

Assessment of Pediatricians Dental Knowledge, Attitude and Behavior in Jeddah, Saudi Arabia

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Early assessment of the oral health status of children has the potential to reduce or even eliminate oral diseases. Parents rarely take their children to dentist early enough to control dental diseases. However, parents contact pediatricians several times even before the child is born and during the child's early life. Accordingly, pediatricians are considered a perfect and reliable source for oral health control and prevention. Aim: To measure the dental knowledge, attitude and behavior (KAB) of pediatricians in the City of Jeddah regarding oral health status and methods for prevention of dental diseases in children. Materials and method: Questionnaires consisting of 40 demographic and KAB's questions were distributed to all pediatricians in Jeddah city (605 pediatricians). The KABs' questions consisted of general dental knowledge, preventive dental measures, timing for referral, diet counseling, parafunctional habits and handling of traumatized teeth. A score was given for each question. Percentages of total scores of KABs were compared. Results: The response rate of pediatricians in Jeddah city (363) was 60%. Their mean age was 39.57 years. Pediatricians' KABs were found to be unsatisfactory. The most important observation was that the concept of oral health prevention was deficient. Pediatricians' awareness of fissure sealants, fluoride, dietary counseling, time of first dental visits and thumb sucking were quite limited. Pediatricians' knowledge was significantly lower than their attitude and behavior's scores. Conclusion: In general, pediatricians' knowledge, attitudes and behavior regarding oral health were not satisfactory.

Keywords: Pediatrician, knowledge, behavior; attitude, dental, oral health, prevention, children
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INTRODUCTION

The rapid development of Saudi Arabia had shed the light on various oral problems. Dental caries is considered a dental health problem that is affecting a significant number of children. The prevalence of dental caries in Jeddah has increased in the last decade from 74%¹ to 96%.² Other oral problems like dental trauma have been

reported to be managed in only 2% of cases.³ Considering the preventive nature of oral diseases, efforts are being exerted to arrest and reverse this disease spread. It has been found that dental diseases could be controlled by parents education. Lewis *et al*⁴ in 2000, highlighted the role of pediatricians in supporting pediatric dentists. by providing preventive guidance to parents of young children. In 2009, Kressin *et al*⁴ found that pediatricians who are properly trained in dental care can possibly reduce the rate of ECC by 77%.⁴

Several studies have evaluated dental knowledge and practices among pediatricians in an attempt to assess their role in children's dental care.⁵⁻⁹ These studies have concluded that although pediatricians are willing to participate in oral disease prevention, they lack the knowledge and training required to do so. Other studies carried out in that respect were planned to assess dental education needed for pediatricians and have suggested plans to upgrade the medical curriculum in attempt to meet the oral health needs of children.¹⁰⁻¹³

In 2003, Al-Hussyeen *et al*¹⁴ focused on oral health practices and knowledge of Saudi pediatricians. Although the study was a pioneering effort, the study group was mainly from Dammam and Riyadh cities, Saudi Arabia. Only thirty-nine pediatricians were polled from Jeddah. This represented

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12.4% of the study sample and only 6% of the Jeddah city pediatricians. Therefore, the aim of this study was to investigate the knowledge, attitudes and behavior (KAB) of pediatricians in Jeddah.

MATERIALS AND METHOD

The present study included all certified pediatricians (residents, specialists and consultants) from the health facilities providing pediatric services throughout the city of Jeddah (605 pediatricians).^{15,16} Pediatricians working in the private sector, ministry of health military hospitals and university hospital, polyclinic and private clinics were all included in the study. A questionnaire was carefully structured to assess dental knowledge, attitude and behavior after a thorough literature review. It was designed to contain open-ended and close-ended questions. It was completed in ten minutes by the pediatricians in the absence of the interviewer and collected at the end of the day. A pilot study was conducted to test visibility and achievability of the study aims, and accordingly the questionnaire was revised.

Statistical analysis

The results included descriptive information on the population. Descriptive statistics were displayed as frequency and percentages for categorical variables, or mean and standard deviations for continuous variables. Responses of the open-ended questions were grouped into four categories which included; correct answers, incorrect answers, no answers or lack of knowledge about the subject area. For each question answered correctly, the participant was awarded a score, thus the total knowledge score ranged from 0 to 13. Total attitude scores ranged from 0 to 6, while the total behavior scores ranged from 0 to 11. Percents of total scores of knowledge, attitude and behavior were compared in pairs using Wilcoxon’s signed rank tests.¹⁷

RESULTS

Out of 605 pediatricians, 363 replied, giving a 60% response rate. The age of respondents pediatricians ranged from 23 to 66 with a mean of 39.57±8.58. Almost half of the responders (53.3%) graduated more than 16 years ago. Out of the 363 respondents pediatricians, 185(51%) were female. Three were excluded from the study because they returned most of the questionnaire with missing information

Oral health information sources accessed by participating pediatricians

Two thirds of the participating pediatricians (63.4%) did not receive oral health information. Those who claimed that they received information, 57.7% of them reported informal sources (Personal communication (25.1%), media (13.8%), magazines(10.5%) and through the internet (8.3%)) as shown in Figure 1.

Responses of participating pediatricians to knowledge questions

The majority of correct responses were related to time of

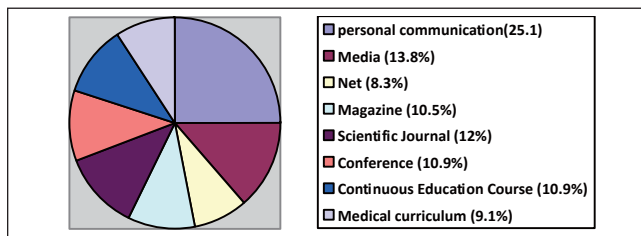


Figure 1. Frequency distribution of oral health information source accessed by participating pediatricians.

eruption of the first primary tooth (89.8%), followed by the importance of frequent sugar intake in relation to caries etiology (82.6%) and the need to visit a dentist regardless of the presence of caries (76%). Some questions revealed that the level of pediatricians’ knowledge was minimal or low. Less than 35% of pediatricians responded correctly to these questions. These included responses to questions concerning the appropriate age for first dental visit (25.6%), knowledge on pit and fissure sealants (17.4%), the time when a child should stop thumb sucking (9.1%), differences between breast and bottle feeding regarding their effect on the dentition (8%) and different questions concerning fluoride supplementation (ranged from 9.1- 1.9%). (Table 1, 2 and 3)

Responses of participating pediatricians to attitude questions

Table 4 shows the participants’ responses to attitude questions. The effect of night feeding on teeth (81.3%) represented the most favorable responses. Less favorable attitudes were recorded in other areas such as the ability to

Table 1. Frequency distribution of participating pediatricians according to their responses to knowledge questions concerning basic information on eruption, habit and etiology of dental diseases.

QUESTION	RESPONSE	FREQUENCY (%)
1- When does the first primary tooth erupt?	6-8 months*	326 (89.8)*
	9-11 months	29 (8)
	12-18 months	3 (0.8)
	After 18 months	5 (1.4)
2- Which is more important in causing dental caries?	Amount of sugar intake	24 (6.6)
	Frequency of sugar intake*	300 (82.6)*
	I don’t know	39 (10.7)
3- Are there any differences between breast and bottle feeding regarding their effect on the dentition?	Yes	324 (89.3)
	No*	29 (8)*
	I don’t know	10 (2.8)
4- When should the child stop thumb sucking?	After the primary dentition has completed (3 yrs)	141 (38.8)
	Before the eruption of the permanent incisor (5-6 yrs)*	33 (9.1)*
	After the eruption of the permanent incisors (8-9 yrs)	4 (1.1)
	No specific age	122 (33.6)
	I don’t know	63 (17.4)

*Correct response

Table 2. Frequency distribution participating pediatricians according to their responses to knowledge questions regarding dental visits

QUESTION	RESPONSE	FREQUENCY (%)
1- At what age should the child have his first dental visit?	By 6-12 months*	93 (25.6)*
	At 2 years	151 (41.6)
	At 3 years	41 (11.3)
	At 4 years	17 (4.7)
	At 5 years	39 (10.7)
	I don't know	22 (6.1)
2- Does a child free of caries need to visit a dentist?	Yes*	276 (76)*
	No	87 (24)

*Correct response

Table 3. Frequency distribution of participating pediatricians according to their responses to knowledge questions concerning prevention of oral diseases.

QUESTION	RESPONSE	FREQUENCY (%)
1- At what age should the child start brushing his teeth with fluoridated tooth paste?	As soon as the eruption of the first primary tooth (6 months-1 year)	110 (30.3)
	After the eruption of primary molars (2 years)*	140 (38.6)*
	After the primary dentition has completed (3 years)	83 (22.9)
	After the eruption of permanent incisors (8 years)	6 (1.7)
	I don't know	24 (6.6)
2- What is the amount of tooth paste that should be applied?	Full length	184 (50.7)
	Pea size*	167 (46)*
	I don't know	12 (3.3)
3- At what age should fluoride supplement be prescribed?****	No supplement prescribed	322 (88.7)
	Correct answer* (6 to 12 months)	16 (4.4)*
	Incorrect answer	18 (5)
	I don't know	7 (1.9)
4- What type of fluoride supplement should be prescribed for children?****	No supplement prescribed	322 (88.7)
	Correct answer*(Na F supplement)	7 (1.9)*
	Incorrect answer	11 (3)
	I don't know	23 (6.3)
5- When calculating the fluoride dose, what factors should be considered?****	Age**	21 (5.8)**
	Weight	16 (4.4)
	Height	0 (0)
	Source of water**	33 (9.1)**
	Caries activity	5 (1.4)
	I don't know	6 (1.7)
6- If no fluoride is prescribed, what are the reasons? ***	They do not need fluoride	18 (5)
	Fluoride may harm the health of the child	28 (7.7)
	Fluoride may harm the teeth	18 (5)
	There are other fluoride sources*	198 (54.5) *
	I don't know	72 (19.8)
7- Do you know what pit and fissure sealants are?	Yes*	63 (17.4)*
	No	300 (82.6)

*Correct response

** The correct response includes both age and source of water; both responses were provided by ten pediatricians (2.8%).

*** Pediatricians could choose more than one response to open-ended questions.

****open-ended questions.

Table 4. Frequency distribution of participating pediatricians according to their responses to attitude questions

QUESTIONS	AGREE N (%)	NEUTRAL N (%)	DISAGREE N (%)
1- Do you think you are able to answer parents' questions about oral health?	119 (32.8)	200 (55.1)	44 (12.1)
2- Do you think that swallowing tooth paste is hazardous to children?	97 (26.7)	85 (23.4)	181 (49.9)
3- Do you think it is important to prescribe fluoride supplements to children by the pediatrician?	78 (21.5)	165 (45.5)	120 (33.1)
4- Before fluoride prescription, do you think it is important to know the drinking water source of your patient?	276 (76)	81 (22.3)	6 (1.7)
5- Do you think that at well or night feeding may affect the teeth?	295 (81.3)	34 (9.4)	34 (9.4)
6- Do you think that an avulsed tooth can be reimplanted?	191(52.6)	120 (33.1)	52 (14.3)

answer parents' questions about oral health (32.8%), hazards of swallowing tooth paste (26.7%) and importance of prescribing fluoride supplements by the pediatricians (21.5%).

Responses of participating pediatricians to behavior questions

Table 5 shows the responses of study participants to behavior / practice questions. The percentage of participants performing desired practices showed a marked diversity. The highest proportion of subjects performing desired practices was reported for the question concerning routine oral and dental examination (78.8%) followed by reasons for dental referral (73.8%). The lowest proportion of pediatricians doing desired practices was reported in questions related to providing dietary counseling to patients (30.9%), rewarding patients (28.9%), sealant recommendations (18.2%) and patients rewarding (28.9%) fluoride prescription (11.3%)

Scores of knowledge, attitude and behavior questions answered by study participants

Figure 2 shows the percent of participants' different scores obtained in questions of knowledge, attitude and behavior. Regarding questions of knowledge, 25.1% of participants had scores less than 30%, 73.6% had scores 30.5%-60% and 1.4% had scores more than 60%. As for attitude questions, the percent was 12.7%, 55.1% and 32.2% respectively. For behavior questions, it was 18.2%, 55.1% and 26.7% respectively. Analysis revealed that the attitude and behavior of the study participants were significantly better than their knowledge (Z of WSRT= 10.35 and 7.36 respectively, P<0.0001 for both). Attitude scores were also significantly better than behavior scores (Z= 2.51, P=0.01).

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Table 5. Frequency distribution of study participants according to responses to behavior / practice questions.

QUESTIONS	ANSWERS	N (%)
1- Do you routinely examine the oral cavity and dentition of your patients?	Yes*	286 (78.8)*
	No	77 (21.2)
2- If your patient faces any oral problems, how do you manage?***	Instruct patient to visit a dentist	172 (47.4)
	Refer to a general dentist**	144 (39.7)**
	Refer to a pediatric dentist**	85 (23.4)**
	Provide the treatment by your self	33 (9.1)
	Ignore the problem	2 (0.6)
3- When do you refer your patient to the dentist?***	If he has caries*	268 (73.8)*
	If he has dental pain	222 (61.2)
	If he has fever or swelling	216 (59.5)
4- If a new born infant presents to your clinic with an erupted tooth/ teeth, how do you manage?	Refer to a general dentist	102 (28.1)
	Refer to a pediatric dentist*	175 (48.2)*
	Provide treatment by your self	41 (11.3)
	Ignore the problem	45 (12.4)
5- Do you prescribe fluoride supplements to children?	Yes*	41 (11.3)*
	No	322 (88.7)
6- Would you recommend pit and fissure sealants to your patients?	Yes*	66 (18.2)*
	No	297 (81.8)
7- Do you recommend at-will (on demand) feeding?	Yes	225 (61.9)
	No*	138 (38.1)*
8- Do you instruct your patients about oral hygiene?	Always*	205 (56.5)*
	Sometimes	144 (39.7)
	Never	14 (3.9)
9- Do you provide dietary counseling to your patient regarding cariogenic food?	Always*	112 (30.9)*
	Sometimes	190 (52.3)
	Never	61 (16.8)
10- How do you manage a child presented to your clinic with trauma to his teeth?	Consult a dentist	110 (30.3)
	Refer to a dentist*	237 (65.3)*
	Provide treatment at your clinic	16 (4.4)
11- How do you reward your patients?	Sweets and candies	82 (22.6)
	Other rewards*	105 (28.9)*
	No rewards	176 (48.5)

* Desirable practice

** Pediatricians doing either one or both desirable behaviors =213 (58.7%)

*** Pediatricians could choose more than one response.

DISCUSSION

The present study focuses on the crucial oral preventive role of pediatricians whom are considered the primary link between dentists and children. Therefore, this study has been planned to investigate the knowledge, attitude and behavior of pediatricians in Jeddah, in order to ensure that maximum preventive and interceptive benefits can be delivered to children in the domain of oral health.

In this study the sample showed a balance distribution of respondents regarding gender. The mean age of the sample was 39.57±8.58 and nearly half graduated more than 16

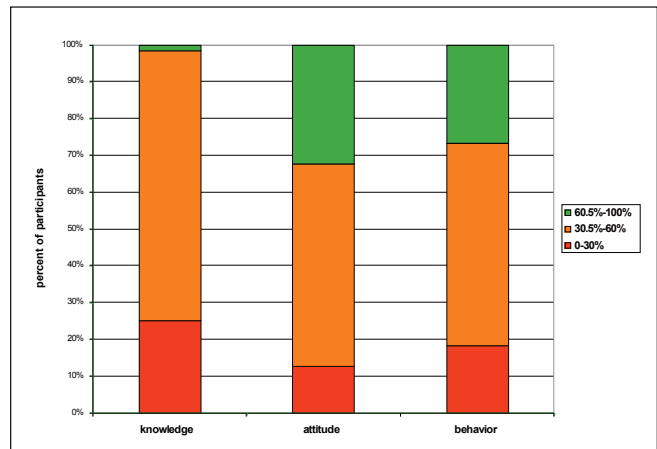


Figure 2. Distribution of participant pediatricians according to KAB scores.

years ago which indicated that the respondent pediatricians have considerable experience in their field.

Pediatricians’ dental knowledge

Pediatricians’ dental knowledge proved to be limited (1.4% had scores higher than 60%). Similar findings were reported by Lewis *et al*⁴ who reported that only 9% of U.S pediatricians answered four knowledge questions correctly. Contrary to the AAPD and AAP^{18,19} recommendations, the majority of the pediatricians in Jeddah (74.4%) did not agree on the concept of early dental visits. This finding coincides with other reports.^{5,20} Moreover, 24% of respondents felt that children who were free of caries did not need to visit a dentist at all.

The results of this study revealed that only 11.3% of pediatricians prescribed fluoride. Some pediatricians had recommended fluoride prescription immediately after birth or during infancy. This coincides with the old fluoride recommendation of AAP in 1986.²¹ Only 4.9% of pediatricians knew the appropriate type of fluoride, 4.4% recognized the right age to receive supplements and 9.1% considered the level of fluoride in drinking water before fluoride prescription. The present finding is not in accordance with the study of Jones and Berg.²² However, Lewis *et al*⁵ reported that only 60.8% of pediatricians’ respondents were aware of the fact that 3 months of age infants do not need fluoride supplementation. This reveals the poor oral health knowledge of pediatricians and highlights urgent need for efforts to upgrade it.

The present study showed that half of pediatricians recommended brushing with an amount of tooth paste equivalent to the brush full-length. This could probably be the results of advertisement presenting a full length tooth paste. Moreover, one third of participants preferred that children start brushing with tooth paste before one year of age. The results are supported by the study of Sanchez *et al*²³ On the other hand, 38.6% were aware that tooth paste should be introduced at two years of age, and 26.7% believed that swallowing fluoridated tooth paste could be hazardous to the children’s health. Many studies considered tooth paste swallowing as a risk factor for dental fluorosis.²⁴⁻²⁶ Based on the

AAPD fluoride guide line in 2009, a 'smear' of fluoride tooth paste for children less than two years of age may decrease risk of fluorosis. A pea size amount of toothpaste is appropriate for children aged 2 through 5 years.²⁷

For several decades, fissure sealants were accepted as an effective way of caries prevention. However, the pediatricians' knowledge of caries preventive and potentials of fissure sealants were found to be limited, considering that 82.6% of pediatricians did not even know what fissure sealants are. Similar results were also reported by previous studies.^{14,23,28}

Thumb-sucking and pacifier use are considered harmless if stopped before the age of three years and complications are reversible when the habit is stopped before the eruption of permanent anterior teeth.²⁹ In the present study, only 9% correctly recognized that thumb-sucking habit should be stopped before the eruption of the permanent incisors. The proportion is far lower than that reported by Al-Hussyeen *et al*¹⁴ Furthermore, almost 39% of respondents reported the age of three years as the critical limit beyond which the habit would exert a harmful effect on dentition. They probably selected this age because it was the lowest age level on the list. They believed that the habit should be controlled as soon as the child adopts it. Since Al-Hussyeen's study sample was derived mainly from Riyadh and Dammam, the finding indicates differences in the oral health knowledge among pediatricians from different areas of the Kingdom of Saudi Arabia. The sample structure could account to this difference, since in Al-Hussyeen *et al* study the responders were only consultants and specialists.

Appropriate breast feeding is recognized as the best feeding method for infants. However, nocturnal breast feeding, at will-breast feeding, and weaning delayed beyond the age of two years could all have a harmful effect on dentition similar to that produced by bottle feeding.^{18,30} In contrast to the previous information, 61.9% of pediatricians recommended at will-feeding for infants. The results of this survey support previous studies suggested that, although clinicians recommended breast feeding, they may not follow all current national guidelines.^{31,32}

Pediatricians' dental attitude

The majority of pediatricians did not feel they were able to provide information related to oral health. Mainly consultants were among those who felt confident to fulfill this part. This could be related to their longer period of experience.

Only 21.5% agreed with AAP¹⁹ recommendation that it was pediatricians obligation to prescribe fluoride. However, it was surprising to find out that the majority of pediatricians (76%) believed that the fluoride level in drinking water is an important issue to be considered before prescribing fluoride supplementation, although the correct responses to the relative knowledge questions scored the lowest (9%). The findings are similar to those reported by Al-Hussyeen *et al*¹⁴ who concluded that although pediatricians are aware of the importance of fluoride, water fluoridation and fluorosis, they did not know the accurate amount of fluoride content in

water. The majority of pediatricians (81.3%) were also familiar with the harmful effect of night breast feeding. This finding is in accordance with Al-Hussyeen *et al* study.¹⁴

Regarding dental trauma, only 52.6% of respondents believed that re-implantation of an avulsed tooth is possible. This supports the conclusion of Al-Nazhan *et al*³³ who recommended that efforts should be made to improve awareness of adverse effects and management of dental trauma.

Pediatricians' dental behavior

Out of the total sample, only 26.7% gave correct responses for 60% of the behavior questions. Seventy-eight percent of pediatricians reported that they routinely examined the oral cavity. This reflects an awareness of their role in promoting oral health care. This result is similar to that reported by Sanchez *et al*.²³ However, Al-Hussyeen *et al*¹⁴ reported that almost half of pediatricians did not routinely include dentition in their examinations.

Only 47.4% of pediatricians instructed their patients to visit the dentist, however, they did not check out parents' compliance or appointment availability. They either referred them to general dentists (39.7%), or to the pediatric dentists (23.4%). The limited number of pediatric dentists in Jeddah might be a reason for limited referrals. An improper referral system and access barriers could also be contributing factors. Lewis *et al*⁴ reported that more than half of US pediatricians had difficulties in referring their patients. This finding is also similar to that of Sanchez *et al*²³ who reported that most physicians referred their patients to general dentists especially those who practiced in rural areas. According to the present study, 9.1% of the pediatricians preferred to deal with dental infection problems in their clinics, probably to control the infection and prevent an emergency situation, or because of the difficulty in making an efficient referrals.

Reasons given for referral includes caries (73.8%), dental pain (61.2%), and fever or swelling (59.5%). These suggested that the majority of pediatricians referred their patients for dental treatment when there was an obvious dental problem. This is accordance with previous data which showed that dental caries and pathoses elicited more concern among physicians than dental developmental issues such as malocclusions or abnormal eruption patterns.¹⁰

The AAPD¹⁸ and AAP¹⁹ have recommended that oral hygiene instructions and dietary counseling be routinely taught to patients during children's well-visits. However, only half of the pediatricians surveyed followed these recommendations.^{14,34} This assumption was supported by other studies.^{14,34}

Concerning dietary counseling, only 30.9% provided dietary counseling to patients. A similar proportion was reported by Sanchez *et al*.²³ Interestingly, almost half of pediatricians who rewarded patients at the end of the child's well-visit rewarded them with sweets. This behavior would undermine the impact of their dietary instructions.

The AAP³⁵ has advised pediatricians to inform parents to avoid prolonged at-will breast feeding. However, in the present study, more than 60% of participants recommended

on-demand feeding for their patients, despite their awareness of the harmful effect of night feeding as reported in their attitude responses.

When respondents' scores for the knowledge, attitude and behavior were compared, analysis proved that attitude scores were significantly the highest, whereas, the knowledge scores were significantly the lowest. Although pediatricians' dental knowledge was considered the minimum, experience from long periods of practice have improved their dental behavior and affected their conception of tasks. In conclusion, this study demonstrated that pediatricians KAB concerning oral health were not satisfactory.

RECOMMENDATIONS

- Pediatricians' role in oral health care should be supported by proper information, motivation and determination.
- Channels of communication should be developed between pediatricians and dental pediatric clinics.
- Collaboration between pediatricians and dental practitioners should be promoted to improve the quality of dental care provided.
- A well established referral system should be structured in every hospital to improve oral health care for children.
- Pediatricians should be trained to perform oral health risk assessment, apply anticipatory guidance, and manage emergency situations.

REFERENCES

1. Alamoudi N, Salako NO, Massoud I. Caries experience of children aged 6 to 9 years in Jeddah, Saudi Arabia. *Int J Pediatr Dent* 6(2): 101–5, 1996.
2. Al-Malik MI, Rehbini YA. Prevalence of dental caries, severity, and pattern in age 6 to 7-year-old children in a selected community in Saudi Arabia. *J Contemp Dent Pract* 7(2): 46–54, 2006.
3. Al-Majed I, Murray JJ, Maguire A. Prevalence of dental trauma in 5-6 and 12-14 year-old boys in Riyadh, Saudi Arabia. *Dent Traumatol* 17(4): 153–8, 2001.
4. Lewis CW, Grossman DC, Domoto PK, Deyo RA. The role of the pediatrician in the oral health of children: a national survey. *Pediatrics* 106(6): e84, 2000.
5. Kressin NR, Nunn ME, Singh H, Orner MB, et al. Pediatric clinicians can help reduce rates of early childhood caries: effects of a practice based intervention. *Med Care* 47(11): 1121–8, 2009
6. Lewis C, Lynch H, Richardson L. Fluoride varnish use in primary care: What do providers think? *Pediatrics* 115(1): e69–e76, 2005.
7. Kumari NR, Sheela S, Sarada PN. Knowledge and attitude of infant oral health among graduated medical students in Kerala. *J Indian Soc Pedod Prev Dent* 24(4): 173–6, 2006.
8. Subramaniam P, Babu KL, Babu PS, Naidu P. Oral health care of children: gynecologists and pediatricians' perspective. *J Clin Pediatr Dent* 32(3): 253–8, 2008.
9. Lewis C, Boulter S, Keels M, Krol D, Mouradian W, O'Connor K and Quinonez R. Oral health and pediatricians: results of a national survey. *Acad Pediatr* 9(6): 457–61, 2009
10. Pierce KM, Rozier RG, Vann WF. Accuracy of pediatric primary care providers' screening and referral for early childhood caries. *Pediatrics* 109:e82, 2002.
11. Mouradian WE, Mouradian W, Schaad DC, Kim S, Leggott PJ, Domoto PS, Maier R, Stevens NG, and Koday M. Addressing disparities in children's oral health: a dental-medical partnership to train family practice residents. *J Dent Educ* 67(8): 886–895, 2003.

12. Mouradian WE, Kim S, Marshal SG. An oral health curriculum for medical students at the University of Washington. *Acad Med* 80(5): 434–42, 2005.
13. Douglass AB, Gonsalves W, Maier R, Silk H. Smile for life: A national oral health curriculum for family medicine. A model for curriculum development by STFM groups. *Fam Med*, 39(2): 88–90, 2007.
14. Al-Hussayen A, Al-Sadhan S, Al-Dhalaan R, Al-Ghanim B. Pediatricians' knowledge and practices towards children's preventive oral health care in Saudi Arabia. *Egyptian Dental Journal*, 49: 827–34, 2003.
15. Ministry Of Health. Physicians and dentists, MOH hospitals by specialty, sex, nationality and region 1421/1422 H. Health Statistical Year Book. Ministry of Health: 145–6, 2001.
16. Ministry of Health, Directory of Health Affairs in Jeddah City. List of licensed pediatricians according to their specializations: Medical licensing regulations—Ministry of Health, 2006.
17. Wilcoxon, F. *Individual Comparisons by Ranking Methods*. Biometrics Bulletin, 1: 80–83,1945
18. American Academy of Pediatric Dentistry. Guidelines on periodicity of examination, preventive dental services, anticipatory guidance, and oral treatment for children. Reference manual. *Pediatr Dent*, 30(7): 112–8, 2008–2009.
19. American Academy of Pediatrics. Oral health risk assessment timing and establishment of the dental home. Policy statement. *Pediatrics*, 111: 1113–6, 2003.
20. Ismail AI, Nainar SM, Sohn W. Children's first dental visit: attitudes and practices of US pediatricians and family physicians. *Pediatr Dent*, 25: 425–30, 2003.
21. American Academy of Pediatrics. Committee on Nutrition Fluoride Supplementation. *Pediatrics*, 77: 758–61, 1986.
22. Jones KF, Berg JH. Fluoride supplementation. A survey of pediatricians and pediatric dentists. *Am J Dis Child*, 146(12): 1488–91, 1992.
23. Sanchez OM, Childers NK, Fox L, Bradley E. Physicians' views on pediatric preventive dental care. *Pediatr Dent*, 19(6): 377–383, 1997.
24. Beltran ED, Szpunar SM. Fluoride in toothpastes for children suggestion for change. *Pediatr Dent*, 10(3): 185–8, 1988.
25. Simard PL, Naccache H, Lachapee D, Brodeur JM. Ingestion of fluoride from dentifrices by children aged 12 to 24 months. *Clin Pediatr (Phila)*, 30(11): 614–7, 1991.
26. Tan BS, Abdul Razak I. Fluoride exposure from ingested toothpaste in 4-5-year-old Malaysian children. *Community Dent Oral Epidemiol*, 33(5): 317–25, 2005.
27. American Academy of Pediatrics Dentistry. Guideline of fluoride therapy. *Pediatric Dentistry*, 30(7): 122, 2009.
28. Tsamtsouris A, Gavis V. Survey of pediatrician's attitudes towards pediatric dental health. *J Pedod*, 14: 152–7, 1990.
29. American Academy of Pediatrics. Dental Health— Effects of pacifiers, thumb sucking and diet. Medical library <http://www.medem.com>, 2004. Sited in April 2007.
30. Dini EL, Holt RD, Bedi R. Caries and its association with infant feeding and oral health-related behaviours in 3-4 year old Brazilian children. *Community Dent Oral Epidemiol*, 28(4): 241–8, 2000.
31. Schanler RJ, O'Connor KG, Lawrence RA. Pediatricians' practices and attitudes regarding breastfeeding promotion. *Pediatrics*, 103(3): e35, 1999.
32. Taveras EM, Li R, Grummer-Strawn L, Richardson M, Marshall R Rêgo VH, Miroshnik I, Lieu TA. Mothers' and clinicians' perspectives on breastfeeding counseling during routine preventive visits. *Pediatrics*, 113(5): e405–e411, 2004.
33. Al-Nazhan S, Andreasen JO, Al-Bawardi S, Al-Rouq S. Evaluation of the effect of delayed management of traumatized permanent teeth. *J Endod*, 21(7): 391–3, 1995.
34. Koranyi K, Rasnake LK, Tarnowski KJ.. Nursing bottle weaning and prevention of dental caries: a survey of pediatricians. *Pediatr Dent*, 13: 32–4, 1991.
35. American Academy of Pediatrics. Breastfeeding and the use of human milk. *Pediatrics*, 115(2): 496–506, 2005.