of the advanced postgraduate program at UMB-SOD was accessed, and the presentations for each year were reviewed [11]. The inclusion criteria were as follows: presentations uploaded to the department repository between 2015-2020 and presentations compiled by pediatric dentistry residents as part of the Case Conference Seminar course. The exclusion criteria were as follows: presentations compiled by the residents in any other course, presentations provided by guest speakers or faculty members, and presentations from departments other than the pediatric dentistry department. All data were tabulated in an Excel spreadsheet to expedite data extraction.

The primary outcome of this study was to define the level of evidence in the presentations through the following parameters: the number of references used, reference details: year of publication, reference source, choice of journal, journal impact factor, study design, altmetric score of the articles, and the h-index of the first author. Additionally, citation-based and

article-based metrics for the references were used to evaluate the level of evidence. The first citation-based metric is the journal impact factor which is the number of citations per published article in a journal in a year. This metric traditionally determines the prestige of the journal [12]. The second citation-based metric is the author h-index, which measures the author's impact instead of the journal [13]. The author's h-index can be found on ResearchGate, Scopus, Google Scholar and Web of Science websites [14]. The article-based metric used was the altmetric score, which was developed to overcome the drawbacks of traditional impact metrics. Altmetric score quantifies the discussion of an article on blogs, podcasts, and social media platforms rather than simply the citation of an article. Such discussion allows a highly-disseminated article to be identified within a very short time after its publication [15].

The study's secondary outcome was to categorize the topics presented at the seminars using the American Board of Pediatric Dentistry's qualifying examination domains [16]. These domains are microbiology, prevention and anticipatory guidance, craniofacial growth and developing dentition and occlusion, restorative dentistry and oral rehabilitation, oral diagnosis/oral pathology/oral medicine, special health care needs, child development/behavior guidance, and pulp therapy/orofacial trauma. For the quantitative data, codes were assigned for each outcome, excluding the presentation topics. All electronic data was kept on a password-encrypted computer. The coding of the study design was based on dividing the evidence pyramid into filtered and unfiltered categories [17]. Filtered studies included evidence-based clinical practice guidelines, meta-analyses, and systematic reviews. Unfiltered studies included all the other studies in the evidence pyramid other than the filtered studies (randomized controlled trials, cohort studies: a prospective, retrospective, and case series). All the data was collected by one investigator (GB) and then reviewed for accuracy and consistency by a second investigator (TH). Disagreements, if any, were resolved during the data revision meetings.

Descriptive analyses were conducted to designate the frequency of the topics presented, stratified by the 8 domains contained in the American Board of Pediatric Dentistry examination, and to describe the references utilized in each presentation by calculating the median, minimum and maximum for each continuous variable. These continuous variables include the number of references used in each presentation, the h-index and the altmetric scores. The references were categorized according to the sources: textbooks, journals, websites, or posters. Years of publications for the references utilized were also recorded. All statistics were conducted using STATA version 15.1 (College Station, TX, USA) [18].

## 3. RESULTS

This retrospective study examined seventy-four presentations that integrated a total of 690 references. The median number for the references used in each presentation was 8 (25<sup>th</sup> - 75<sup>th</sup> IQR = 5-12). The median number of the first author's h-index was 25 (25<sup>th</sup> - 75<sup>th</sup> IQR = 15-46), while the median number of altmetric scores was 4 (25<sup>th</sup> - 75<sup>th</sup> IQR =

2-13). Table 1 represents the median, interquartile rate, minimum and maximum for the number of references used in each presentation, the first authors' h-index, and the references' altmetric scores.

Table 2 represents the number of presentations assessed each year, along with the number of references with and without a reported altmetric score and the number of references with and without an available h-index. Most of the references used had first authors with no reported h-index (n= 573; 83%) and with no reported altmetric score (n= 483; 70%).

Table 3 represents the frequency of sources used in each reference and the journals most often used in order of frequency, with each impact factor. Most of the references

were from journals (n= 569; 82.7%), while very few came from scientific posters and presentations (n= 10; 1.4%). Generally, the references used by the residents were from recent publications, with the majority published between 2010 and 2019 (Fig. 1). "Pediatric Dentistry Journal" was the origin of 82/690 references (11.88%), while 28/690 references (4.06%) came from the "Dental Traumatology" journal.

Table 4 presents the number of presentations assessed in this study by year and the frequency at which each domain was used in the presentations. Most of the presentations reported on the area of special health care needs (n= 22; 29.7%), followed by oral diagnosis/oral pathology/oral medicine (n= 23; 17%). Only one presentation was related to microbiology and restorative dentistry.

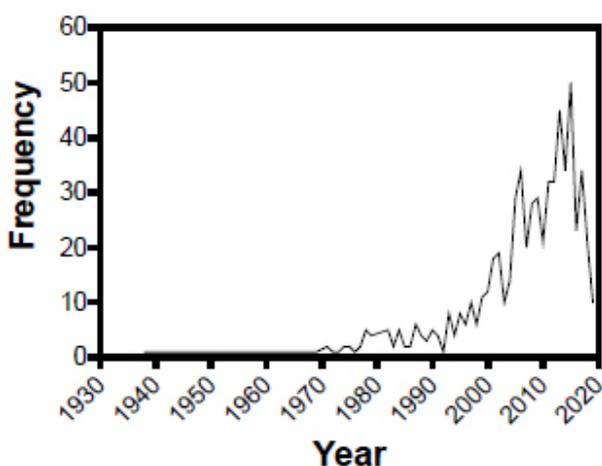


Fig. (1). Distribution of the publication years of the references used.

Table 1. Median, Interquartile rate, minimum and maximum for each variable measured.

Continuous Variable	Median	(25 <sup>th</sup> - 75 <sup>th</sup> IQR)	Minimum – Maximum
Number of References/ presentation	8	5 – 12	0 -27
H-index	25	15 – 46	0-172
Altmetric Score	4	2 – 13	1-2022

Table 2. Total number of references used collectively in each year as well as reference number with and without h-index and altmetric score.

Year of Presentation	Number of References (%)		
2015	93 (13.5)		
2016	98 (14.2)		
2017	70 (10.1)		
2018	143 (20.7)		
2019	85 (12.3)		
2020	201 (29.1)		
<b>Total</b>	<b>690 (100.0)</b>		
References Characteristics	With (%)	Without (%)	Total
H-index	117 (17)	573 (83)	690 (100.0)
Altmetric Score	207 (30)	483 (70)	690 (100.0)

**Table 3. Sources used in each reference along with the journals most often used in order of frequency, with each's impact factor.**

Source Type	Frequency (%)	
Journals	569 (82.7)	
Websites	54 (7.8)	
Books	47 (6.8)	
Presentations, courses or posters	10 (1.4)	
Unidentified (missing data)	10 (1.4)	
<b>Total</b>	<b>690 (100.0)</b>	
Journal Name with Each's Impact Factor	Number of times used	Impact Factor
Pediatric Dentistry	82	1.59
Dental Traumatology	28	1.53
Journal of the American Dental Association	18	2.8
Journal of Dental Research	16	4.91

Note: The Reference Manual of the American Academy of Pediatric Dentistry was used frequently by the residents.

**Table 4. Number of residency presentations collected by years and the frequency each domain was used in the presentations.**

Presentation Year	Frequency (%)
2015	11 (14.9)
2016	12 (16.2)
2017	10 (13.5)
2018	15 (20.3)
2019	9 (12.2)
2020	17 (23.0)
<b>Total</b>	<b>74 (100.0)</b>
Domains Contained in the ABPD Examination	Frequency (%)
Special health care needs	22 (29.7)
Oral diagnosis/oral pathology/oral medicine	17 (23)
Pulp therapy/orofacial trauma	12 (16.2)
Craniofacial growth and developing dentition and occlusion	6 (8.1)
Prevention and anticipatory guidance	6 (8.1)
Child development/behavior guidance	8 (10.8)
Other (residency personal experience)	1 (1.4)
Microbiology	1 (1.4)
Restorative dentistry and oral rehabilitation	1 (1.4)
<b>Total</b>	<b>74 (100.0)</b>

#### 4. DISCUSSION

This retrospective study reported on the level of evidence in the presentations compiled in the library of an advanced postgraduate program in pediatric dentistry at a U.S.-based dental institution. This study contributes valuable data to the current body of evidence, as clinical care in pediatric dentistry is established on an evidence-based platform [10]. This study determined that the average number of references used per presentation was eight. When residents use high-quality, reliable references in presentations, it fosters active learning through evidence-based clinical approaches, improving learning experiences and patient care outcomes.

Using citation-based metrics and Altmetric together can demonstrate the digital impact of a publication and the relevance of a scholarship [14]. In the current study, the first citation-based metric used was the journal impact factor. The

most cited journal was "Pediatric Dentistry Journal", the official publication of the American Academy of Pediatric Dentistry [19]. This indicates that the residents are aware of this publication's importance to the field of pediatric dentistry. One must consider that while integrating the impact factor of a journal grants benefits, it also imposes limitations. Journal impact factors are updated relatively slowly, are narrow, and are irreproducible [15]. The second citation-based metric used in this study was the authors' h-index. This index identifies experts that have published extensively in the field by integrating the authors' productivity (number of published articles) and their impact (number of citations). It is of note that the h-index can be influenced by self-citation and may recognize junior authors with fewer articles but with higher impact [15]. In addition, the h-index can play a significant part in faculty promotions, resource distribution, and prize granting.

Even in its limitations, integrating the h-index in this study is important, as this index correlates with academic rank in a variety of medical fields, including pediatric dentistry and craniofacial surgery [20, 21]. A previous study including full-time faculty members in the department of pediatric dentistry at accredited U.S. and Canadian residency programs reported that an h-index of  $\geq 3$  was identified as a threshold for a promotion from assistant professor to associate professor rank. Furthermore, for a promotion to the rank of professor, an h-index of  $\geq 6$  is recommended [20]. In addition, among other bibliometric measures used, the h-index has the strongest correlation with the academic rank [20].

The presentations included in this study covered various study designs and topics reported by the American Board of Pediatric Dentistry. When seeking similar research within the current literature, one study appraised posters presented by pediatric dental residents at the American Academy of Pediatric Dentistry Annual Conferences between 2013 and 2016 [10]. Most of the examined studies were cross-sectional and case reports [10]. In contrast to the current findings, most of the research poster topics were related to prevention, followed by caries, with other less common topics including syndromes, oral pathology, pulp therapy, and trauma [10]. Similar to the current study, "Pediatric Dentistry Journal" was cited most commonly in residents' publications [10].

While these findings are specific to one residency program, the results provide potential insight into the use of evidence in pediatric dentistry training programs. Program directors may consider assessing the distribution of presentation topics among different domains and the level of evidence used in their programs to take necessary steps to address disparities.

Considering the nature of this study, one should consider a potential limitation – missing data. The current study included only the presentations uploaded to the school repository. Some presentations may not have been uploaded, although according to the administrators of the program, the chances of this are minimal.

The current study represents an important step toward more meaningful integration of evidence-based dentistry in education and clinical practice. The findings of this study provide information to other educational institutes that could improve postgraduate programs and tailor them to fulfill residents' educational needs. Compared to other studies available, this study assesses the levels of evidence by integrating multiple variables and suggests ways to improve residents' presentations. Possible recommendations include establishing guidelines for presenting an evidence-based presentation and teaching residents how to appraise literature when searching their topics. Future studies may consider a prospective study design that invites residents to share criteria used in their reference selection. Another possible improvement could be to match references used in the presentations with the articles most used in the American Board of Pediatric Dentistry examination. Finally, using the altmetric scores and the h-indexes, future studies could compare the levels of evidence employed at various academic institutions.

## CONCLUSION

This retrospective study reported on the level of evidence in presentations compiled in the library of an advanced postgraduate program in pediatric dentistry at an U.S. based dental institution. This study highlights the components of evidence-based dentistry in these presentations, reporting on recently accessed articles, the type of journals selected, and the impact and dissemination of the evidence used. In addition, by categorizing the presentations' topics, one can further assess the residents' selection of the most interesting or common cases encountered in pediatric dentistry clinics. The study provides a suggested mechanism to evaluate residents' presentations and may guide postgraduate program directors in assessing the level of evidence used within their programs.

## ETHICAL STATEMENT

Institutional ethical approval was received for this retrospective study design from the University of Maryland-Baltimore (UMB) (# HP-00095618).

## CONSENT FOR PUBLICATION

Not applicable.

## AVAILABILITY OF DATA AND MATERIALS

The data supporting this study's findings are available from the corresponding author [G. B.] upon request.

## FUNDING

None.

## CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

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