

Caries Experience and Oral Health-related Factors of Kuwaiti Preschool Children and their Mothers: A Pilot Study

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ABSTRACT

Aim: The objective of this study was to investigate the association between the caries experience and oral-health-related behavior of Kuwaiti preschool children and their mothers.

Materials and methods: A convenience sample of 84 participants (42 child–mother pairs) was selected. Data regarding children's and mothers' demographics, oral hygiene practices, and dietary habits were obtained by questionnaires. Oral clinical examinations were carried out on the participant children and mothers to determine their caries experience (decayed, missing, and filled teeth index-dmft/DMFT).

Results: An estimated 19% of children were caries-free and 66% of mothers have untreated caries. The mean dmft index of the preschool children was 3.90 ± 2.9 , and the mean DMFT index of their mothers was 12.38 ± 5.4 . Mothers' untreated caries was significantly associated with their children's untreated caries ($r = 0.183, p < 0.05$). No correlation was found between the brushing frequencies of children and their mothers ($p = 0.582$). High consumption of sugary snacks and sugary beverages was detected among the children and mothers with a significant association ($p < 0.05$). The mean dmft of the children was found to be significantly lower among the young mothers, less than 30 years, (2.4 ± 2.1) compared to that among the mothers older than 30 years ($4.3 \pm 2.9, p < 0.05$).

Conclusion: There was a high prevalence of early childhood caries in the preschool children studied. A positive correlation was found between the dental caries experience and sugar consumption of the Kuwaiti preschool children and those of their mothers.

Clinical significance: The oral health status and dietary habits of mothers are potentially significant risk factors for the development of early childhood caries in their children. Pediatric dentists need to identify the main caries risk factors in their community in order to implement appropriate preventive dental care and educational programs.

Keywords: Dental caries, Oral health, Preschool children.

International Journal of Clinical Pediatric Dentistry (2019): 10.5005/jp-journals-10005-1652

INTRODUCTION

Early childhood caries (ECC) is a major worldwide oral health problem that affects preschool children.¹ The American Academy of Pediatric Dentistry defines ECC as the "presence of one or more decayed, missing or filled tooth surfaces in any primary tooth" in children aged 71 months or younger.² There were numerous terminologies used to illustrate the condition such as rampant caries, baby bottle tooth decay, nursing caries, and milk bottle syndrome. A review of the literature found that the prevalence of ECC in most developed countries was 1–12%, while the prevalence in developing countries has been found to be high (up to 70%).³ In Kuwait, the prevalence of ECC in 4- and 5-year-old children was 68% and 76%, respectively,⁴ which was similar to the prevalence reported in some Middle Eastern countries.^{5,6} The high prevalence of ECC in preschool children remains a major clinical problem for oral health professionals because it has a negative impact on the child, family, and community.¹

Dental caries is a multifactorial disease that results from critical interactions among a susceptible tooth surface, cariogenic bacteria, and exposure to fermentable carbohydrates.⁷ In young children, there are distinctive risk factors for ECC, including the presence of white spot lesions, increased counts of mutans streptococci, a high frequency of sugary intake, and other socioeconomic factors.⁷ A young child's dental environment is complex because their mothers' dental knowledge, attitudes, beliefs, and practices affect the child's oral condition.^{8,9} Mothers are usually the main caregivers during early childhood and are the key persons in their family for the determination of dental health behavior of young children.¹⁰ Recent research found that mothers' oral health status is a strong

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How to cite this article: Husain FAAM, Alanzi AN. Caries Experience and Oral Health-related Factors of Kuwaiti Preschool Children and their Mothers: A Pilot Study. *Int J Clin Pediatr Dent* 2019;12(4):283–287.

Source of support: Nil

Conflict of interest: None

predictor of the oral health status of their young children.¹¹ Also, mothers' educational level showed a significant association with dental caries in their preschool children.^{12,13}

The increasing trend of dental caries experience of the preschool children in Kuwait warrants further attention to investigate the caries-related factors in their mothers. Therefore, this pilot study aimed to investigate the association between the caries experience and oral health-related behavior of a selected group of Kuwaiti preschool children and their mothers. The results will determine the need and guide the planning of a large-scale project and preventive programs.

MATERIALS AND METHODS

The research protocol was approved by Kuwait University Health Sciences Centre Ethical Committee. A random selection of one big

kindergarten school in Hawalli governate, Kuwait, was made. One-hundred and twenty children, aged 3–5 years, were enrolled in the school and were invited to participate in the study. The informed consents were sent to their mothers by classroom teachers. The selection was based on the following criteria: 3–5-year-old preschool children with ASA physical status I or II, and mothers who were the primary caregivers. The study included two parts: questionnaires and clinical examinations.

Data on the demographic information, oral hygiene practices, and dietary habits were collected by orally administered questionnaires. They were completed by the mothers on the same visit as the clinical examinations were performed. The questionnaire consisted of two parts and was not expected to take longer than 10 minutes to complete. Both parts had 10 questions. The first part had questions related to the child's age, oral hygiene practices, and sugar consumption. The second part had questions regarding the mother's age, education, oral hygiene practices, and dietary habits.

The clinical examinations were carried out on the participant children and their mothers at school premises (nurse's room). All examinations were conducted by a single calibrated examiner using a mobile dental chair with a portable light (Sun-led Classic, BPR Swiss, Switzerland). Dental caries experience was assessed using the decayed, missing, and filled teeth (DMFT) index.¹⁴ After the examination, all participant children received a fluoride varnish.

Statistical Analysis

All data were entered and analyzed using the Statistical Package for the Social Sciences version 20 software (SPSS Inc, Chicago, IL, USA). Descriptive statistics (mean, frequencies, percentage) were performed. A Chi-square test was used for nominal or ordinal variables. Analysis of variance (ANOVA) was used to determine the difference in the dental caries experience (dmft) and to compare children's dmft by mothers' dmft, mothers' demographic factors, and oral-health-related factors. A *p* value of less than 0.05 was considered statistically significant.

RESULTS

A total of 42 mother–child dyads participated and completed this study. There were 13 boys and 29 girls. Children's age ranged from 3–5 years. The mothers of those children varied in their age between 20 years and 50 years with a mean age of 33.9 ± 9.4 . The distribution of the demographic variables, oral hygiene factors, and dietary habits of the participant children and mothers are presented in Tables 1 and 2. Almost two-thirds of the participant mothers (64.3%) had college education, and only 21.4% of them were unemployed.

Oral Health Status

The mean dmft index for the preschool children was 3.90 ± 2.9 , and the mean DMFT index of their mothers was 12.38 ± 5.4 (Table 3). Only 19% of the children were caries-free, and 28% had filled teeth. Two-thirds of the mothers (66.6%) had untreated caries, and about one-third (28.4%) had dental fillings. Mothers' untreated caries was significantly associated with their children's untreated caries ($r = 0.183, p < 0.05$).

Oral Hygiene Practices

More than half (54.8%) of the children brushed their teeth at least twice a day, while most of the mothers (90.5%) brushed their teeth twice a day or more. The majority of the children performed tooth brushing with the help of their mothers (74%) and used fluoridated

Table 1: Demographic features, oral hygiene practices, and dietary habits of the participant children

| | Number (n = 42) | Percentage |
|--|-----------------|------------|
| Child age | | |
| 4 years | 20 | 47.6 |
| 5 years | 22 | 52.4 |
| Gender | | |
| Male | 13 | 30.9 |
| Female | 29 | 69.1 |
| Child's toothbrushing frequency | | |
| <Once/day | 19 | 45.2 |
| >Twice/day | 23 | 54.8 |
| Child's frequency of sugary snack intake | | |
| <Once/day | 3 | 7.2 |
| >Twice/day | 39 | 92.8 |
| Child's frequency of sugary beverages | | |
| <Once/day | 8 | 19.1 |
| >Twice/day | 34 | 80.9 |
| Child's frequency of soft drinks | | |
| <Once/day | 27 | 64.3 |
| >Twice/day | 15 | 35.7 |
| Previous dental visits | | |
| Never | 19 | 45.2 |
| Once | 7 | 16.7 |
| Twice or more | 16 | 38.1 |
| Reason for previous dental visit | | |
| Check up | 11 | 26.2 |
| Toothache | 31 | 73.8 |

toothpaste (76%). Only 7% of the mothers used dental floss regularly, and almost a half of them (48.6%) had never used it. The results showed no statistically significant correlation between the brushing frequencies of children and mothers ($p = 0.582$). Also, no significant association was found between children's tooth brushing frequency and their caries experience ($p = 0.141$).

Dietary Habits

High consumption of sugary snacks and sugary beverages was found among the children (92.8%, 80.9%, respectively) and mothers (73.8%, 52.4%, respectively). Regarding the intake of soft drinks, most children (64.3%) and mothers (80.9%) never or rarely used them on a daily basis. There was a strong association in the use of sugary food and beverages, including soft drinks between the mother and the child ($p < 0.05$). Also, a significant association was shown between the children's caries experience (dmft) and their sugar consumption ($p < 0.05$).

Dental Visits

In all, 45% of children had never visited a dentist in their life. Those children had lower mean dmft (3.1 ± 3.6) than those who had one (4.4 ± 3.5) or more visits (4.8 ± 2.2). The most common reason for previous dental visits was toothache (73.8%). There was not a significant association between a child's dental visit and his/her mother's dental visits ($p = 0.114$). When asked about the preventive care methods, only one mother reported that her child had received topical fluoride application in a dental clinic. None of the children received dental sealants in their primary teeth.

Table 2: Demographic features, oral hygiene practices, and dietary habits of the participant mothers

| | Number (n = 42) | Percentage |
|---|-----------------|------------|
| Mother's age (years) | | |
| 20–29 | 8 | 19.1 |
| 30–39 | 26 | 61.8 |
| 40–49 | 8 | 19.1 |
| Mother's education level | | |
| High school/GED or less | 15 | 35.7 |
| College graduate or more | 27 | 64.3 |
| Mother's occupation | | |
| Unemployed | 9 | 21.4 |
| Employee/non-professional | 13 | 31.0 |
| Employee/professional | 20 | 47.6 |
| Mother's toothbrushing frequency | | |
| <Once/day | 4 | 9.5 |
| >Twice/day | 38 | 90.5 |
| Mother's frequency of sugary snack intake | | |
| <Once/day | 11 | 21.2 |
| >Twice/day | 31 | 73.8 |
| Mother's frequency of sugary beverages | | |
| <Once/day | 20 | 47.6 |
| >Twice/day | 22 | 52.4 |
| Mother's frequency of soft drinks | | |
| <Once/day | 34 | 80.9 |
| >Twice/day | 8 | 19.1 |
| Mother's previous dental visits | | |
| Never | 0 | 0 |
| Once | 16 | 38.1 |
| Twice or more | 26 | 61.9 |

Table 3: Decayed, missing, and filled teeth index of the preschool children (dmft) and their mothers (DMFT)

| | Preschool children (n = 42), mean ± SD | Mothers (n = 42), mean ± SD |
|-----------|--|-----------------------------|
| Dmft/DMFT | 3.90 ± 2.9 | 12.38 ± 5.4s |
| dt/DT | 3.20 ± 2.2 | 6.60 ± 5.5 |
| mt/MT | 0.12 ± 1.1 | 1.28 ± 1.2 |
| ft/Ft | 0.58 ± 1.5 | 4.50 ± 3.81 |

Mother's Demographics

The mean dmft of the children was found to be significantly lower among the young mothers, less than 30 years, (2.4 ± 2.1) compared to that among the mothers older than 30 years (4.3 ± 2.9, *p* < 0.05, Fig. 1). The association between the dental caries experience of the preschool children and their mothers' educational level existed but it was not statistically significant (*p* = 0.08). The effect of mothers' occupation on the children's caries experience was not evident (0.189).

DISCUSSION

This is the first exploratory study to investigate the possible association between the caries experience and the oral health habits of Kuwaiti preschool children and their mothers. The results

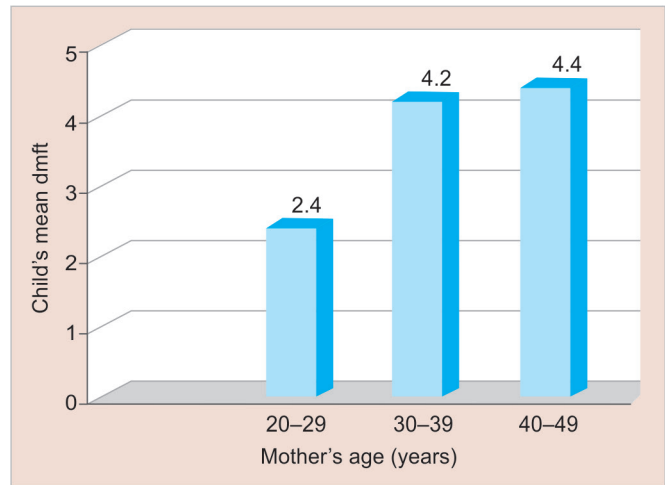


Fig. 1: The mean dmft of the participant children according to the age of their mothers

of the study will pave the way for conducting a large-scale research in Kuwait.

Early childhood caries was found in 80% of the children in this study. This prevalence is higher than that reported in Saudi Arabia and Jordan (73% and 67% of children in similar age group respectively).^{15,16} However, it was similar to the prevalence observed previously in Kuwait by Vigild et al.¹⁷ An increase in caries experience figures of the primary dentition had been reported between 1982 and 2000.¹⁸ The proportion of caries-free children in primary dentition has been reported to be 14% in 2002,¹⁸ which was not different from the finding of this study. There is a school-based oral health program (SOHP) in Kuwait, which provides oral health education, prevention, and treatment to the school children. Recently, the SOHP is giving more emphasis to the youngest age group by increasing the efforts on their preventive care.¹⁹ Before that, no oral health programs have been implemented for targeting very young children in Kuwait.²⁰

The results of the present study indicated that the overall dental caries experience was slightly higher (3.9) than what was documented previously in Kuwait (2.9) by Murtomaa et al.²¹ The mean DMFT reported for the mothers in our sample was similar to what was found in Saudi Arabia.²² The association between the caries experience of the children and their mothers was evident in our sample. Mothers' dental caries status has been correlated to their young children's dental caries status in previous studies.^{23–25} Also, the maternal untreated dental caries was found to double the odds of children's untreated dental caries.²⁶ Therefore, mothers' oral health condition is an important risk indicator for their preschool children.

In our sample, the children's oral health behavior did not show any significant association with their dental caries experience. This finding was in agreement with the results of Okada et al. study.²⁷ Although the correlation between the mothers' oral health habits and their children's oral health habits was marked in previous studies,^{27–29} this association failed to emerge in this study. The effect of toothbrushing habits might have been overwhelmed by the effect of dietary habits since this variable was strongly associated with the caries experience. Also, in Kuwait, many working mothers rely on nannies and babysitters to look after their children, including the child's dental care. The oral health status of other primary caregivers should be explored when implementing a future research.

High consumption of sugary food and beverages was found among the participating children and mothers with clear evidence linking their dietary habits to their caries experience. The present study supports the earlier studies, which showed that the frequent consumption of sugary snacks and beverages increases the risk for dental caries.^{30,31} A significant association existed in the sugar intake between the children and their mothers in our sample. This was probably because they were readily available in front of the child when his/her mother consumed them. Sweets may also well have been used as a reward by the parents. This leads to the establishment of a habit that persists even when a child gets older.³²

The findings of our study showed that the caries experience of children who never visited a dentist was lower than that of children who had one or more dental visits. It can be explained by the fact that mothers had taken their children to the dentist because of a toothache rather than for a regular check-up. There was not a significant association between the mothers' dental visits and their children's dental visits ($p = 0.114$), which was consistent with the findings of Bozorgmehr et al. study.³³ Many parents may not be aware of the importance of primary teeth as they mistakenly believe that these teeth are temporary. Therefore, the parents may visit the dentist when their child complains of dental pain and for their own dental problems.

The caries experience of the preschool children of young mothers, less than 30 years, in this investigation was found to be lower compared to that of the children of older mothers. A young Kuwaiti mother tends to have his/her first and second child before the age of 30. So, it is more likely that the mother gives more attention to her first-born children, concerning the preventive behavior and the control of dietary sugars in particular. The opposite is true for the high-birth-order children.³⁴ Consequently, the lowest caries experience occurred in children whose birth order was less than three. Maternal education was found to have a crucial role in their children dental care.³⁵ Although a high dental caries level in the preschool children was associated with the low educational level of the mothers,¹³ no clear association was found in the present study and this finding was in line with Rajab et al. study.³⁶

Even though the present study demonstrated a significant relationship in the caries experience and sugar consumption between the preschool children and their mothers, there are some shortcomings. This study was conducted in a convenience sample and the children included in this investigation were living in one governorate, reducing the generalizability of the results. Also, not all possible dental caries risk and protective factors were assessed and controlled for in this study (e.g., salivary flow rate, level of mutans streptococci, fathers' demographics). On the basis of the current findings, the implementation of future study with a larger sample size involving all governorates is required to give a representative picture of the national caries experience and associated factors.

CONCLUSION

There was a clear correlation between the dental caries experience and sugar consumption of the Kuwaiti preschool children and their mother's caries experience and sugar consumption. However, no correlation was found between the oral health habits of the children and those of their mothers. The high prevalence of early childhood caries emphasizes an urgent need for comprehensive preventive programs covering all preschool children and an intensive oral health education covering all parents of the young children.

CLINICAL SIGNIFICANCE

The oral health status and dietary habits of mothers are potentially significant risk factors for the development of early childhood caries in their children. Pediatric dentists need to identify the main caries risk factors in their community in order to implement appropriate preventive dental care and educational programs.

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