Research Article

Oral Health Knowledge and Experience of Pediatricians and Pediatric Residents in Kuwait: A Nationwide Cross-Sectional Survey Study

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Received 30 November 2021; Revised 23 March 2022; Accepted 13 May 2022; Published 6 June 2022

Academic Editor: Sivakumar Nuvvula

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Objective. To evaluate the knowledge level and practice of pediatricians and pediatric residents regarding children’s oral health in Kuwait. Subjects and Methods. A nationwide cross-sectional survey was distributed to pediatricians and pediatric residents practicing in Kuwait. Data concerning demographic variables, knowledge on dental caries preventive measures, current anticipatory guidance, and experience with dental problems and oral care were collected using online and paper-based surveys. Results. A total of 230 completed the survey with a response rate of 50.1%. Most respondents (81%) had noticed dental caries in children more frequently. Two-thirds of respondents felt confident in detecting dental caries. However, more than two-thirds were unfamiliar with preventive dental practices and the management of dental trauma. Only 16.5% of the respondents got satisfactory knowledge score on the preventive measures questions, and nearly 51% got satisfactory knowledge on the recent anticipatory guidance questions. No significant correlations were found between gender or years of practice and knowledge scores. Respondents’ confidence in detecting caries was significantly associated with the knowledge score of the anticipatory guidance (p = 0.003). Conclusion. Dental caries is an oral problem commonly encountered by many pediatricians and pediatric residents in Kuwait. The majority has adequate knowledge of the current anticipatory guidance of oral health issues, but they have insufficient knowledge levels on oral preventative measures. Adequate education and training in oral health are highly recommended.

1. Introduction

Early childhood caries (ECC) is a major worldwide infectious oral health problem that affects preschool children [1]. ECC occurs as a result of the interaction of many risk factors such as pathogenic microorganisms, sugary diets, poor oral hygiene, low socioeconomic status, and irregular dental visits [2, 3]. Despite recommendations for young children to visit a dentist by 12 months [2], many parents often take their children to the dentist only when a dental problem becomes severe and causes pain or discomfort [4].

Regarding global prevalence, the World Health Organization (WHO) reported that about 60–90% of preschool children are affected by ECC in most countries [5]. The prevalence remains high in developing countries (up to 70%) and among children of low-income and minority status in developed countries [6]. In Kuwait, the prevalence of ECC in 4- and 5-year-old children was 68% and 76%, respectively [7]. It was similar to the prevalence reported in some Middle Eastern countries [8, 9].

Oral health has a significant impact on children’s general health [10, 11]. ECC often results in pain and swelling that lead to problems in eating, speaking, and aesthetics. Moreover, the consequences of ECC have been associated with high emergency room visits [12], high treatment costs [13], loss of school days [14], lessened learning ability [15], and reduced oral health-related quality of life [16].

Parents usually contact pediatricians several times during the child’s early life [17]. Pediatricians are often the primary care providers of young children when ECC may
develop. Therefore, pediatricians can play a vital role in improving the oral health of their child patients. They may provide preventive information, early caries risk assessment, early detection, and appropriate referrals that help in the child’s growth and development [17]. Unfortunately, pediatricians receive insufficient education on oral health during their medical training [17, 18]. Therefore, they should seek to know the updated knowledge and information related to oral health preventive measures [19].

The increasing prevalence of preschool children’s dental caries experience in Kuwait [7] would necessitate further attention to assess the overall pediatricians’ knowledge, attitudes, and practices regarding children’s oral health. Therefore, the current study aimed to evaluate the knowledge level and practice of pediatricians and pediatric residents regarding children’s oral health in Kuwait.

2. Materials and Methods

This was a nationwide cross-sectional survey study approved by the ethical committee of Kuwait University Health Sciences Centre and the Ministry of Health in Kuwait. The study population was pediatricians and pediatric residents who provide health care for children in Kuwait. They were identified using the membership databases of the Kuwait Medical Association (KMA) and the Kuwait Pediatric Association (KPA). To get a medical license and practice in Kuwait, it is a must to be a member of KMA. There were a total of 532 registered members (residents, pediatricians) in the database. Based on the current data, the minimum required respondents were predicted to be 224, to have a confidence level of 95% with an estimated 5% margin of error.

A structured questionnaire was adapted from previous surveys in the literature [20–24]. Then, it was piloted with a group of ten pediatric residents and ten pediatricians who were not included in the study results. No further changes were made. All items in the questionnaire were assessed for content and face validity among the pilot group on a Likert Scale. All participants found the questionnaire to be understandable and comprehensible. Brief information about children’s dental caries experience in Kuwait and the study aims were provided on the cover page. The questionnaire included five sections. The first section obtained the sociodemographic characteristics of participants (e.g., age, gender, years of practice, practice sector, place of specialty, degree, number of children they treat per day, and whether they receive any dental health-related subjects during medical school or residency). The second section consisted of six questions (yes/no) related to the participant’s knowledge of preventive measures in children’s oral health. The third section contained twelve knowledge-based questions (yes/no) on current anticipatory guidance and assessment practices during the childcare visit and was regarded as practising following the recommendations of the American Academy of Pediatrics (AAP) and AAPD. The fourth and fifth sections of the questionnaire addressed the participants’ experience in pediatric dental problems and aspects of continuing education, respectively. The questionnaire was not expected to take longer than 10 minutes to complete.

The data were collected between January and March 2019. Recruitment was performed by distributing the questionnaire in two different formats. Online surveys, using Google Forms (https://www.google.com/forms), were sent to all registered KMA and KPA members’ emails and WhatsApp (https://www.whatsapp.com). Two follow-up reminders to complete the survey were sent two weeks apart. The other format was paper surveys given to 314 registered attendees at the 4th International Pediatric Conference, which occurred in Kuwait in 2019. The conference participants were asked not to complete the survey if they had already returned the online surveys. Participation was anonymous and voluntary.

The knowledge level of participants on oral preventive measures and current anticipatory guidance and assessment practices was determined based on their total knowledge scores. The knowledge questions were scored as correct or incorrect according to the recommendations of the AAP and AAPD [2, 25–28]. A score of “1” was given for the correct answer and “0” for incorrect or unknown answers. A total knowledge score was calculated and then classified into three tertials [29]:

(i) Poor score: <50% of the correct answers
(ii) Fair score: 50%–75% of the correct answers
(iii) Satisfactory score: >75% of the correct answers

The data were entered into an Excel spreadsheet and then analyzed using Statistical Package for the Social Science version 20.0 software (SPSS Inc., Chicago, Ill., USA). Descriptive statistics (frequency, percentage, and mean) were determined. The chi-square test was used to determine the associations between the categorical variables. All p values <0.05 were considered statistically significant.

3. Results

Of the 532 registered members in the database, all invited to take part in the online study survey, 41 were returned because of incorrect email addresses and phone numbers (Figure 1). Of the remaining 491 members with valid addresses, 13 reported that they had retired and 19 reported that they did not provide care for young children (surgical specialties or administrators). Therefore, out of 459 eligible members, a total of 72 online surveys were completed. For the paper survey, out of 314 conference attendees, 31 reported their completion of the online survey. Of the 283 eligible attendees, 158 agreed to participate and completed the paper survey (response rate 55.8%). Therefore, a total of 230 agreed and completed online and paper surveys with a response rate of 50.1%.

Table 1 shows the sociodemographic characteristics of the study participants. The study sample included 194 pediatricians (84.3%) and 36 pediatric residents (15.7%). There were 127 female respondents (55.2%) and 103 male respondents (44.8%). More than a third of the respondents (37.8%) were in (35 to 44 years) age, and only 12.2% were
532 identified in the database

**Online Survey**
532 invited to participate
(i) Excluded (n=73)
   (1) Incorrect contact addresses (n=41)
   (2) Retired (n=13)
   (3) Do not provide care (n=19)
(ii) Eligible (n=459)

72 participants completed the online survey

**Paper Survey**
314 invited to participate
(i) Excluded (n=31)
   (1) Completed online surveys
(ii) Eligible (N=283)

158 participants completed the paper survey

230 participants completed the study surveys

**Figure 1:** Flow chart of survey study participants.

**Table 1:** Socio-demographic characteristics of the study participants.

| Characteristic             | Total N = 230 | Percentage (%) |
|----------------------------|---------------|----------------|
| **Gender**                 |               |                |
| Female                     | 127           | 55.2           |
| Male                       | 103           | 44.8           |
| **Age Group**              |               |                |
| 25-34                      | 56            | 24.3           |
| 35-44                      | 87            | 37.8           |
| 45-54                      | 59            | 25.7           |
| >55                        | 28            | 12.2           |
| **Current Position**       |               |                |
| Pediatricians              | 194           | 84.3           |
| Pediatric Residents        | 36            | 15.7           |
| **Years of Practice**      |               |                |
| ≤5                         | 29            | 12.6           |
| 6-10                       | 38            | 16.5           |
| 11-15                      | 60            | 26.1           |
| 16-20                      | 37            | 16.1           |
| >20                        | 66            | 28.7           |
| **Practice Sector**        |               |                |
| Public Sector              | 143           | 62.1           |
| Private Sector             | 39            | 17             |
| Academic                   | 8             | 3.5            |
| Academic and public        | 22            | 9.6            |
| Academic and private       | 18            | 7.8            |
| **Number of patients per day** |         |                |
| <10                        | 67            | 29.1           |
| 10-25                      | 108           | 47             |
| >25                        | 55            | 23.9           |
above 55 years old. Almost one-third of the respondents (28.7%) had more than twenty years of practice, and 12.6% of the respondents had less than five years of practice. Two-thirds of respondents (62.2%) work in the public sector. About half of the respondents (47%) reported that they see 10 to 25 patients daily. The majority of respondents (64.3%) were board-certified. When asked about studying any dental health-related subjects during the medical school or residency program, 66.5% and 72.2% of respondents denied, respectively.

The knowledge level of participants on the oral preventive measures was investigated and described in Table 2. Most respondents were aware that the baby bottle is not the only cause of ECC (62.2%), and the recommended age for the child’s first dental visit is 1 (61.7%). Around half of the respondents knew that a 3-month-old child did not require fluoride supplementation (47%), bacterial transmission can occur from mother to child (55.2%), dental sealants are not often applied to primary teeth (50.9%), and fluoridated toothpaste should be used to children less than 3 years old (47.9%). Only 16.5% of respondents (n = 38) correctly answered all six questions and got a satisfactory level of knowledge. While more than half of the respondents (56.1%) got fair knowledge, followed by a third of the respondents (27.4%) with a poor knowledge score (Figure 2). There was no significant association between knowledge level and gender (χ² (2) = 0.303; p = 0.859) or years of practice (χ² (2) = 10.5, p = 0.230).

Regarding the participants’ knowledge on the current anticipatory guidance and assessment practices (Table 3), the majority claimed that they inquired information about the infant’s bottle use at bedtime (79.6%) and children’s oral habits (65.2%), and they examined children’s teeth for dental caries (72.2%). Furthermore, counseled on dental visits (67.4%), the importance of tooth brushing (73.9%), and children’s sugar consumption (74.3%). Only half of the respondents considered prescribing sugar-free syrup (47.4%), and about 39% counseled the use of mouthguards during sports for schoolchildren. In addition, when asked about their opinion on specific dental practices to be part of the routine well-childcare visit, most respondents (85%) agreed to assess the dental problems and counsel on their prevention (Table 3). Besides, two-thirds (60.9%) acknowledged referring the child to a dentist at age 1. Additionally, half of them (54.8%) considered applying fluoride varnish in the office. Overall, 50% of participants got satisfactory knowledge levels of the current anticipatory guidance and assessment practices (shown in Figure 1). Neither gender (χ² (2) = 0.767, p = 0.681) nor years of practice (χ² (2) = 8.7, p = 0.368) had significant associations with the knowledge level.

The participants’ experiences with dental problems and dental care are presented in Table 4. Nearly eighty percent of the respondents had noticed early childhood caries in young children on a monthly (43.5%) and a weekly basis (37.8%) in their practice. Moreover, dental caries in school-aged children were noticed more frequently by half of the respondents (51.3%) on a weekly basis. Many respondents (63.5%) were confident in detecting dental caries. Of those, 70% got a satisfactory knowledge level on the current anticipatory guidance and assessment practices compared to the unconfident respondents (30%, χ² (2) = 11.5, p = 0.003). In contrast, only 19.2% of those confident practitioners got a satisfactory knowledge level of preventive measures. There was no significant effect of practice years on the confidence level (χ² (4) = 5.1, p = 0.271). Many participants were unfamiliar with preventive dental practices such as fluoride varnish (68.7%) and dental sealants (73.9%) or with the management of dental trauma (74.8%).

Regarding the information source of oral health, 30.9% of respondents received oral health information. The internet was the primary information source (21.7%), followed by continuing education courses (12.2%) and books (11.3%, Table 5). Few respondents got information from scientific journals (5.7%). The necessity of having a continuing education course regarding children’s oral health has been strongly agreed by respondents (85.2%, Table 5).

4. Discussion

Many surveys have been conducted internationally to investigate the role of non-dental practitioners in improving children’s oral health outcomes [28]. Although the prevalence of dental caries in children is extremely high in Kuwait, to our knowledge, this is the first nationwide survey to investigate the pediatricians’ knowledge and awareness regarding children’s oral health. Oral health education differed remarkably among several countries, and it was mainly delivered through continuing education and practical experience [30]. The current study showed that most respondents did not receive oral health

Table 1: Continued.

| Characteristic                        | Total N = 230 | Percentage (%) |
|--------------------------------------|---------------|----------------|
| Board-certification                  |               |                |
| Yes                                  | 148           | 64.3           |
| No                                   | 82            | 35.7           |
| Receiving dental subjects in medical school |         |                |
| Yes                                  | 77            | 33.5           |
| No                                   | 153           | 66.5           |
| Receiving dental subjects in residency program |       |                |
| Yes                                  | 64            | 27.8           |
| No                                   | 166           | 72.2           |
education in medical school (66.5%) or residency programs (72.2%). A similar finding was reported (67%) in a recent European study [30], and even a higher percentage (90.4%) was documented in neighboring Saudi Arabia [31]. Inadequate knowledge or training on oral health issues may be a barrier for pediatricians to promote children’s oral health effectively [21].

In the current survey, deficits of key knowledge related to dental caries preventive measures were spotted among half of the pediatricians. They were unaware of the transmission of cariogenic bacteria from mother to child and the international recommendations on specific interventions such as fluoride therapy and dental sealants. Other studies have documented similar findings in the knowledge of preventive measures [31–35], but a better knowledge of transmission was reported in the US and European studies [20, 30]. Regarding the first dental visit, AAP and AAPD recommend that all children have their initial dental visit

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**Table 2: Responses to knowledge questions on preventive measures.**

| Questions                                                                 | Correct response | Agreed N (%) | Disagreed N (%) | Don’t know N (%) |
|---------------------------------------------------------------------------|------------------|--------------|-----------------|------------------|
| Only bottle-fed children get early childhood caries (baby bottle tooth decay) | False            | 82 (35.6)    | 143 (62.2)      | 5 (2.2)          |
| A 3-month-old baby living in non-fluoridated area needs fluoride supplementation | False            | 118 (51.3)   | 108 (47.0)      | 4 (1.7)          |
| Dental decay-causing bacteria can be transmitted between mother and child  | True             | 127 (55.2)   | 98 (42.6)       | 5 (2.2)          |
| Dental sealants are usually applied to the child’s primary teeth          | False            | 109 (47.4)   | 117 (50.9)      | 4 (1.7)          |
| The recommended age for the child’s first dental visit is at 1-year-old   | True             | 142 (61.8)   | 84 (36.5)       | 4 (1.7)          |
| Fluoridated toothpaste should not be used in children less than 3 years of age | False            | 116 (50.4)   | 110 (47.9)      | 4 (1.7)          |

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**Figure 2: Participants’ level of knowledge (%) on preventive measures and current anticipatory guidance and assessment practices.**

**Table 3: Current anticipatory guidance and assessment practices on the role of pediatricians in promoting oral health.**

| At a well-childcare visit in your practice, do you likely perform the following? | Likely N (%) | Agreed N (%) |
|-------------------------------------------------------------------------------|--------------|--------------|
| Inquire about infant’s feeding practices and bottle use at bedtime             | 183 (79.6)   | 196 (85.2)   |
| Examine child’s teeth for dental cavities                                     | 166 (72.2)   | 195 (84.8)   |
| Counsel on going to dentists                                                   | 155 (67.4)   | 126 (54.8)   |
| Counsel on the importance of toothbrushing                                    | 170 (73.9)   |              |
| Counsel on child’s sugar consumption                                           | 171 (97.3)   |              |
| Consider sugar free syrup prescriptions                                       | 109 (47.4)   |              |
| Counsel on the use of mouth guard during sports for school children           | 89 (38.7)    |              |
| Inquire about child’s oral habits                                             | 150 (65.2)   |              |

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### Current Anticipatory Guidance & Assessment Practices

- Preventive Measures:
  - 27.4% Poor
  - 56.1% Fair
  - 16.5% Satisfactory

- Current Anticipatory Guidance & Assessment Practices:
  - 13% Poor
  - 36.1% Fair
  - 50.9% Satisfactory

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no later than their first birthday [2]. Two-thirds of respondents in the current survey supported the dental referral of children by one year of age. They believed that it should be performed during the child’s physical examination. This result was high compared to what was previously reported [20, 30–35]. According to other researchers, half of their responders recommended children’s first dental visits be between the ages of 1 and 3 [21, 22, 29, 30]. Despite many pediatricians being aware of the recommended referral, Karasz et al. found that few managed to complete the referral [36].

Most pediatricians in the present study claimed that they assess children’s teeth and include anticipatory guidance on oral health issues in their well-childcare visits. Variable rates were previously reported for the examination of children’s teeth. Rates ranged from 90% in the US and Canadian studies [21, 26] to 60% in the Saudi and Emirati studies [31, 35] and lower rates in some Indian studies [32, 33]. Most pediatricians in the present survey (85%) believed that assessing dental problems and counseling on their prevention should be part of the routine childcare visit. Two-thirds (64%) of our respondents felt confident enough to detect dental caries. Studies conducted in the US, Europe, and India found similar results [21, 29, 30, 32]. Of note in the present study, no significant effect of years of practice was shown on the pediatricians’ confidence in detecting caries. However, Hadjipanayis et al. found that experienced pediatricians (>10 years in practice) felt confident about identifying dental caries [30].

Around half of the surveyed pediatricians agreed that they should apply fluoride varnish during the routine childcare visit. Lewis et al. [21] found that although 21% of pediatricians agreed that the application of fluoride varnish should be a part of well-childcare, only 4% of them provided that. Pediatricians can play a vital role in preventing dental caries by offering the application of fluoride varnish in their practice [37]. It is an effortless procedure and doesn’t require special training or operatory.

Relatively half of the pediatricians in the present study were likely to consider sugar-free syrup prescriptions. The result was inconsistent with Girish Babu et al.’s study [38]. The finding was not investigated in previous similar studies [21, 26, 29–35]. In general, many pediatricians believe that sugar-free medications are not as sweet as sugar-containing medications and are more expensive [38, 39].

With the increased participation by children in different sports, the risk of orofacial injuries is rising as a shared concern. About thirty percent of oral injuries in children have been reported to occur during sports activities [40]. AAPD and Academy for Sports Dentistry recommend using

| Questions | N (%) |
|-----------|-------|
| How often do you notice “Early childhood caries” in young children? | |
| At least once a month | 100 (43.5) |
| At least once a week | 87 (37.8) |
| I don’t check children’s teeth | 43 (18.7) |
| How often do you notice “Dental Caries” in school-aged children? | |
| At least once a month | 73 (31.7) |
| At least once a week | 118 (51.3) |
| I don’t check children’s teeth | 39 (17.0) |
| Are you confident in detecting dental caries?* | 146 (63.5) |
| Are you familiar enough with “fluoride varnish” for preventive dental care?* | 72 (31.3) |
| Are you familiar enough with “dental sealants” for preventive dental care?* | 60 (26.1) |
| Are you familiar enough with the management of dental trauma?* | 58 (25.2) |

*Yes answers only

| Questions | N (%) |
|-----------|-------|
| Are you receiving any information on oral health? | |
| Yes | 71 (30.9) |
| Scientific journals | 13 (5.7) |
| Continuing education | 28 (12.2) |
| Brochures or pamphlets | 12 (5.2) |
| Internet | 50 (21.7) |
| Books | 26 (11.3) |
| Others | 9 (3.9) |
| Need for continuing education course regarding child’s oral health? | |
| Yes | 196 (85.2) |
| Diagnosis only | 51 (22.2) |
| Management only | 38 (16.5) |
| Prevention only | 68 (29.6) |
| All | 144 (62.6) |
mouthguards for all children engaged in competitive sports [41]. In the current study, more than two-thirds were not aware of the management of dental trauma. Also, a few respondents (38%) counseled using sports mouthguards for schoolchildren. Educating pediatricians on the need for and use of mouthguards for children who engage in sports is essential.

Overall, half of the respondents in the current study demonstrated fair knowledge of preventive measures and satisfactory knowledge of anticipatory guidance and assessment practices. This might be explained by the fact that many respondents were board-certified and followed the AAP guidelines. However, the findings still imply significant gaps in preventive oral health and dental trauma topics. In our study, years of practice have not shown significant associations with investigated knowledge levels. Most of our respondents had eleven or more years of experience. Interestingly, Oge et al. found that years of experience were linked to a major decline in oral health knowledge [42].

In the present study, both paper-based surveys and online-based surveys were used. The conducted online surveys produced lower response rates compared to the paper-based surveys. The mixed-mode survey administration has been found to produce the highest response rate but at a considerably greater cost [43]. The respondents in the current study appeared to have a particular interest in the survey results and might have felt a professional obligation to complete the survey. The majority showed their need for further continuing education courses on the child’s oral health.

There are some limitations in the current study. As with any survey, there is the potential for response bias. Although the response rate of 50.1% is consistent with previous surveys [20, 29], the nonrespondents possibly had other experiences and opinions regarding oral health in pediatric practice. Also, this study did not include family physicians since most of them work in polyclinics and often refer children’s cases to pediatricians to evaluate the rest work in administrative jobs. Even though the current survey research has validity problems in which the provided answers may not reflect the accurate participants’ knowledge and practice, the findings of this survey would establish baseline data about pediatricians’ oral health knowledge in Kuwait. In addition, it would be the foundation for the Kuwait Board of Pediatrics and local authorities to uphold good oral healthcare by running educational courses on different oral health aspects. Also, the current data generated from Kuwait, together with data from Saudi Arabia [31] and UAE [35], would give a clearer picture to the authorities of the Gulf Cooperation Council (GCC) in healthcare. The collaboration between the medical and dental sectors is a must to promote children’s oral health. Further research is required to explore pediatricians’ attitudes and practice on oral health prevention and orofacial trauma topic after implementing educational courses.

5. Conclusion

The current study shows that early childhood caries is an oral problem commonly encountered by many pediatricians and pediatric residents in Kuwait. Most of them have insufficient knowledge levels on the preventative measures of dental caries and dental trauma. However, they have adequate knowledge levels on the current anticipatory guidance of children’s oral health. Many pediatricians were willing to perform appropriate oral assessments and dental referrals as well as fluoride varnish applications. Continuing oral health education courses during pediatric training programs is required to ensure high-quality care for children locally and internationally.

Data Availability

Raw data have been stored securely at the Kuwait University Dental School. All the data generated or analyzed during the current study are included in this published article. The data are available on request to the corresponding author.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Acknowledgments

The author is very thankful to all associated personnel in any reference that contributed to for the purpose of this research.

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