

Knowledge and Beliefs of Early Childhood Caries and Late Night Bottle Feeding among Mothers in Saudi Arabia

Abdulrahman Sulaiman Aldakhili, Anas Abdulrahman Alsoqeer, Abdulrahman Khaled Alothaim, Abdulaziz Sulaiman Alkhodair, Saleh Musaad Alsaykhan
Dentist, Faculty of Dentistry, Al-Qassim University, Al-Qassim, Saudi Arabia

ABSTRACT

Background: Early Childhood Caries is a public health problem that continues to affect babies and preschool children worldwide. A comprehensive review of the epidemiology of ECC showed that its prevalence varies from population to population, however, disadvantaged children, regardless of race, ethnicity or culture, are most vulnerable. It is considered one of the most prevalent diseases in childhood, affecting 60% to 90% of children globally. It is considered one of the most prevalent diseases in childhood, affecting 60% to 90% of children globally. ECC is still highly prevalent among children in communities in both developing and developed countries.

Aim of the work: To assess and evaluate Saudi mothers' knowledge and beliefs of early childhood caries.

Methods: Descriptive cross-sectional study was conducted during the period between 1st of November 2017 to the 4th of January 2018 among Saudi mothers. Data were collected through an online questionnaire distributed to all regions of Saudi Arabia. **Results:** Among the 1477 Saudis' mothers, the majority of participants were from the Middle region 1178 (79.8%). Less than half of mothers 637 (43.1%) have 1-3 children, 434 (29.4%) of them have 4-5 children, 348 (23.5%) have more than 5 children, and only 59 (4%) have no children. Nearly three fourths 1117 (75.6%) of the mothers thought deciduous teeth are important and 654 (44.2%) think bottle feeding of children at late night is not harmful to child's teeth. **Conclusion:** Better knowledge of the cause of early childhood caries and effective strategies to reduce its risk should produce enormous reductions in initial and long-term dental treatment costs

Keywords: Knowledge, Dental, Caries, Childhood.

INTRODUCTION

Dental caries is the most common chronic oral disease worldwide, affecting 2.4 billion people. On average, 2.11 billion people have decayed, missing, or filled teeth worldwide. Untreated dental caries affects the quality of social, psychological and economical life of people⁽¹⁾. Dental caries is not always painful, it is expensive to treat, and it can affect nutrition and overall health negatively⁽²⁾. Early childhood caries (ECC) is the term used to describe the presence of decayed, missing or restored teeth in the primary dentition of children younger than six years old⁽³⁾. ECC is a public health problem that continues to affect babies and preschool children worldwide.

A comprehensive review of the epidemiology of ECC showed that its prevalence varies from population to population; however, disadvantaged children, regardless of race, ethnicity or culture, are most vulnerable⁽⁴⁾. Although fluoridated toothpaste and the continued use of fluoride in various forms are effective in caries prevention^(5,6), ECC is still highly prevalent among children in communities in both developing and developed countries⁽⁷⁾. It is known that ignorance of ECC and malpractice of breastfeeding may lead to laziness, obesity and unhealthy child's health⁽⁷⁾. In many cases, ECC is thought to be initiated and exacerbated by inappropriate feeding with a nursing bottle.

The use of nursing bottles and "Sippy cups" enhances the frequency of exposure. This type of

feeding behavior during sleep intensifies the risk of caries, as oral clearance and salivary flow rate are decreased during sleep. In addition, caries-promoting feeding behaviors result in an increase in the magnitude of dental reservoirs of *S. mutans*⁽⁸⁾.

The condition, when associated with the bottle habit, has been characterized as first affecting the primary maxillary anterior teeth, followed by involvement of the primary molars. Mandibular incisors generally are not affected, reportedly due to the child's tongue in the suckling position protecting these teeth from the cariogenic challenge^(4,9). Prolonged and night-time bottle-feeding practices in infants and toddlers generally are thought to provide the carbohydrate source that promotes high acid production by mutans streptococci. Yet evidence suggests that blaming sleeping with a bottle of milk may over simplify the cause of rampant caries⁽¹⁰⁾.

Treatment of ECC is expensive, often requiring extensive restorative treatment and extraction of teeth at an early age. Estimates of the cost of restoring the teeth alone may exceed \$1,000 per child⁽¹¹⁾. Accordingly, our aim in this study is to assess and evaluate Saudi mothers' knowledge and beliefs of early childhood caries.

METHODS

We conducted a descriptive cross-sectional study among 1477 Saudi mothers. The study conducted

during the period between 1st of November 2017 to the 4th of January 2018. Data were collected through an online questionnaire distributed to all regions of Saudi Arabia. The questionnaire composed of two parts.

The first part consists of the demographic data and it includes the following: region, age, education of the mother, education of father and number of children. The second part consists of the following: sleep area of child, preventive or follow up visits to the pedodontist, perception of importance of the deciduous teeth, practice of breastfeeding of mothers, mother's knowledge about late night feeding of child, relationship between permanent and deciduous' teeth caries, causes of dental caries among children, effects of dental caries on general health of children, time mother started to brush her kid's teeth, practice of mothers toward brushing teeth of children at bedtime and mother reaction if their kids have toothache.

The questionnaire responses were analyzed using the Statistical Package for the Social Science (SPSS Inc. Chicago, IL, USA) version 23. Categorical variables were described by frequencies and percentages.

Descriptive analysis involving Chi-square test was used to test significance of association between categorical variables.

The level of significance was set at $P < 0.05$. The research was approved by the local Research Committee of the Faculty of Dentistry, Al-Qassim University.

RESULTS

Table 1 shows general characteristics of participants. Among the 1477 Saudis' mothers, the majority of participants were from the Middle region 1178 (79.8%), and only 138 (9.3%) from West, 79 (5.3%) from the East, and 41 (2.8%) from the North and South regions. We classified participants by age to four groups and they were as follow: from 18-25 years old 145 (9.8%), from 26-35 years old 473 (23%), from 36-60 years old 827 (56%) and above 60 years old 33 (2.2%). The majority of both mothers and parents were with Bachelor or higher education, 1083 (73.3%) and 968 (65.6%), respectively. Less than fifth of mothers and nearly a fourth of parents was with secondary education, 275 (18.6%) and 373 (25.2%), respectively.

Table 2 shows frequencies of number of children, practice of breast feeding and where mothers let their children sleep. Less than half of mothers 637 (43.1%) have 1-3 children, 434 (29.4%) of them have 4-5 children, 348 (23.5%) have more than 5 children, and only 59 (4%) have no children. Regarding how much mothers breastfeed their children before children

become able to eat, 594 (40.2%) of them reported that breast feeding constitute 10-25% from all feeding, nearly a fifth 378 (25.6%) of them reported that breast feeding constitute 26-50% from all feeding and 506 (34.2%) of them reported that breast feeding constitute more 50% from all feeding. Regarding where mothers let their children sleep, the majority reported that their children either sleep in separate room 671 (45.4%) or sleep in shared room 651 (44%), only 156 (10.6%) reported that their children sleep with shared bed.

Table 3 shows perception and believes about dental caries of deciduous teeth and its relation with permanent teeth among mothers. Nearly three fourths 1117 (75.6%) of the mothers thought that the deciduous teeth are important, 278 (18.8%) of them do not know about the importance of deciduous teeth and only 82 (5.6%) thought the deciduous teeth are not important.

More than half of mothers 824 (55.8%) considered that giving children the bottle to feed at late night is harmful to their teeth while 654 (44.2%) believed it is not harmful to their teeth. Nearly two thirds of mothers 952 (64.4%) assumed that there is deference if they fed their children with milk or fed them with anything rather than milk because it affects the health of teeth of children while 526 (35.6%) does not matter because it does not affect teeth of children. More than two thirds of mothers 1026 (69.4%) presumed that dental caries of deciduous teeth will affect health of permanent teeth while 452 (30.6%) supposed it does not. When mothers asked if dental caries of deciduous teeth will affect general health of children, the majority of them agreed it will affect it and only 212 (14.3%) thought it does not affect general health of children.

Table 4 shows perceived causes of dental caries of deciduous teeth in children. The most reported causes of dental caries of deciduous teeth in children were as follow: sweet 735 (49.7%), Lack of/ improper teeth brushing 524 (35.5%), Feeding children at late night 221 (15%) and Calcium deficiency and unhealthy diet 53 (3.6%).

Table 5 shows practice of mothers about preventive visits and follow up to pedodontist and teeth brushing toward their children. About the preventive visits to the pedodontist, 1093 (74%) of the mothers reported that they took their children to pedodontist when only child has toothache, 215 (14.6%) of them reported they go to pedodontist one visit for checkup per year and 169 (11.4%) of them reported they go to pedodontist more than one visit for checkup per year. A third of mothers 494 (33.4%) do not remember when they started to brush their child teeth, 252 (17.1%) of them reported they started to brush their child teeth after first year, nearly a fourth of them 368 (24.9%) reported

they started to brush their child teeth after eruption of all deciduous teeth, 245 (16.6%) reported after eruption of 2-4 of deciduous teeth and only 119 (8%) reported after eruption of first deciduous teeth. Half of mothers 724 (49%) do not remember if they brush their children's teeth bed time, more than fourth of mothers 418 (28.3%) said they brush their children's teeth at bed time and 336

(22.7%) said they do not. Mothers asked if the child complains of toothache and required to visit pedodontist, what treatment they prefer. Almost the majority 1316 (89%) said they prefer the pedodontist to treat the tooth and try to preserve it and minority said they prefer to extract the tooth or do not know, 37 (20.5%) and 125 (8.5%), respectively.

Table 1: General characteristics

n=1478		
Character		
Region	Middle region(n (%))	1179 (79.8%)
	West region (n (%))	138 (9.3%)
	East region (n (%))	79 (5.3%)
	North and south region (n (%))	82 (5.6%)
Age	18 – 25 years old (n (%))	145 (9.8%)
	26 – 35 years old (n (%))	473 (23%)
	36 – 60 years old (n (%))	827 (56%)
	Above 60 years old (n (%))	33 (2.2%)
Maternal education	Basic (n (%))	120 (8.1%)
	Secondary (n (%))	275 (18.6%)
	Bachelor or higher (n (%))	1083 (73.3%)
Paternal education	Basic education (n (%))	137 (9.2%)
	Secondary education (n (%))	373 (25.2%)
	Bachelor or higher (n (%))	968 (65.6%)

Table-2: Number of children, breast feeding and sleeping area of children

Character		
Number of children	No children (n(%))	59 (4%)
	From 1 to 3 children (n(%))	637 (43.1%)
	From 4 to 5 children (n(%))	434 (29.4%)
	More than 5 children (n(%))	348 (23.5%)
Breast feeding	10-25% of all feeding (n (%))	594 (40.2%)
	26-50% of all feeding (n (%))	378 (25.6%)
	More than 50% of all feeding	506 (34.2%)
Sleeping area of children	Share the same bed with parents (n (%))	156 (10.6%)
	Share the same room (n (%))	651(44%)
	Sleep in separate room (n (%))	671 (45.4%)

Table-3: Perception and believes about dental caries of deciduous teeth and its relation with permanent teeth

Character	n	%
Deciduous teeth are important		
Agree	1117	75.6%
Disagree	82	5.5%
Do not know	279	18.9%
Giving children the bottle to feed at late night is harmful to his teeth		
Agree	824	55.8%
Disagree	654	44.2%
Feeding of children either milk or not milk, it does not affect health of teeth		
Agree	526	35.6%
Disagree	952	64.4%
Dental caries of deciduous teeth will affect health of permanent teeth		
Agree	1026	69.4%
Disagree	452	30.6%
Dental caries of deciduous teeth will affect general health of children		
Agree	1266	85.7%
Disagree	212	14.3%

Table-4: Perceived causes of dental caries of deciduous teeth in children

Perceived causes	n=1478	%
Eating sweet	735	49.7%
Lack of/ improper teeth brushing	524	35.5%
Feeding children at late night	221	15%
Calcium deficiency and unhealthy diet	53	3.6%

Table-5: Practice of mothers about preventive visits and follow up to pedodontist and teeth brushing toward their children

Character	n	%
Visiting the pedodontist		
Only one time per year	215	14.5%
More than one time per year	169	11.5%
Only when my child has toothache	1094	74%
When you started to brush your child teeth		
After eruption of first deciduous tooth	119	8%
After eruption of 2-4 deciduous teeth	245	16.6%
After eruption of all deciduous teeth	368	24.9%
After first year of his age	252	17.1%
Do not remember	494	33.4%
Brushing teeth of children at bed time		
Yes	418	28.3%
No	336	22.7%
Do not remember	724	49%
If your child complains of toothache, what would you prefer from pedodontist to do		
Treating tooth and trying to preserve it	1316	89%
Tooth extraction	37	2.5%
Do not know	125	8.5%

DISCUSSION

Early childhood caries is a common dental public health problem that warrants the attention of the government and the dental profession officials in Saudi Arabia⁽²⁾. Mothers' knowledge toward ECC is an important factor in prevention of ECC and if public health institution applied more attention to it and increased the awareness of mothers about ECC, this may lead to decrease in prevalence of ECC and decrease the costs spent on it throughout the kingdom, and may influence public health institution to create and find methods to improve mothers' knowledge toward their children's oral health⁽²⁾. Although ECC is an infectious disease, the role of diet in acquisition of the infection⁽¹²⁾ and development of ECC⁽¹³⁾ is critical. Children with ECC have frequent and prolonged consumption of sugars from liquids⁽⁹⁾.

In this study, mothers asked to identify the causes of ECC in children, and the most reported causes by mothers were eating sweet (49.7%), Lack of/ improper teeth brushing (35.5%), Bottle feeding of children at late night (15%) and Calcium deficiency and unhealthy diet (3.6%). A study published at 2008 about parental knowledge and believes for oral health in Australia reported different results. They asked parents to identify the most important causes of tooth decay in children and the majority of parents said either not cleaning teeth everyday (40%) or sweet snacks and drinks (39%) is the most important causes of tooth decay in children. Only (5.5%) said the use of bottles at night time was the most important factor⁽¹⁴⁾. In this study we reported nearly a third of mothers (33.4%) do not remember when they started to brush their child teeth, (17.1%) of them reported they started to brush their child teeth after first year, nearly a fourth of them (24.9%) reported they started to brush their child teeth after eruption of all deciduous teeth, (16.6%) of them reported after eruption of 2-4 of deciduous teeth and only (8%) reported after eruption of first deciduous teeth. The previous study reported quite different results as most parents (95%) believed that they should begin brush their child's teeth when or soon after the teeth first appeared as opposed to waiting until all the primary teeth were present⁽¹⁴⁾. Another study conducted in Hong Kong at 2002 about oral hygiene habits of preschool children reported that the tooth brushing habit had already started in (86%) of the children by the age of two years⁽¹⁵⁾. Regarding the preventive visits to pedodontist, nearly three fourths of mothers in this study (74%) said they would take their children to pedodontist only if child has tooth problem. The same previous study that conducted in Hong Kong reported quite different result as nearly one fourth (26.4%) said they would not take their child to visit a

pedodontist until after the age of six years, or only when child has tooth problem⁽¹⁵⁾. In the current study, more than half of mothers (55.8%) believed that giving children the bottle to feed at late night is harmful to their teeth while (44.2%) thought it is not harmful to their teeth. A study done in United States reported that (86%) of children with caries of the maxillary anterior incisors were reported to have taken a bottle to bed, but at the same time, (69%) of those who did not have maxillary anterior caries also reported to have taken a bottle to bed⁽¹⁶⁾. In the same context, there are case reports reported the association between night-time breast feeding and ECC^(17, 18).

In conclusion, early childhood caries is of epidemic proportions in populations especially in developing countries, better knowledge of the cause of early childhood caries and effective strategies to reduce its risk should produce enormous reductions in initial and long-term dental treatment costs, as well as the pain and suffering of affected children and may lead to decrease in prevalence of ECC throughout the kingdom.

REFERENCES

1. **Aguirre P, Coelho M, Rios D *et al.* (2017):** Evaluating the Dental Caries-Related Information on Brazilian Websites: Qualitative Study. *Journal of medical Internet research*, 19:12.
2. **Al Agili D (2013):** A systematic review of population-based dental caries studies among children in Saudi Arabia. *The Saudi dental journal*, 25(1): 3-11.
3. **American Academy of Pediatric Dentistry (2006):** American Academy of Pediatric Dentistry Council on Clinical Affairs Policy on early childhood caries (ECC): classifications, consequences, and preventive strategies. *Pediatr Dent.*, 27(7):31-43.
4. **Milnes A (1996):** Description and epidemiology of nursing caries. *Journal of public health dentistry*, 56(1): 38-50.
5. **Marthaler T (2004):** Changes in dental caries 1953–2003. *Caries research*, 38(3): 173-181.
6. **World Health Organization (2003):** Complementary feeding: report of the global consultation, and summary of guiding principles for complementary feeding of the breastfed child. <https://www.who.int/nutrition/publications/infant-feeding/924154614X/en/>
7. **Lagerweij M, Van Loveren C (2015):** Declining caries trends: are we satisfied?. *Current oral health reports*, 2(4): 212-217.
8. **Van Houte J (1981):** Experimental odontopathic infections--effect of inoculation methods, dietary carbohydrate, and host age. *Proceedings Animal models in cariology*. agris.fao.org/agris-search/search.do?recordID=US201301971967

9. **Ripa L (1988):** Nursing caries: a comprehensive review. *Pediatr Dent.*, 10(4): 268-82.
10. **Kaste L M, Gift H C (1995):** Inappropriate infant bottle feeding: status of the Healthy People 2000 objective. *Archives of pediatrics & adolescent medicine*, 149(7): 786-791.
11. **Jones D B, Schlife C M, Phipps K R (1992):** An oral health survey of Head Start children in Alaska: oral health status, treatment needs, and cost of treatment. *Journal of Public Health Dentistry*, 52(2): 86-93.
12. **Bruerd B, Kinney M B, Bothwell E (1989):** Preventing baby bottle tooth decay in American Indian and Alaska native communities: a model for planning. *Public Health Reports*, 104(6): 631.
13. **Benitez C, O'Sullivan D, Tinanoff N (1994):** Effect of a preventive approach for the treatment of nursing bottle caries. *ASDC journal of dentistry for children*, 61(1): 46-49.
14. **Gussy M G, Waters E B, Riggs E M, Lo S K, & Kilpatrick N M (2008):** Parental knowledge, beliefs and behaviours for oral health of toddlers residing in rural Victoria. *Australian dental journal*, 53(1): 52-60.
15. **Chan S C L, Tsai J S J, King N M (2002):** Feeding and oral hygiene habits of preschool children in Hong Kong and their caregivers' dental knowledge and attitudes. *International journal of paediatric dentistry*, 12(5): 322-331.
16. **O'Sullivan D M, Tinanoff N (1993):** Social and biological factors contributing to caries of the maxillary anterior teeth. *Pediatric dentistry*, 15(1): 41-44.
17. **Curzon M E J, Drummond B K (1987):** Case report—Rampant caries in an infant related to prolonged on-demand breast-feeding and a lacto-vegetarian diet. *J Paediatr Dent.*, 3: 25-28.
18. **Dilley G J, Dilley D H, Machen J B (1980):** Prolonged nursing habit: a profile of patients and their families. *ASDC journal of dentistry for children*, 47(2): 102-108.