

KNOWLEDGE, ATTITUDE AND PRACTICE OF PEDIATRICIANS REGARDING EARLY CHILDHOOD CARIES AND INFANT'S ORAL HEALTH: A CROSS-SECTIONAL STUDY

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ABSTRACT

Aim: This study aimed to assess the Knowledge, Attitude, and Practice (KAP) of pediatricians regarding Early Childhood Caries (ECC) and Infant' Oral Health (IOH).

Methodology: A total number of 141 pediatricians completed a structured closed-ended questionnaire composed of 30 closed-ended multiple-choice questions and divided into 4 sections as follows: Sociodemographic data, knowledge assessment questions, attitude assessment questions, and practice assessment questions. The questionnaire was presented in two forms: hard copies (printed forms) and online google forms. The collected data were statistically analyzed to assess the KAP of the participants regarding ECC and IOH.

Results: A significantly high percentage of the participants had good knowledge 133 (94.3%) ($p < 0.001$), good attitude 134 (95.0%) ($p < 0.001$) and good practice level 90 (63.8%) ($p = 0.001$) regarding ECC and IOH. There was no significant relation between the qualification and the level of knowledge ($p = 0.514$), attitude ($p = 0.739$), and practice regarding ECC and IOH ($p = 0.258$). There was no significant relation between the years of experience and the level of knowledge ($p = 0.881$), and practice ($p = 0.493$). While the correlation with the attitude level was significant ($p = 0.017$), with a significantly higher percentage of the respondents with good attitude having less than 5 years of experience 51 (98.1%) or having 5-10 years of experience 66 (97.1%) ($p < 0.001$).

Conclusions: Pediatricians have an overall good KAP regarding ECC and IOH. There was a statistically significant correlation between the years of experience of the pediatricians and attitude level regarding ECC and IOH.

KEYWORDS : Oral health, early childhood caries; pediatricians, knowledge; attitude and practice.

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INTRODUCTION

Infant's Oral Health (IOH) is the target on which preventive strategies and dental care must be formed to promote children's opportunity to have a life free from preventable oral disease. Good oral health positively influences children's physical, mental, and social well-being. Children can enjoy their lives by allowing them to eat, speak, and socialize without experiencing pain or even discomfort (**Pattanshetti et al., 2020**).

Early Childhood Caries (ECC), though largely preventable, is one of the most prevalent oral diseases in children and is one of the strongest predictors of poor oral health in adulthood (**Tsai et al., 2022**). The American Dental Association (ADA) 2021 identifies it as "a significant public health problem in deprived communities and also among the general child population" (**Chen et al., 2019**). Recent global reports reveal that oral health problems have not improved over the past 25 years, with 573 million children in 2015 estimated to have untreated dental caries in their primary teeth (**Uribe et al., 2021**).

ECC in *Egypt* in preschool children has a prevalence of (61.4%) and according to a recent cross-sectional study, (74%) of the children had ECC with mean dmft: 3.23 ± 4.07 ; deft: 4.21 ± 3.21 (**Shalan & Abo Bakr, 2018; Abbass et al., 2019**).

Early Childhood Caries affects both the oral and general health of the child. Untreated ECC leads to discomfort, pain, infections, loss of tooth structure, difficulty eating, malnutrition, sleep disturbance, decreased cognitive performance at school, and an increased chance of hospitalization. ECC affects child esthetics, self-esteem, and social communication. Also, its treatment is considered a load for child psychology, families, health care providers, and organizations (**Mariam et al., 2021**).

Prevention of ECC starts with sufficient knowledge of the importance of infants' oral health

(IOH) and the child's primary teeth. As early as the preventive measures are conducted, more benefits will be gained (**Tinanoff et al., 2019**).

Pediatricians are the first healthcare provider to contact infants and their parents. They have a significant role in educating, guiding, accessing, and counseling the parents about preventive measures and referring suspected cases to the pedodontist (**Sogi et al., 2016**).

Physicians' knowledge, attitude, and awareness are important factors affecting their performance in pediatric dental & oral health (**Jain et al., 2018**). Therefore, the current study aims to assess pediatricians' knowledge, Attitude, and Practice (KAP) regarding ECC and IOH.

SUBJECTS & METHODS

Study Design and setting:

This study is a cross-sectional study based on a closed-ended questionnaire given to pediatricians to assess their KAP regarding ECC and IOH. The questionnaire was introduced in English and presented in two forms: hard copies (printed forms) distributed among the pediatricians of Abu El-Reesh and El Demrdash pediatric hospitals and online google forms. The current study was reviewed and approved by the Research Ethical Committee, Faculty of Dentistry, Cairo University, in September 2019 concerning the scientific content and the compliance with the relevant research and human subjects regulations. This study was registered at clinical trial.gov with the identifier NCT04003129.

Sample size:

A power analysis was designed to have adequate power to apply a two-sided statistical test of the KAP of pediatricians regarding ECC and IOH. According to the results of Alshunaiber et al., 2019, the expected frequency of good attitude was (86.1%), having good knowledge (65.3%) and good practice (42.6%) by adopting a confidence interval

of (95%) and a margin of error of (10%) with finite population correction; the predicted sample size (n) was a total of (94) pediatricians. Sample size calculation was performed using Epi info for windows version 7.2*. Although the minimum predicted number for the sample size was 94, by sharing the questionnaire online with pediatricians, a greater number of pediatricians than the calculated sample responded to the questionnaires. The final total analyzed sample was 141 participants.

Consent (Informed and Electronic)

Before filling out the questionnaire, pediatricians in Abu El-Reesh pediatric hospital, Faculty of Medicine, Cairo University, were asked to sign a written consent. For the approval of participants who responded to the online google form of the questionnaire, a separate consent section containing a YES/NO question was added at the beginning of the questionnaire form. The privacy of the participants was governed and protected.

Eligibility criteria

Inclusion criteria

- Pediatricians treating infants and children less than six years old.
- Residents working in Abu El-Reesh pediatric hospital, Faculty of Medicine, Cairo University.
- Pediatricians who agreed to answer the online Google form.
- Pediatricians who signed the informed consent.
- Both sexes were enrolled.

Exclusion criteria

- Pediatricians in the emergency department and intensive care unit.

Data sources and management:

Questionnaire Design:

The questionnaire comprises 30 closed-ended multiple-choice questions divided into four sections: Sociodemographic data, knowledge assessment questions, attitude assessment questions, and practice assessment questions.

- ***Section (A) Sociodemographic data:*** This section is composed of eight questions (from Q1 to Q8) about age, gender, qualification, experience years, place of practice, presence of dental department, dental training and education, along with the location of dental training.
- ***Section (B) Knowledge assessment questions:*** This section is composed of twelve questions (from Q9 to Q20) related to the importance of the primary teeth and timing of eruption, importance of the timing of the first child's dental visit, the child's oral hygiene practice, use, and amount of fluoridated toothpaste. Another three questions were about the relation of caries with a child's diet, sucrose, juice, and carbonated beverages. There were two questions to assess the knowledge regarding the first signs of dental caries and the effect of caries on child development and growth.
- ***Section (C) Attitude assessment questions:*** This section is composed of four questions (from Q21 to Q24) for the participants' belief of having a role in several aspects, including; prevention of dental caries, parents' education, children's teeth examination, and referral of required cases.
- ***Section (D) Practice assessment questions:*** This section comprises six questions (from Q25 to Q30) regarding; parents' dental counseling, diet analysis, children's teeth examination, and type of action that will be carried out once dental caries has been identified.

* Dean, A. G., et al. "Epi Info™, a database and statistics program for public health professionals." CDC, Atlanta, GA, USA (2011).

Few modifications have been made to the original questionnaire starting with the removal of two sections: section E (Questions regarding the barriers preventing the performance of oral health-related activities) and section F (Questions about the participants' desire to receive dental training and education besides the preferred dental topics and training methods).

Also, some adjustments have been made in sections (A) and (B). In section (A) the sociodemographic data section, a question related to the qualification was added and other questions (questions related to nationality, marital status, having children, hours of dental training) were removed. In section (B) the knowledge assessment section, a modification was made to the form of questions number one and two to allay confusion about the meaning of the question by adding some terms. In Q1: the first primary tooth "in most children" erupts at the age of six months? In Q2: "the common known" time of the first dental visit is with the eruption of the first primary tooth?.

Scoring of the KAP

The scoring of KAP questions of pediatricians regarding ECC and IOH was calculated following **Alshunaiber et al., 2019:**

For knowledge assessment: 12 questions were measured (from Q9 to Q20) on a two-point scale. The minimum score was 0 and the maximum one was 12, of which a score of six and less was considered poor knowledge, and a score of seven and more was considered good knowledge.

For the attitude assessment: four questions were measured (from Q21 to Q24) on a two-point scale. The minimum score was 0 and the maximum one was four, of which a score of two and less was considered poor attitude, and a score of three and more was considered a good attitude.

For the assessment of practice: six questions were measured (from Q25 to Q30) on a two-point

scale. The minimum score was 0 and the maximum one was six, of which a score of three and less was considered poor practice and a score of four and more was considered good practice.

Statistical analysis

Categorical data were presented as frequencies and percentages and were analyzed using Fisher's exact test. The significance level was set at $p \leq 0.05$ within all tests and p-values were adjusted for multiple comparisons using Bonferroni correction. Statistical analysis was performed with IBM² SPSS³ Statistics Version 26 for Windows.

RESULTS

This study included 141 pediatricians who agreed to complete both questionnaire forms (hard copy and online Google form). KAP of the participants regarding ECC and IOH were assessed.

Sociodemographic data

Regarding the gender and age distribution of the participants (Q 1 and Q 2), there were 117 females (83.0%) and 24 males (24%). A significantly higher percentage of participants were 30-40 years old (51.8%) and less than 30 years old (38.3%). Regarding the qualifications (Q 3), most participants were master's degree holders (61.7%). For the years of experience (Q 4), a significantly higher percentage of participants had 5-10 years of experience (48.2%) or less than 5 years (36.9%).

Concerning the question about the place of practice (Q 5 and Q6) that could be answered with more than one option, there were a total of 171 responses, with the majority of the participants working in a government hospital (75.4%). A high percentage of the participants had a dental department in their workplace (78.7%). For the question about if the participant had dental training before (Q7), 128 responders did not have dental training (90.8%). Concerning the question about

the place of dental training (Q8) that could be answered with more than one option, there were a total of 146 responses. The 128 (87.7%) responders confirmed again that they didn't have dental training ($p < 0.001$), 8 (5.5%) responders had their dental experience from their practice, 7 (4.4) responders had the dental exercise in the medical school, and 3 (2.1%) responders had the dental training during residency.

Knowledge assessment regarding ECC and IOH

The frequency and percentage values for the answers to the knowledge questions (from Q9 to Q20) regarding ECC and IOH are presented in table (1). Regarding knowledge about the date of the eruption of the first primary tooth in most children (Q9), a high percentage of the participants (92.9%) were aware of it, (70.9%) of participants lacked knowledge about the time of the child's

TABLE (1): Frequency and percentage (%) for the answers to the knowledge assessment questions regarding ECC and IOH:

Question number (Q)	Question	Answers	n	%	p-value
Q 9	The first primary tooth in most children erupts at age of 6 months?	No	10	7.1%	<0.001*
		Yes'	131	92.9%	
Q 10	Children should have their first dental visit after eruption of first primary teeth?	No	100	70.9%	<0.001*
		Yes'	41	29.1%	
Q 11	Parents should start cleaning their children's oral cavity from time of birth after every feed?	No	64	45.4%	0.247ns
		Yes'	77	54.6%	
Q 12	Children should start using fluoridated toothpaste at age of 6 months?	No'	112	79.4%	<0.001*
		Yes	29	20.6%	
Q 13	Tooth paste's amount to be used when starting brushing child's teeth is smear or the size of a grain of rice?	No	23	16.3%	<0.001*
		Yes'	118	83.7%	
Q 14	Bottle feeding at night for sleep might cause teeth decay?	No	32	22.7%	<0.001*
		Yes'	109	77.3%	
Q 15	Sucrose is the most cariogenic sugar (can cause teeth decay)?	No	22	15.6%	<0.001*
		Yes'	119	84.4%	
Q 16	Juice and carbonated beverages can cause teeth decay?	No	6	4.3%	<0.001*
		Yes'	135	95.7%	
Q 17	Bacteria that are responsible of teeth decay can be transmitted from the mother to her child?	No	90	63.8%	0.001*
		Yes'	51	36.2%	
Q 18	White spots are the first sign of tooth decay?	No	55	39.0%	0.009*
		Yes	86	61.0%	
Q 19	Early Childhood Caries if untreated it could affect child general health and development?	No	14	9.9%	<0.001*
		Yes'	127	90.1%	
Q 20	Primary (baby) teeth have a significant role in child's health and development?	No	10	7.1%	<0.001*
		Yes'	131	92.9%	

' : the correct answer.

*; significant ($p \leq 0.05$)

ns; non-significant ($p > 0.05$)

first dental visit(Q10). On the other hand, (90%) of the participants did not know that bacteria can be transmitted from the mother to the child (Q17).

Attitude assessment regarding ECC and IOH

The frequency and percentage values for the answers to the attitude assessment questions (from questions number 21 to 24) regarding ECC and IOH are presented in table (2). From the total number of participants, a significantly high percentage of respondents had a good attitude in believing in their role in caries prevention, infant's oral health promotion, and oral health education to the caregivers. Moreover, they approve of their role in the examination of children's teeth and advising the parents in case of suspected cases of dental caries.

Practice assessment regarding ECC and IOH

Frequency and percentage values for the answers to the practice assessment regarding ECC and IOH questions (from Q25 to Q30) are presented in table (3) .

A high percentage of the respondents (77.3%) reported that they counsel the parents or caregivers regarding teething, dental care, and check-up of their children, and (91%) of participants indicated that do diet counseling with the parents or the caregiver regard cariogenic food. Regarding the routine examination of children's teeth for the presence of decay and recording in the medical chart in case of decay present, there was no significant statistical difference between both answers with ($p=0.674$), ($p=0.556$), respectively. On the other hand, (96.5%) of participants stated that they advise the parents to see a dentist when they identify a child with teeth decay but only (75.2%) reported that they do a referral to a dentist when they identify a child with teeth decay.

Overall assessment of the different parameters of KAP levels regarding ECC and IOH

Frequency and percentage (%) for the overall assessment of the different parameters of KAP regarding

TABLE (2): Frequency and percentage (%) for the answers to the attitude assessment questions regarding ECC and IOH:

Question number (Q)	Question	Answers	N	%	p-value
Q 21	Pediatricians play an important role in prevention of dental caries and promotion of infants' oral health?	No	8	5.7%	<0.001*
		Yes'	133	94.3%	
Q 22	Pediatricians have to educate parents or caregivers regarding preventive dental measurements?	No	7	5.0%	<0.001*
		Yes*	134	95.0%	
Q 23	Pediatricians have to examine children teeth for presence of caries?	No	21	14.9%	<0.001*
		Yes'	120	85.1%	
Q 24	Pediatricians have to refer or advice parents in case of suspected cases of dental caries?	No	3	2.1%	<0.001*
		Yes'	138	97.9%	

*; significant ($p \leq 0.05$)

ns; non-significant ($p > 0.05$)

TABLE (3): Frequency and percentage (%) for the answers to the practice assessment questions regarding ECC and IOH:

Question number (Q)	Question	Answers	N	%	p-value
Q 25	I counsel parents or caregivers regard teething, dental care and check-up of their children?	No	32	22.7%	<0.001*
		Yes'	109	77.3%	
Q 26	I do diet counseling with parents or caregiver regard cariogenic food?	No	50	35.5%	0.001*
		Yes*	91	64.5%	
Q 27	I routinely examine children's teeth for presence of decay?	No	73	51.8%	0.674ns
		Yes*	68	48.2%	
Q 28	When I identify a child with a teeth decay, I record it in the medical chart?	No	74	52.5%	0.556ns
		Yes*	67	47.5%	
Q 29	When I identify a child with a teeth decay, I advise parents to see a dentist?	No	5	3.5%	<0.001*
		Yes*	136	96.5%	
Q30	When I identify a child with a teeth decay, I do a referral to a dentist?	No	35	24.8%	<0.001*
		Yes*	106	75.2%	

*; significant ($p \leq 0.05$)ns; non-significant ($p > 0.05$)

ECC and IOH are presented in table (4) : A significantly high percentage of the respondents had good knowledge 133(94.3%) ($p < 0.001$), good attitude 134 (95.0%) ($p < 0.001$) and good practice level regarding ECC and IOH 90 (63.8%) ($p = 0.001$).

TABLE (4): Frequency and percentage (%) for the overall assessment of the different parameters of KAP regarding ECC and IOH :

Parameter	Answers	n	%	p-value
Knowledge level	Poor	8	5.7%	<0.001*
	Good	133	94.3%	
Attitude level	Poor	7	5.0%	<0.001*
	Good	134	95.0%	
Practice level	Poor	51	36.2%	0.001*
	Good	90	63.8%	

*; significant ($p \leq 0.05$) ns; non-significant ($p > 0.05$)

Relation between the qualification and the different parameters of KAP regarding ECC and IOH

There was no significant relation between the qualification and the level of knowledge ($p = 0.514$), attitude ($p = 0.739$), and practice regarding ECC and IOH ($p = 0.258$).

Relation between the years of experience and the different parameters of KAP levels regarding ECC and IOH

There was no significant relationship between the years of experience, the level of knowledge ($p = 0.881$), and practice ($p = 0.493$). In contrast, the correlation with the attitude level was significant ($p = 0.017$), with a significantly higher percentage of the respondents with good attitude having less than 5 years of experience, 51 (98.1%) or having 5-10 years of experience, 66 (97.1%) ($p < 0.001$).

DISCUSSION

Pediatricians are the primary link between dentists and children, especially during infancy. It is unclear to what degree pediatricians are knowledgeable about children's oral health and the extent to which they recognize their role in oral health promotion as a part of the child's primary care. Besides, little is known about the incidence of their participation in the assessment and prevention of oral health-related issues (**Dickson-Swift et al., 2020**).

Early intervention provides the opportunity for early detection of any pathosis, parents' education in oral hygiene practices, and prevention of ECC by establishing proper feeding habits. Therefore, the present study focused on the significant preventive role of pediatricians regarding ECC and infant's oral health by assessing their knowledge attitudes, and practices (**Sitthisettapong et al., 2021**).

Collecting the data using a survey questionnaire is one of the most appropriate and convenient methods for participants and investigators. The participants in the research always prefer an easy-to-follow and complete tool (**Ikart, 2019**).

The results of the present study revealed an overall good knowledge, attitude, and practice of the participants regarding ECC and IOH. Still, there was a discrepancy between the knowledge, attitude, and practice of pediatricians regarding ECC and IOH.

It was very encouraging that the majority of pediatricians (95.0%) in the current study have an overall good attitude with (p-value <0.001) toward IOH and a willingness to contribute to the prevention of ECC. Despite holding these positive views, (63.8%) of the pediatricians reported an overall good but lower level of practices (p-value =0.001) related to ECC and IOH during their daily work. These results correspond with the results of **Alsunaiber et al., 2019**. These findings indicate that workshops

on dental caries signs and oral cavity examination will benefit pediatricians for early identification and referral of suspected children to the pedodontist to avoid the further spread of caries and prevent its future complications (**Patel et al., 2021**).

The decreased knowledge of pediatricians about some aspects of ECC and IOH, along with the associated practice, could be related to the lack of the required dental education and training among the majority of the participants (**Sezer et al., 2013; Sogi et al., 2016**). As previously mentioned (90.8%) of the participants in the present study reported that they did not have dental training before.

By reviewing a recent study by **El Bayoumi, 2021** in Tanta city, Egypt, pediatricians reported that they had not received oral health education either in undergraduate or postgraduate curricula. Similar limitations in oral health education and training were also noted by **Aburahima et al., 2020** (81.4% of the participant), **Oge & Cetiner, 2017** (76.2% of the participant), and **Ramroop et al. 2019** (63.3% of the participant). While in **Hadjipanayis et al., 2018** study among European pediatricians, fewer participants (15%) hadn't received oral health education before.

This may be attributed to the fact that globally oral health education does not prioritize medical education, either in pre-graduation or post-graduation curricula. Oral health has mostly not been considered part of the medical profession's scope in a strange separation from general health and development. To decrease the knowledge and practice gap, oral health education must be vital among health professionals. Consequently, increase pediatricians' comfort in addressing oral health-related issues (**Koirala et al., 2019**).

Oral health training indirectly influences pediatricians' oral health practices by increasing their confidence in practices like advising parents and performing oral health screening and risk assessment. Efforts to engage medical professionals

in oral health training to promote their confidence and increase the chance of performing preventive oral health care practices (**Gupta et al., 2019**).

The current study displayed that there was no significant relationship between the qualification and the level of knowledge ($p=0.514$), attitude ($p=0.739$), and practice ($p=0.258$). This may be due to the absence of dental training in the different stages of education, as most of the pediatricians in the present study reported. This finding highlights the need for improvement in the curriculum of Paediatric courses in the medical school, continuing dental education programs for Pediatricians, and interactions between the medical and dental specialties. **Herndon et al., 2015** stated that pediatricians who received training in oral health education have better knowledge and confidence in performing oral health practices and caries risk assessment.

There was no significant relationship between the years of experience, the level of knowledge ($p=0.881$), and practice ($p=0.493$). In comparison, the correlation with the attitude level was significant ($p=0.017$), with a significantly higher percentage of the respondents with good attitudes having less than 5 years of experience 51 (98.1%) or having 5-10 years of experience 66 (97.1%) ($p<0.001$).

This may highlight that young pediatricians may easily adopt new work strategies, as assumed by **El Bayoumi, 2021** among the Egyptian pediatricians in *Tanta* city. This contradicts **Aburahima et al., 2020** results where the participants with more years of experience had significantly better knowledge than those with fewer years of experience. Authors attributed that to the theory that experience from long practice periods improved their dental behavior.

Most pediatricians realize their important role in children's oral health promotion but lack knowledge and inadequate training on some oral health-related issues, which may be a barrier to actively promoting children's oral health. Oral health training is

associated with improved oral health knowledge, confidence in counseling parents about oral health-related issues, and examination of the oral cavity (**Oge & Cetiner, 2017; Hadjipanayis et al., 2018**).

The current study focused on the key aspects of the KAP of pediatricians regarding ECC and IOH. Inadequate education and training, time restrictions in practice, lack of referral strategies, and cost considerations that are often associated with complicated medical/dental insurance schemes are effective barriers to be considered in oral health practice for pediatricians (**Dickson-Swift et al., 2020**).

The results of the present study may provide valuable data and perspectives for improving oral health education and training of pediatricians and motivate them to perform their oral health role in their routine child care practice. The study provides motivations for developing appropriate oral health education programs for future pediatricians. Nevertheless, this study has some limitations: the dominance of the female gender may be one of the sources of bias in this survey. Although internet surveys facilitate recording responses accurately and targeting the required participants faster and at a lower cost, they make it difficult to achieve sample representativeness, and the quality of data may be poor due to low engagement of the responders or limited understanding of the questions.

LIMITATIONS OF THE STUDY

There are certain limitations in the present study: The dominance of the female gender may be one of the sources of bias in this survey. Although internet surveys facilitate recording responses accurately and targeting the required participants faster and at a lower cost, they make it difficult to achieve sample representativeness, and the quality of data may be poor due to low engagement of the responders or limited understanding of the questions.

CONCLUSIONS

Pediatricians have an overall good KAP regarding ECC and IOH. There was no significant relationship between the qualification or the years of experience of pediatricians and the level of KAP regarding ECC and IOH. There was a significant correlation between the years of experience of pediatricians and attitude level regarding ECC and IOH, with a significantly higher percentage of the respondents with good attitude having less than 5 years of experience or having 5-10 years of experience. Most pediatricians did not receive dental training regarding oral health before the study.

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