Knowledge and Practices for Early Childhood Caries Prevention among Parents of the Children Visiting King Abdulaziz University Pediatric Dental Clinics, Kingdom of Saudi Arabia

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ABSTRACT

Aim: Children’s oral health maintenance is influenced by their parents’ knowledge and behaviors. Therefore, the aim of this study was to assess the knowledge and practices among parents for prevention of early childhood caries (ECC) in children.

Materials and methods: This cross-sectional study interviewed the parents visiting the Pediatric Dental Clinic in King Abdulaziz University, Faculty of Dentistry (KAUFD), from January 1, 2018 to December 31, 2018. The questionnaire was drafted based on the recommendations on strategies for ECC prevention by the American Academy of Pediatric Dentistry in 2018.

Results: Of the 549 parents, 283 responded. The mean knowledge score for caries prevention was 2.29 (standard deviation = 1.26) out of 10. In addition, 13.8% of participants scored zero. Knowledge questions that showed the highest correct responses were those associated with fluoride application. However, only 96 (24.4%) participants were aware of fissure sealants, 48 (17%) participants knew that fissure sealants are applied to sound teeth, 35 (12.4%) participants knew the correct age of the first dental visit, and 157 (55.5%) participants practiced snacking between meals. Mothers showed significantly higher mean knowledge score compared with fathers (p < 0.001). In addition, the number of dental visits significantly correlated with the mean parental knowledge score (p < 0.05).

Conclusion: Parental dental knowledge and practices were not satisfactory. Anticipatory guidance should be reinforced by oral healthcare providers on each dental visit. In addition, pediatricians and physicians could be involved in improving parental dental knowledge.

Clinical significance: This study reported the level of knowledge and awareness of parents visiting the Pediatric Dental Clinic in KAUFD. It could be used as a reference for future community services and caries prevention programs conducted by oral healthcare services for children to prevent ECC.

Keywords: Cross-sectional study, Knowledge, Parents, Practice.

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INTRODUCTION

Dental caries is an infectious process involving the breakdown of the tooth enamel.³ Extensive dental caries influences the health and well-being of young children.³ Despite preventive methods, dental caries is highly prevalent worldwide.³,⁴ Children are susceptible to caries, which is multifactorial in origin, as soon as the first tooth erupts.⁵ Early childhood caries (ECC) is a serious dental public health problem in Saudi Arabia. A systematic review in 2013 found that the prevalence of ECC is high and varies with geographic location across Saudi Arabia. The national prevalence is 80% for primary dentition.⁶

Children’s oral health maintenance is influenced by the parent’s knowledge and behaviors. Children under the age of 5 years generally spend most of their time with the parents, especially the mother.⁷ Therefore, the aim of this study was to assess the knowledge and practices for ECC prevention among parents of children with dental caries visiting the Pediatric Dental Clinic in KAUFD.

MATERIALS AND METHODS

Subjects

This cross-sectional study was performed in the Pediatric Dental Clinic at KAUFD, Jeddah, Saudi Arabia. It included all parents of children who attended the pediatric dental clinics between January 1, 2018 and December 31, 2018. The inclusion criteria were (1) healthy children, (2) age ≤16 years, (3) at least one visit to a pediatric dentistry resident or specialist, and (4) at least one carious lesion. The exclusion criteria were (1) comprehensive dental treatment under general anesthesia, (2) no dental treatment, (3) visit to clinics other than the Pediatric Dental Clinic at KAUFD, and (4) no carious lesions.
Methods
Approval for this study was obtained from the ethics committee of KAUF (089-09-18). Parents of the children who met the inclusion criteria (549 parents) were interviewed via telephone by four dental students for 10–15 minutes to complete a questionnaire. Face validity of the questionnaire was performed by two consultants with 20 parents, and the questionnaire was modified accordingly. The questionnaire was drafted based on the recommendations on strategies for ECC prevention by the American Academy of Pediatric Dentistry (AAPD) in 2018. The questionnaire included demographic data of the child and parent, socioeconomic factors (family income, parental education, and parental occupation), and hospital factors (number of dental visits).

Statistical Analysis
The results included descriptive information of the population, which is expressed as number and percentage. The Chi-square test was used to compare the categorical variables, with a significance level of 0.05. In addition, for each question regarding knowledge that was answered correctly, the participant was awarded a score of 1. Thus, the total knowledge score ranged from 0 to 10. Ordinal regression analysis was performed to assess the adjusted association of demographic predictors and sociodemographic predictors (parental occupation, parental education, and family income) with the dependent factor (knowledge score) reported as p-value and 95% confidence interval (CI).

Results
A total of 283 parents (51.5% response rate) participated in the study. The number of fathers and Saudi citizens were 150 (53%) and 225 (79.5%), respectively. The number of parents with male and female children were 137 (48.4%) and 146 (51.6%), respectively. The mean age of children was 8.6 years (standard deviation (SD) = 2.54) years. In terms of educational level, 164 (58%) of the fathers and 142 (50.2%) of the mothers held a bachelor’s degree or higher (Table 1). The mean knowledge score for ECC prevention was 2.29 (SD = 1.26) out of 10. In addition, 13.8% of the participants scored zero. Knowledge questions that showed the highest correct responses were those associated with the duration of professional fluoride application (172/283 (60.8%)) and the appropriate amount of toothpaste recommended in children aged 3–6 years (151/283 (53.4%)). Only 96 (24.4%) participants were aware of fissure sealants, and only 48 (17%) participants knew that it should be applied to sound teeth. In addition, 35 (12.4%) participants knew that the first dental visit should be at the age of 6–12 months. Regarding dietary sugar intake, 67 (23.7%) and 157 (55.5%) participants fed sugary snacks to their children immediately after meals and between meals, respectively. Moreover, 172 (60.8) and 140 (49.5%) participants performed ad libitum breastfeeding and bottle feeding, respectively, until the age of 2 years (Table 2). Mothers showed significantly higher mean knowledge score compared with fathers (p < 0.001). In addition, parents with higher monthly income (p = 0.04), educational level (p = 0.047), and number of dental visits showed significantly higher mean knowledge score (p = 0.008; Table 3).

Regarding practices for ECC prevention, 188 (66.4%) participants did not take their children to a dentist in the absence of dental problems, 53.4% participants brushed their children’s teeth twice a day, and only 21 (7.4%) participants used dental floss for their children (Table 2). The parental educational level and number of dental visits significantly correlated with parental ECC prevention practices (p < 0.05; Table 4).

| Variable | n (%) |
|----------|-------|
| Gender   |       |
| Male     | 137 (48.4) |
| Female   | 146 (51.6) |
| Nationality |       |
| Saudi    | 225 (79.5) |
| Non-Saudi| 58 (20.5) |
| Who answered the questionnaire |       |
| Father   | 150 (53.0) |
| Mother   | 133 (47.0) |
| Father education level |       |
| Illiterate | 7 (2.5) |
| Primary/intermediate | 31 (11.0) |
| High school | 81 (28.6) |
| University or higher | 164 (58.0) |
| Mother education level |       |
| Illiterate | 5 (1.8) |
| Primary/intermediate | 38 (13.4) |
| High school | 98 (34.6) |
| University or higher | 142 (50.2) |
| Father occupation |       |
| Not working | 3 (1.1) |
| Retired   | 15 (5.3) |
| Private sector | 102 (36.0) |
| Government | 83 (29.3) |
| Military  | 33 (11.7) |
| Medical field | 13 (4.6) |
| Teacher   | 31 (11.0) |
| Dentist   | 3 (1.1) |
| Mother occupation |       |
| Housewife | 227 (80.2) |
| Retired   | 3 (1.1) |
| Private sector | 15 (5.3) |
| Government | 7 (2.5) |
| Teacher   | 22 (7.8) |
| Medical field | 5 (1.8) |
| Dentist   | 4 (1.4) |
| Family income/month |       |
| Less than 7,000 SAR | 77 (27.2) |
| 8,000–10,000 SAR | 90 (31.8) |
| 11,000–16,000 SAR | 69 (24.4) |
| More than 16,000 SAR | 47 (16.6) |
| How many children do you have? |       |
| 1–2 children | 61 (21.6) |
| 3–4 children | 139 (49.1) |
| More than 5 | 83 (29.3) |
| Did your child receive any dental treatment before coming to the pediatric specialty clinic? |       |
| Yes | 124 (43.8) |
| No | 159 (56.2) |
| Number of treatment session |       |
| One | 25 (8.8) |
| Two | 20 (7.1) |
| Three | 41 (14.5) |
| Four | 42 (14.8) |
| More than 4 | 155 (54.8) |
| Type of program |       |
| Intern | 49 (17.3) |
| Masters and PhD | 151 (53.4) |
| Board | 75 (26.5) |
| Faculty | 8 (2.8) |
| Dentist | 242 (85.5) |
| Edubook | 16 (5.7) |
| Social media | 111 (39.2) |
| Friends | 9 (3.2) |
| Pediatrician | 15 (5.3) |
| Magazine | 6 (2.1) |
| TV | 22 (7.8) |
| GP | 3 (1.1) |
Table 2: Distribution of participants based on the responses to questions regarding knowledge and practices

| Question                                                                 | Answers                      | Prevalence (%) |
|--------------------------------------------------------------------------|------------------------------|----------------|
| Knowledge questions                                                      |                              |                |
| At what age should the child have the first dental visit?                | 6–12 months*                 | 35 (12.4)*     |
|                                                                          | 2 years                      | 63 (22.3)      |
|                                                                          | 3 years                      | 49 (17.3)      |
|                                                                          | 4 years                      | 26 (9.2)       |
|                                                                          | 5 years                      | 51 (18)        |
|                                                                          | I do not know                | 59 (20)        |
| Do you know what are pit and fissure sealants?                           | Yes*                         | 96 (24.4)*     |
|                                                                          | No                           | 214 (56)       |
| On what pit and fissure sealants should be applied?                      | Caries teeth                 | 15 (5.3)       |
|                                                                          | Sound teeth*                 | 48 (17.0)*     |
|                                                                          | I do not know                | 220 (77.7)     |
| When should dental flossing be begun?                                    | When there is contact between the teeth* | 43 (15.2)* |
|                                                                          | 3 years                      | 17 (6.0)       |
|                                                                          | 6 years                      | 112 (39.6)     |
|                                                                          | I do not know                | 111 (39.2)     |
| What is the amount of toothpaste that should be applied for children aged 3–6 years? | Smear or rice-size          | 16 (5.7)       |
|                                                                          | Pea size*                    | 151 (53.4)*    |
|                                                                          | Full-length brush            | 43 (15.2)      |
|                                                                          | I do not know                | 73 (25.8)      |
| What is the amount of toothpaste that should be applied for children under the age of 3 years? | Smear or rice size*         | 76 (26.9)*     |
|                                                                          | Pea size                     | 112 (39.6)     |
|                                                                          | Full-length brush            | 25 (8.8)       |
|                                                                          | I do not know                | 70 (24.7)      |
| Should a child receive topical fluoride every 6 months?                   | Yes*                         | 172 (60.8)*    |
|                                                                          | No                           | 40 (14.1)      |
|                                                                          | I do not know                | 71 (25.1)      |
| When should sugary and cariogenic food be given to the child?            | Any time                     | 55 (19.4)      |
|                                                                          | With meals*                  | 67 (23.7)*     |
|                                                                          | Between meals                | 157 (55.5)     |
|                                                                          | Before going to bed          | 4 (1.4)        |
| When should ad libitum breastfeeding be stopped?                         | 6 months (after eruption of first primary molar)* | 25 (8.8)* |
|                                                                          | 1 year                       | 35 (12.4)      |
|                                                                          | 2 years                      | 172 (60.8)     |
|                                                                          | I do not know                | 51 (18.0)      |
|                                                                          | 1–1.5 years*                 | 67 (23.7)*     |
|                                                                          | 2 years                      | 140 (49.5)     |
|                                                                          | 3 years                      | 37 (13.1)      |
|                                                                          | 4 years and more             | 7 (2.5)        |
|                                                                          | I do not know                | 32 (11.3)      |
| Parental practices questions                                            | Rarely                       | 17 (6.0)       |
|                                                                          | If pain or trauma            | 188 (66.4)     |
|                                                                          | Every 3–6 months*            | 78 (27.6)*     |
| How many times your child brushes teeth?                                 | No brushing                  | 46 (16.3)      |
|                                                                          | Once/day                     | 86 (30.4)      |
|                                                                          | 2 or more per day*           | 151 (53.4)*    |
| Do you use dental floss for your child?                                  | Yes*                         | 21 (7.4)*      |
|                                                                          | No                           | 139 (49.1)     |
|                                                                          | I do not know what dental floss is | 123 (42.5) |

*Correct response

Table 3: Ordinal regression analysis showing the adjusted association of sociodemographic predictors and number of dental sessions with the dependent factor (mean knowledge score)

| Predictors                      | Mean knowledge score/10 (SD) | Adjusted p value | 95% confidence interval |
|---------------------------------|-----------------------------|------------------|-------------------------|
| Gender                          |                             |                  |                         |
| Male                            | 2.22 (1.71)                 | 0.948            | 0.416 to −0.444         |
| Female**                        | 2.36 (2)                    |                  |                         |
| Which parent answered the questionnaire? |                   |                  |                         |
| Father                          | 1.87 (1.57)                 | <0.0001*         | −1.564 to −0.584*       |
| Mother**                        | 2.77 (2.04)                 |                  |                         |
| Family income/month             |                             |                  |                         |
| Less than 7,000 SAR             | 2.06 (1.712)                | 0.115            | −1.717 to 0.188         |
| 8,000–10,000 SAR                | 1.91 (1.458)                | 0.118            | −1.507 to 0.178         |
| 11,000–16,000 SAR               | 2.14 (1.556)                | **0.04**         | −1.601 to 0.036         |
| More than 16,000**              | 3.62 (2.558)                |                  |                         |
| Father education                |                             |                  |                         |
| Illiterate                      | 0.71 (0.756)                | **0.047**        | −3.686 to 0.028         |
| Primary and intermediate        | 2.06 (1.692)                | 0.27             | −1.365 to 0.382         |
| High school                     | 1.99 (1.609)                | 0.336            | −0.951 to 0.324         |
| Bachelor and higher**           | 2.55 (1.988)                |                  |                         |
| Mother education                |                             |                  |                         |
| Illiterate                      | 1.00 (1.000)                | 0.337            | −3.878 to 1.065         |
| Primary and intermediate        | 1.63 (1.364)                | 0.151            | −1.477 to 0.227         |
| High school                     | 2.02 (1.592)                | 0.369            | −0.835 to 0.317         |
| Bachelor and higher**           | 2.70 (2.069)                |                  |                         |
| Paternal professionalism        |                             |                  |                         |
| Dentist                         | 7.67 (0.58)                 | **0.006**        | 1.029–6.064             |
| Private                         | 2.25 (1.96)                 | 0.155            | −1.61 to 0.255          |
| Government                      | 2.22 (1.62)                 | 0.139            | −1.766 to 0.246         |
| Military                        | 1.97 (1.45)                 | 0.65             | −1.929 to 0.329         |
| Medical field                   | 2.23 (1.74)                 | 0.126            | −2.475 to 0.305         |
| Teacher                         | 2.16 (1.21)                 | 0.069            | −2.231 to 0.082         |
| Retired**                       | 2.83 (2.75)                 |                  |                         |
| Maternal professionalism        |                             |                  |                         |
| Dentist                         | 7.75 (0.957)                | **0.033**        | 0.121–2.849             |
| Retired                         | 0.67 (1.155)                | **0.033**        | −4.952 to −0.207        |
| Private                         | 2.40 (2.165)                | 0.821            | −1.117 to 0.878         |
| Government                      | 2.00 (1.826)                | 0.145            | −2.517 to 0.371         |
| Teacher                         | 2.82 (1.842)                | 0.97             | −0.897 to 0.929         |
| Medical field                   | 4.40 (2.793)                | 0.301            | −0.811 to 2.636         |
| Housewife**                     | 2.12 (1.660)                |                  |                         |
| Number of treatment sessions    |                             |                  |                         |
| One                             | 1.60 (1.354)                | **0.008**        | −1.885 to −0.284        |
| Two                             | 2.95 (2.114)                | 0.485            | −0.557 to 1.173         |
| Three                           | 1.68 (1.572)                | **0.001**        | −1.841 to −0.497        |
| Four                            | 1.86 (1.945)                | **0.003**        | −1.618 to −0.329        |
| More than 4**                   | 2.60 (1.868)                |                  |                         |

*Significant at 0.05
**Reference
The bold values are the significant values
Table 4: Distribution of included parents with correct responses based on their demographic data, socioeconomic status (parental education, profession, and income), and treatment session characteristics (number of visits and history of previous treatment)

| Variable                      | When do you take your child to dentist? | How many times your child brushes? | Do you use dental floss for your child? |
|-------------------------------|----------------------------------------|------------------------------------|----------------------------------------|
|                               | Correct answers (95% CI)               | Correct answers (95% CI)           | Correct answers (95% CI)               |
| Child gender                  |                                        |                                    |                                        |
| Male                          | 39/137 (28.46%)                        | 109/137 (79.56%)                  | 10/137 (7.29%)                        |
| Female**                      | 39/146 (26.7%)                         | 128/146 (87.67)                   | 11/146 (7.5%)                         |
| Who answered the questionnaire?|                                        |                                    |                                        |
| Father                        | 36/150 (24%)                           | 121/150 (80.66%)                  | 11/150 (7.33%)                        |
| Mother**                      | 42/133 (31.5%)                         | 116/133 (87.2%)                   | 10/133 (7.52%)                        |
| Family income/month           |                                        |                                    |                                        |
| Less than or equal to 7,000 SAR| 13/77 (16.88%)                         | 62/77 (80.5%)                     | 7/77 (9.1%)                           |
| 8,000–10,000 SAR              | 26/90 (28.88%)                         | 73/90 (81.1%)                     | 5/90 (5.56%)                          |
| 11,000–16,000 SAR             | 26/69 (37.6%)                          | 60/69 (86.95%)                    | 4/69 (5.797%)                         |
| More than or equal to 16,000 SAR| 13/47 (27.6%)                         | 42/47 (89.36%)                    | 5/47 (10.64%)                         |
| Mother educational level      |                                        |                                    |                                        |
| Illiterate                    | 1/5 (20%)                              | 5/5 (100%)                        | 0/5 (0%)                              |
| Primary/intermediate          | 5/38 (13.1%)                           | 29/38 (76.3%)                     | 6/38 (15.79%)                         |
| High school                   | 26/98 (26.5%)                          | 77/98 (78.57%)                    | 5/98 (5.10%)                          |
| University or higher**        | 46/142 (32.3%)                         | 126/142 (88.7%)                   | 10/142 (7.04%)                        |
| Father education level        |                                        |                                    |                                        |
| Illiterate                    | 0/7 (0%)                               | 7/7 (100%)                        | 1/7 (14.29%)                          |
| Primary/intermediate          | 4/31 (12.9%)                           | 21/31 (67.7%)                     | 3/31 (9.68%)                          |
| High school                   | 20/81 (24.69%)                         | 69/81 (85.18%)                    | 4/81 (4.94%)                          |
| University or higher**        | 54/164 (32.9%)                         | 140/164 (85.36%)                  | 13/164 (7.93%)                        |
| Mother professionalism        |                                        |                                    |                                        |
| Dentist                       | 3/4 (75%)                              | 4/4 (100%)                        | 0/4 (0%)                              |
| Retired                       | 3/3 (100%)                             | 3/3 (100%)                        | 0/3 (0%)                              |
| Private sector                | 7/15 (46.6%)                           | 12/15 (80%)                       | 1/15 (6.67%)                          |
| Government sector             | 2/7 (28.57%)                           | 6/7 (85.7%)                       | 1/7 (14.29%)                          |
| Teacher                       | 5/22 (22.7%)                           | 18/22 (81.8%)                     | 2/22 (9.091%)                         |
| Medical field                 | 1/5 (20%)                              | 4/5 (80%)                         | 0/5 (0%)                              |
| Housewife**                   | 57/227 (25.1%)                         | 190/227 (83.7%)                   | 17/227 (7.49%)                        |
| Father professionalism        |                                        |                                    |                                        |
| Dentist                       | 3/3 (100%)                             | 3/3 (100%)                        | 0/3 (0%)                              |
| Private sector                | 29/102 (28.4%)                         | 88/102 (86.27%)                   | 5/102 (4.90%)                         |
| Government                    | 27/83 (32.5%)                          | 66/83 (79.5%)                     | 6/83 (7.23%)                          |

Contd…
Parental knowledge and practices play an important role in preventing oral diseases and improving dental health in children. In addition, maintenance of oral health is initially a parental responsibility, which later involves both parents and children.8 In this study, the parents’ mean dental knowledge score was low. This was similar to studies performed in Saudi Arabia9–11 and other countries12. In addition, mothers scored significantly higher (2.77 ± 2.04) compared with fathers (1.87 ± 1.57). This could be because mothers usually accompany children to dental visits and are more involved in their children’s healthcare. Accordingly, Pani et al.13 reported that mothers’ perception of their children’s oral hygiene-related quality of life (HRQoL) was higher compared with fathers.

Similar to a previous study,9 the highest parental knowledge mean score was reported in questions associated with fluoride application. However, 75.6% of participants was not aware of pit and fissure sealants. In addition, only 12.4% of participants was aware that the first dental visit should be made within 6–12 months of tooth eruption. Relatively similar findings have been previously reported.2,14,15 This suggests the importance of increasing parental awareness regarding the first dental visit and fissure sealants.

Moreover, although AAPD reported that frequent consumption of sugar-containing snacks or drinks (e.g., juice, formula, soda) between meals increased the risk of caries, more than half the parents (55.5%) believed that sugary and cariogenic foods are better consumed between meals than at the end of meals.16 This finding is important, as the role of sugary and cariogenic foods in the etiology and initiation of caries is crucial.17

Regarding baby feeding, most parents thought that ad libitum breastfeeding should be stopped at the age of 2 years. However, AAPD reports that ad libitum nocturnal breastfeeding should be avoided after the first primary tooth begins to erupt.18 Parental behavior training on oral hygiene practices is important, as healthy practices develop early in life, during childhood, and continue to adulthood, with numerous oral and general health benefits.19 However, most participants in this study reported that their children brushed teeth two or more times a day. This apposed the reports on school children in Jizan, Saudi Arabia, where most children brushed irregularly.20 This could be explained by Theunissen et al.21 who reported that in most cases, children report significantly poor oral HRQoL, motor function, cognitive function, and physical complaints compared with their parents, though reports of both child and parents were valid.

In addition, more than half the participants (66.4%) took their children to dental visits only when there was pain or trauma. In another study in Riyadh, less than one third (28%) of the participants made dental visits for their children in the absence of pain.3 In addition, AAPD guidelines advise early and regular dental visits for early detection of caries, reinforcing and motivating parents regarding the importance of oral hygiene.8

Similar to previous studies,2,23 this study also found an association between socioeconomic status and the level of parental dental knowledge and practices. Parental knowledge and behavior were significantly associated with the frequency of dental visits, similar to other studies reporting that changing a behavior needs multiple reinforcements and extended duration.24–26 Therefore, it is important to reiterate anticipatory guidance at each dental visit. Moreover, this study suggested that the lack of parental awareness followed the same pattern as the lack of pediatricians’ awareness. Studies have shown pediatricians lacked awareness regarding the frequency of dental visits and fissure sealants. However, knowledge was better regarding fluoride application and sugar cariogenicity.15,27–29 In addition, Anand et al.29 reported that children are consulted by physicians more than 10 times before the age of 3 years.30 This suggests that the key to imparting parental education...
is to establish dental awareness programs for pediatricians, family physicians, and general practitioners. Therefore, future awareness campaigns are necessary for dental caries prevention for all those involved in children’s healthcare. This was previously recommended by Al-Shalan et al.¹⁵ in Riyadh and Sabbagh et al.¹⁵ in Jeddah. However, the efforts put since then do not seem satisfactory.

This study reported the level of knowledge and awareness of parents visiting the Pediatric Dental Clinic in KAUFD. It could be used as a reference for future community services and caries prevention programs conducted by oral healthcare services for children. However, a limitation of this study is that it did not investigate the reason for dental visits, the treatment involved, and whether anticipatory guidance was provided in the dental visits. Further studies with greater sample size and from other dental healthcare services are recommended to measure parental knowledge and practices after the children undergo a full dental treatment, and a comparison should be made with the findings of this study.

**Conclusion**

Parental dental knowledge and practices were not satisfactory. Anticipatory guidance should be reinforced by oral healthcare providers, on each dental visit. In addition, the role of pediatricians and physicians could be critical in improving parental dental knowledge.

**Clinical Significance**

This study reported the level of knowledge and awareness of parents visiting the Pediatric Dental Clinic in KAUFD. It could be used as a reference for future community services and caries prevention programs conducted by oral healthcare services for children to prevent ECC.

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