Pediatrician Knowledge, Attitude and Practices on Children's Oral Health in a Tertiary Public Hospital in the Philippines: A Descriptive Study

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ABSTRACT

Background. Dental caries is a tolerated and overlooked chronic disease in the Philippines. The 2018 National Survey on Oral Health of the Department of Health found that 85.2% of Filipino children aged five years old have dental caries. Prevention and management of this disease can be established early with better collaborations between dental professionals and pediatricians who generally see children promptly in their well-baby check-ups.

Objective. The study aimed to evaluate pediatricians' knowledge, attitude, and practices on dental caries prevention among their child patients.

Method. A cross-sectional descriptive study was conducted in March 2017 among pediatricians working in a tertiary public hospital in Metro Manila through a self-administered questionnaire. The questionnaire gathered data on knowledge about dental caries prevention, attitude towards the importance of dental screening and oral hygiene instructions, and dental health practices.

Results. Among the 122 participants, 67.8% scored high in the oral health knowledge part, 85.0% revealed a positive attitude toward dental caries prevention, and many claimed that they frequently included dental caries risk assessment and preventive oral health education in their clinical practices.

Conclusion. Most pediatricians had high knowledge and a positive attitude toward dental caries prevention, although responses varied in the practice component. It will be valuable to continue improving the oral health proficiency of pediatricians to benefit early dental caries prevention in young patients.

Keywords: knowledge, attitude, practices, dental caries, pediatricians, Philippines

Paper was featured as an Oral Presentation in the Asia-Pacific Dental Convention on May 8, 2018, at the SMX Convention Center in Pasay City, Metro Manila, Philippines.

eISSN 2094-9278 (Online)
Published: July 27, 2023
https://doi.org/10.47895/amp.vi0.5323

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INTRODUCTION

Evidence is increasing that oral health has an important impact on systemic health. Dental caries do not directly cause disability or death but can weaken bodily defenses and lead to other more severe and potentially dangerous systemic diseases and infections. Serious conditions like heart disease, endocarditis, gastrointestinal diseases, and some ocular-skin-renal infections may be consequences of untreated dental caries. Aside from physical conditions, dental caries may significantly cause nutritional deficiencies that weaken the immune system, alter growth and development, disturb speech, and lead to detrimental effects on school/work performances, social interactions, income, and self-esteem. In the Philippines, toothache is a common ailment among

school children. It is the primary cause of absenteeism from school, placing a heavy burden on Filipino school children's[1] quality of life. Overall, five-year-old children have a higher prevalence of dental caries of primary dentition compared to twelve-year-old children (85.18% vs. 62.16%), more likely secondary to most of the 12-year-old's primary teeth have been lost/replaced, rather than due to better oral hygiene.[2]

The Department of Health classifies pediatric patients from 0 to below 19 years of age, but those under five years old have been identified as the vulnerable age group. Pediatricians can see child patients regularly in the first three years of life.[3] Part of the physical milestones expected in a child's first year is the eruption and development of the primary dentition. While dentists recommend that mouth cleaning be practiced by parents even before teeth come out, it is more possible for pediatricians to provide this essential educational information as part of their routine well-baby check-ups for the sake of a realistic preventive strategy against dental caries. It is a problem that a considerable number of parents are not aware of standard preventive procedures especially brushing from the eruption of the first tooth onwards.[4] With pediatricians being one of the first health professionals to examine children, they can deliver proper oral hygiene measures at the earliest age possible. Following the lead of the American Academy of Pediatrics in promoting the medical home, the concept of the dental home in 2002 presented guidelines for critical periods in a child's life for establishing preventive routines, periodic examinations, and interventions when indicated in a comprehensive, continuously accessible, coordinated, and family-centered way. Today, most pediatric health organizations recommend that physicians perform a caries risk assessment for children as early as six months and refer those at high risk and all children at age 12 months to a dental home.[5] The American Academy of Pediatrics (AAP) policy has been in line with the American Academy of Pediatric Dentistry (AAPD), in which both recommend a dental caries risk assessment in the first year of life and referral to a dental home by the first birthday should be done.[6] It is ideal for complying with the recommendation of securing a dental home for any child because it provides an opportunity for anticipatory guidance and the establishment of desirable oral health behaviors before disease occurs. However, numerous reports confirm that despite published professional association policies and recommendations, most children's first dental visits occur at an age older than one. Dye and colleagues cited a report that one-half of children ages two to five in the United States never had a dental visit.[7] As for the Philippines, there is no published information similar to the said report.

Dentists can work with pediatricians to assess the risks of dental caries and advise child patients and their parents on the proper prevention and intervention against dental caries. Screening for dental problems can also be conducted by pediatricians given adequate training. Moreover, pediatricians should refer their child patients with high risk for dental caries and help establish a dental home. For over a decade, there have been calls for pediatricians to address children's oral health. Still, incorporating oral health screening, referral, and oral healthcare in pediatric practice remains underdeveloped.[8] It is unclear, however, to what degree pediatricians are knowledgeable about preventive dental health and to what extent they may be actively participating in the prevention and assessment of oral health.[9] Thus, the study aimed to evaluate the knowledge, attitude, and practices of pediatricians on dental caries prevention among children with the following specific objectives: (1) to determine the knowledge of pediatricians on the transmission, progression, prevention, and risk factors of dental caries; (2) to determine the attitude of pediatricians on the importance of oral hygiene instructions and dental screening; and (3) to determine the self-reported practices of pediatricians on examining pediatric patients' teeth for signs of dental caries, assessing the potential for dental caries, including oral hygiene instructions, and use of fluoride.

MATERIALS AND METHODS

Study design and sample selection

The descriptive cross-sectional survey of pediatricians from the pediatric departments of the selected tertiary public hospital was conducted with the distribution of self-administered questionnaires during their department conferences held every Wednesday in March 2017. This tertiary public hospital's mission is to be an example of ideal health care delivery, and its vision commits to the health of the Filipino people. Participants' inclusion criteria are as follows: (1) licensed physician; and (2) employed resident, fellow, or active consultant of the selected tertiary public hospital dealing with pediatric patients during the research study. Pediatricians who were on leave during the conduct of the study were excluded.

Considering that there was positive feedback from the identified study population and sufficient time allotment for data gathering, the sampling technique involved the total enumeration of listed pediatricians from this tertiary public hospital situated within Metro Manila to obtain an accurate measure of the population on an excellent benchmark data. There were 64 residents (medical school graduates taking a 3-year pediatric residency course at the Department of Pediatrics, after which they become general pediatricians), 67 fellows (residency graduates/general pediatricians undergoing continued specialty training in the different subspecialties of pediatrics, after which they become subspecialists like pediatric cardiologists, pediatric pulmonologists, etc.) and 80 consultants (pediatric doctors who have completed all of their specialist training and have been placed on the specialist register at the tertiary public hospital), with a total of 211 pediatricians at the time of the study.

Data collection instrument

The four-page self-administered questionnaire was divided into three sections: knowledge of dental caries had

true or false responses; attitude towards dental screening and oral health instructions provided statements wherein respondents can agree or disagree; dental health practices were assessed by responding if they examine the child's teeth for signs of dental caries, consider the potential for developing caries, apply fluoride gel or varnish to children's teeth, and if they provide fluoride recommendations to parents/caregivers. The questionnaire was adapted from the studies of Di Guiseppe et al., Lewis et al., and Peedikayil et al.[9-11] Additionally, some questions were developed by the researchers based on McDonald and Avery[12] and the AAP guidelines.[13] The questionnaire form is featured in Figure 1.

Instructions: All fields should be answered completely as possible.
Age: ___ Sex: ___

I. Knowledge

Please put an (x) mark on the blank space to answer if the following statements are true, false, or uncertain.

1. Cavity-causing bacteria can be transmitted between mother and child.
   ___ True ___ False ___ Uncertain
2. Early childhood caries may be acquired from bottle-feeding.
   ___ True ___ False ___ Uncertain
3. Earliest clinical sign of dental caries that is seen is a white spot lesion. Eventually, this results in the formation of cavitation.
   ___ True ___ False ___ Uncertain
4. Child's teeth are susceptible to decay three days after eruption.
   ___ True ___ False ___ Uncertain
5. Flouride varnish is a concentrated topical flouride that is applied to the teeth by using a small brush and sets on contact with saliva.
   ___ True ___ False ___ Uncertain
6. The use of topically applied flouride has been widely researched as a way to reduce the risk of dental caries even with the absence of other treatment modalities.
   ___ True ___ False ___ Uncertain
7. Children with increased caries risk should receive a professional flouride treatment at least every six months.
   ___ True ___ False ___ Uncertain
8. Dental sealants are recommended for high caries risk children and sholud be applied by dentists as soon as the back teeth are sufficiently erupted to allow sealing.
   ___ True ___ False ___ Uncertain
9. Children who are in ned of special health care needs may be more susceptible to dental caries even if they are not pampered with cariogenic snacks and other unhealthy eating habits.
   ___ True ___ False ___ Uncertain

II. Attitude

Please put an (x) mark on the blank space to answer if you agree, disagree, or uncertain of the question/statement. You may specify your answer on the blank after the question.

1. Do you recommend that all children visit a pediatric dentist
   ___ Yes ___ No ___ Uncertain
   If yes, please specify the earliest recommended age (in months) of the patient that you will refer him/her to a pediatric dentist. _____
2. Do you think that looking at the children's teeth should be part of your medical check-up?
   ___ Yes ___ No ___ Uncertain Please elaborate (optional). _____
3. Do you think oral hygiene instructions should be part of your medical check-up?
   ___ Yes ___ No ___ Uncertain Please elaborate (optional). _____
4. It is a great benefit to children at high risk of caries and who may have limited access to dental care to undergo application of flouride varnish.
   ___ Yes ___ No ___ Uncertain Please elaborate (optional). _____

III. Practice

Please put an (x) mark on the blank space before your answer.

1. How frequently do you examine a child's teeth for sign of decay?
   ___ Always ___ Frequently ___ Sometimes ___ Rarely ___ Never
2. How frequent do you assess the potential for developing tooth decay?
   ___ Always ___ Frequently ___ Sometimes ___ Rarely ___ Never
3. Do you apply topical flouride gel/varnish to children's teeth?
   ___ Always ___ Frequently ___ Sometimes ___ Rarely ___ Never
4. Do you prescribe dietary flouride supplementation to children?
   ___ Always ___ Frequently ___ Sometimes ___ Rarely ___ Never
5. Do you educate families about preventive oral health?
   ___ Always ___ Frequently ___ Sometimes ___ Rarely ___ Never

Please place the survey questionnaire inside the envelope, seal properly and drop the envelope inside the box provided.

Figure 1. Data collection instrument form.

Data management and analyses

Descriptive statistics included univariate analyses of responses using frequency and percentages for the closed-ended questions. The normality test assessed the data distribution, prompting a 50th percentile cut-off to distinguish participants with high or low knowledge. Data from elaborating answers to the attitude part were also duly noted.

The participants' identities were kept confidential by assigning codes instead of obtaining names. Names of the pediatricians were not included in the survey questionnaire. Instead, envelopes were coded by the investigators (r_n for resident$_n$, f_n for fellow$_n$, c_n for consultant$_n$). The investigators distributed the survey questionnaire together with the coded envelope to distinguish the category of the pediatrician (resident, fellow, or consultant), i.e., questionnaire plus envelope coded with r1 for resident #1, questionnaire plus envelope coded with f1 for fellow # 1, questionnaire plus envelope coded with c1 for consultant #1. Participants' responses were obtained and initially coded in Microsoft Excel 2016 (Microsoft Corp., Redmond, WA), while subsequent data manipulation and statistical analysis were carried out in Stata 14.2 (StataCorp., College Station, TX).

Ethical consideration

The study secured clearance (reference number UPMREB 2016-512-UND issued 17 February 2017) from the University of the Philippines Manila Research Ethics Board (UPMREB), a constituted and established body, and functions following the requirements set by the University of the Philippines Manila, the Philippine Health Research Ethics Board (PHREB) and in compliance with the WHO Standards and Operational Guidance for Ethics Review of Health-related Research with Human Participants (2011), the International Conference on Harmonization of the Technical Requirements for Registration of Pharmaceuticals for Human Use (1996), and the National Ethical Guidelines for Health Research (2011).

A letter asking for consent was submitted to the Chairperson of the tertiary public hospital, and this was forwarded to the Department of Pediatrics. Participation in the research study was completely voluntary. The study's background and information material were provided with the letter of intent to survey the hospital. The same information was reiterated at the start of the survey questionnaire form. At the same time, investigators made themselves readily available at the entrance of the conference room before every distribution of the questionnaires. Said questionnaire was subjected to pre-testing before issuance. An oral hygiene kit was a token of appreciation for participation, and the investigators duly recognized the pediatrics department for their valuable input to the study.

Collected data was kept in an undisclosed storage facility and secured by the investigators as prescribed by law or until it was cleared for proper disposal. Confidentiality and privacy were maintained to the fullest extent.

RESULTS

Of the 211 pediatricians surveyed, 122 (57.82%) participated in the study. This total is broken down into the following: 34 of 64 (53.13%) residents, 49 of 67 (73.13%) fellows, and 39 of 80 (48.75%) consultants returned the questionnaires handed to them.

Normality testing revealed that participants' scores in the knowledge part are normally-distributed. The median score (M = 6) was used to determine whether the participant had high or low knowledge. Those scoring below the median score were considered to have low knowledge, while those with a score equal to or greater than the cut-off value were believed to have high knowledge. The participant's scores in the knowledge part ranged from a minimum of 1 to a maximum of 9, with the distribution heavily skewed to the left, as shown in Figure 2.

This suggests that more participants have registered higher scores than lower ones. There were 43 participants (35.25%) who scored five or lower on the test and were classified as having low knowledge, while the rest were classified as having high knowledge. Among the participants, fellows have the highest proportion who have high knowledge, followed by consultants, and lastly, residents (Table 1).

For the attitude part, almost all participants demonstrated positive attitudes toward preventing dental caries, with at least 85.00% of the respondents saying "yes" to each attitude question. In contrast, the third question got a unanimous "yes" response (Table 2).

In the aspect of the practice, replies varied but generally showed that the pediatricians always or frequently included teeth examination as well as assessment of tooth decay potential in their approach, never applied topical fluoride in the course of their professional work, and never prescribed dietary fluoride and always or frequently educated families on the importance of preventive dental health (Table 3).

DISCUSSION

Pediatric dentistry experts recommend that children undergo an oral examination within six months of the eruption of the first primary tooth but not later than 12 months of age. In their 2016 study, Sharma et al. found that children visit a pediatrician eight to ten times before their first birthday compared to a dentist.[14] Pediatricians, therefore, may play

Table 1. Distribution of pediatricians based on their knowledge on dental caries prevention

Type of Physicians	Level of Knowledge	
	Low Knowledge n (%)	High Knowledge n (%)
Residents	17 (50.00)	17 (50.00)
Fellows	13 (26.53)	36 (73.47)
Consultants	13 (33.33)	26 (66.67)

a critical role in introducing and providing primary dental care to young children and their families. Because health care professionals, specifically pediatricians, have frequent and early contact with families, they can influence the oral health of young children by incorporating oral health prevention and early referrals[6] to establish a dental home early and institute infant oral health care promptly. Infant oral health care is intended to prevent the initiation of dental caries, establish oral health literacy and good oral health behaviors in the family, and create a dental home relationship with a dentist for both recurring and urgent needs during the child's early life.[15] A significant goal of infant oral health is to identify children at risk for early childhood caries, so actions can be taken to prevent this disease. Initiation of early childhood caries with the establishment of infection can begin a lifelong propensity to new caries.[15] Several studies agreed that pediatricians generally lack knowledge and familiarity with dental caries prevention.[10,13] A scoping review of 42 articles

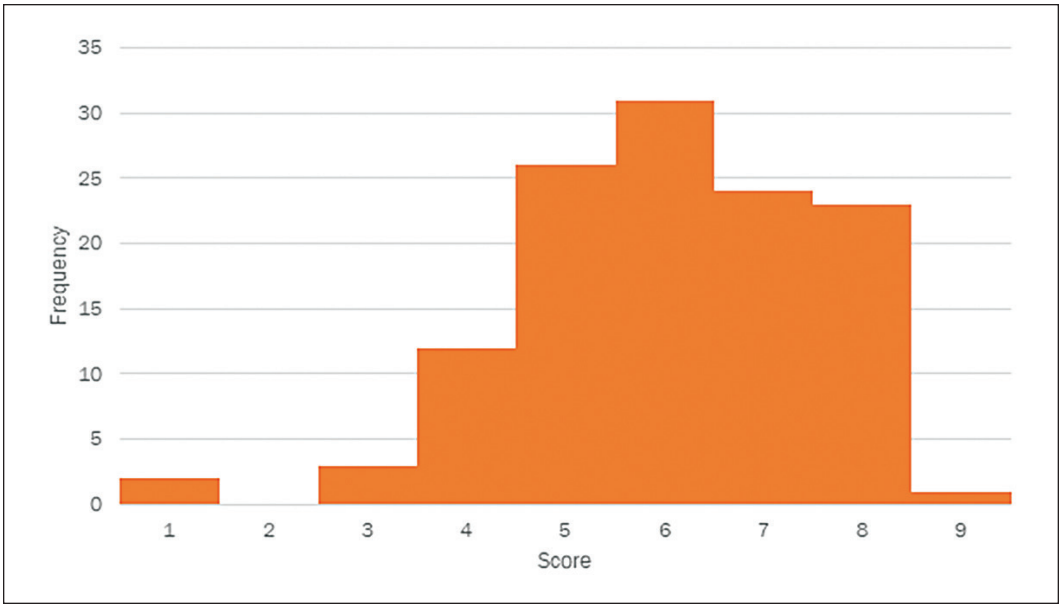

Figure 2. Scores distribution of pediatricians according to their knowledge on dental caries prevention.

Table 2. Attitude responses of pediatricians towards preventing dental caries among their child patients

Questions	Response n (%)			
	Yes	No	Uncertain	Missing
1. Do you recommend that all children visit a pediatric dentist?	119 (90.16)	3 (2.46)	0 (0.00)	0 (0.00)
2. Do you think looking at the children's teeth should be part of your medical check-up?	121 (99.18)	0 (0.00)	1 (0.82)	0 (0.00)
3. Do you think oral hygiene instructions should be part of your medical check-up?	122 (100.0)	0 (0.00)	0 (0.00)	0 (0.00)
4. It is a great benefit to children at high risk of caries who may have limited access to dental care to undergo the application of fluoride varnish.	106 (86.89)	4 (3.28)	12 (9.84)	0 (0.00)

Table 3. Practices of pediatricians in preventing dental caries among their child patients

Questions	Response n (%)						
	Always	Frequently	Sometimes	Rarely	Never	Before	Missing
1. How frequently do you examine a child's teeth for signs of decay?	53 (43.44)	46 (37.70)	22 (18.03)	0 (0.00)	0 (0.00)	*	1 (0.82)
2. How frequently do you assess the potential for developing tooth decay?	33 (27.05)	41 (33.61)	33 (27.05)	13 (10.66)	1 (0.82)	*	1 (0.82)
3. Do you apply topical fluoride gel/ varnish to children's teeth?	0 (0.00)	3 (2.46)	4 (3.28)	10 (8.20)	103 (84.43)	1 (0.82)	1 (0.82)
4. Do you prescribe dietary fluoride supplementation to children?	5 (4.10)	15 (12.30)	22 (18.03)	21 (17.21)	55 (45.08)	2 (1.64)	2 (1.64)

* *Choice not applicable for these items*

on oral health knowledge among pediatricians findings that pediatricians had limited knowledge and understanding in critical areas, including; initial clinical signs of dental caries (25% of the 510 European pediatricians who were members of EAPRASnet or European Pediatric Research In Ambulatory Setting Network), recommended age for the first dental visit (1 Indian survey had 11% of pediatricians routinely advised caregivers about the child's first dental visit before age one; US pediatricians using an oral health risk assessment and referral tool showed low referral rates for at-risk children while another survey reported recommending a dental check-up only when dental problems were reported), etiology of dental caries and suggested use of fluorides (90% of Brazilian respondents having outdated knowledge in fluoride use while only 20% pediatric postgraduate trainees could correctly identify the correct dosages for fluoride supplements).[8] From this 2020 review, findings suggest significant gaps in pediatric educational programs, indicating a need for greater formal education and training for pediatricians in terms of oral health and effective related interventions. However, no meaningful research focused on a more detailed understanding of the critical barriers to translating oral health knowledge to pediatric practice.

In contrast, the current study obtained a more desirable result from the pediatricians of a tertiary public hospital in Metro Manila, wherein 64.75% were classified as having a high knowledge of dental caries prevention. However, some incorrect information needs to be straightened out as it can negatively affect the eventual provision of proper dental care. Examples are (1) 42% of the pediatricians believed that children's teeth are susceptible to decay only three days after the eruption when dental caries can be detected soon after eruption since carious lesions become evident in some children shortly after tooth eruption, indicating that the environment necessary for caries development is present at an early age[16], and (2) 70% believed that topically applied fluoride alone is sufficient to reduce the risk of dental caries which may put child patients at a disadvantage as dental caries is a multifactorial disease requiring a combination of preventive management strategies. While professionally applied, 5% sodium fluoride varnish can remineralize early enamel caries.[17] Caries management requires caregivers to ensure adequate daily oral hygiene, fluoride application via toothpaste, and an emphasis on reducing sugar intake to prevent early childhood caries.[4] The importance of knowing that other treatment modalities are necessary for conjunction with topical fluoride application and that child's teeth are susceptible immediately after eruption should thus be emphasized to improve dental caries prevention.[18]

Forty-two percent of the pediatricians believed that vertical transmission of cariogenic microorganisms from mother to child is possible; 38% replied otherwise, while 19% were uncertain. Over decades, it has been stated that cariogenic microorganisms can be transferred from mother to child. However, a changing paradigm in dental caries etiology is moving towards an ecological and microbial community-based approach instead of targeting specific oral pathogens like streptococci and lactobacilli.[19] The oral microbiome shows an ordered ecological succession during the first four years of life. The bacterial composition of saliva and, in particular, the abundance of certain species may have potential as biomarkers for early childhood caries.[19] Information relayed to pediatricians' continuing professional education should reflect relevant updates as knowledge usually translates to suitable therapies.

Pediatricians presented a positive attitude towards the importance of oral hygiene instructions and dental screening, with 85% of the participants saying "yes" to each attitude question. All participants agreed that pediatricians should refer their patients to a pediatric dentist. Diverse answers were obtained for the elaboration part of their yes/no/uncertain replies in the attitude part. Still, many participants specified that referral should occur immediately after tooth eruption. Interestingly, this result contrasts the only 42% of those who agreed that children's teeth are susceptible to tooth decay three days after tooth eruption.

Self-reported practices of participants revealed that they examine children's teeth and assess the potential for tooth decay. It showed that most pediatricians always or frequently do both as part of their practice. Regarding a topical fluoride application, 84% claimed that they never applied topical fluoride gel/varnish, whereas 3% apply topical fluoride frequently, 3% sometimes use topical fluoride, and 8% rarely do it. Despite the low percentages, pediatricians must be aware of the Philippine Pediatric Society advisory released in June 2012, stating that pediatricians shall not engage in topical fluoride application in the course of their medical practice about R.A. 9484.[20] On the other hand, very few participants always or frequently prescribed dietary fluoride while more than half of them had never or rarely prescribed dietary fluoride. The reasons behind the prescription were unclear, or if the medications were prompted after consulting with a dentist.

In the 2014 systematic review for the prevention of dental caries in children under five years old to update the U.S. Preventive Services Task Force (USPSTF), they found insufficient evidence to assess the benefits and harms of dental caries screening by primary care clinicians. The recommendation then was to prescribe oral fluoride supplements to preschool children living in deficient residential areas and the fluoride varnish application to the teeth of all infants and children at the time of the first tooth eruption. The USPSTF conducted a scoping review of the 2020 evidence on primary care screening for and prevention of dental caries in children younger than five years old, wherein one notable cohort study (n=258) found primary care pediatrician examination following 2 hours of training associated with a sensitivity of 0.76 (95% confidence interval [CI], 0.55 to 0.91) for identifying a child with one or more cavities and 0.63 (95% CI, 0.42 to 0.81) for identifying children younger

than 36 months of age in need of a dental referral, compared with a pediatric dentist evaluation. One study (n=697) found a novel risk assessment tool administered by home visitor nurses associated with suboptimal accuracy for predicting future caries in children one year of age. The other included studies supported the effectiveness of primary care fluoride supplementations and applications. A call for research was recommended to look into the accuracy of oral health examination and caries risk assessment by primary care clinicians and primary care referral for dental care.[21]

Caries risk assessment is still a relatively new part of the dental diagnostic process. It uses information on a patient's risk and protective factors to categorize dental disease risk. In the U.S., there is an oral health risk assessment and referral tool (POORT) for pediatricians' use, but it failed to translate to high referral rates for at-risk children.[8] Locally, no such mechanism exists and even dentists wanting to do a formal caries risk assessment refer to foreign-created tools. A clinician's most common but informal way of assessing caries risk is to simply try to spot obvious dental cavities from an actual mouth examination. In this study, respondents were asked if they examined the child's teeth for signs of dental caries. Unfortunately, suppose a non-dental healthcare worker can see dental caries from a quick oral examination. In that case, the current disease process is well into its advanced stages, and preventive strategies may be more challenging to implement.

Strengths and limitations

Since inter-professional collaboration among pediatricians and dentists seems to play a significant key role in maintaining the oral health status of children, this is a preliminary study providing baseline data for possible future use. Further research with larger sample size and extending to other groups and institutions are recommended to strengthen the validity of these initial results and to possibly test the relationships of variables influencing their oral health knowledge, attitude, and practices. Nevertheless, the current study can provide an essential glimpse into pediatricians' knowledge, attitude, and practices about oral health to provide concerned stakeholders with information to improve primary preventive strategies in their decision-and policy-making efforts. The longstanding dental caries problem in the country will continue to be a public health burden unless a holistic approach is adopted wherein interdisciplinary sectors become involved not merely in the treatment and management of the disease but, more importantly, in assessing and diagnosing it at an earlier stage.

CONCLUSION

For this initial study, pediatricians showcased high knowledge and attitude regarding dental caries prevention for their child patients, but their practices to support it varied. It is recommended that dental health professionals actively collaborate with and update pediatricians to provide a timely, targeted preventive approach against dental caries in young children. It is safe to assume that oral health can only lead to beneficial outcomes for child patients and their families when integrated with primary health care.

Acknowledgments

The researchers would like to extend their heartfelt gratitude to those who facilitated data collection and rendered assistance in data analysis.

Statement of Authorship

All authors contributed in the conceptualization of work, acquisition and analysis of data, drafting and revising and approved the final version submitted.

Author Disclosure

All authors declared no conflicts of interest.

Funding Source

The study received full funding from the National Institutes of Health, University of the Philippines Manila.

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