

Analysis of Breastfeeding Pattern with Early Childhood Caries

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ABSTRACT

Aim: This study aimed to investigate the relationship between breastfeeding pattern and early childhood caries (ECC) based on a case in Bukittinggi.

Materials and methods: This was a cross-sectional study located in Integrated Post Service (*Posyandu*) in Bukittinggi City. In this study, 66 pairs of parents and children aged 2 to 3 years were selected. Breastfeeding pattern was observed using questionnaire and decayed-extract-filled teeth (deft) index was used for ECC. Data were analyzed by chi-square test.

Results: The average of the deft index was 2.33. Samples with exclusive breastfeeding have an average deft index of 1.42 and nonexclusive had an average deft index of 2.48 ($p = 0.783$). This study also found that samples with exclusive breastfeeding and complementary foods had a deft index of 2.27. Nonexclusive breastfeeding and complementary foods had a deft index of 2.31 ($p = 0.038$).

Conclusion: Children with breastfeeding had a lower ECC degree. Breastfeeding with complementary foods at 6 months to 2 years had a significant relationship with ECC.

Clinical significance: Breastfeed could lower the occurrence of ECC. Hence, breastfeeding needs to be promoted and the mothers guided in breastfeeding.

Keywords: Breastfeeding, Decayed-extract-filled teeth, Early childhood caries.

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INTRODUCTION

Caries is an infectious disease, which has been a major problem in oral health that happens at all ages.^{1,2} Early childhood caries is defined as caries in primary teeth among children under 71 months. The prevalence of ECC for children under 5 years is high in several countries. For instance, the prevalence of ECC for children under

5 years in the United States was 90%.³ The prevalence of ECC for children aged 2 to 5 years in Southern Taiwan was 68.9%.⁴ The prevalence of ECC for children aged 2 to 3 years in Jakarta was 52.75%. These facts show that the prevalences are still far from the World Health Organization (WHO) target that 90% children under 5 years old should be caries free.⁵

Early childhood caries is a major health problem that needs serious attention, disrupting the function of mastication and affecting the growth and development of children, causing speech impairment and the children to become inferior.^{6,7} The American Academic of Pediatric Dentistry states that drinking milk patterns, such as frequency, duration, addition of sweetener, and duration of breastfeed are risk factors for ECC.⁸ Carbohydrate content, acidity, and frequency of drinking milk affect the occurrence of caries. Carbohydrates contained in breast milk and formula milk are cariogenic foods that will be fermented by bacteria to acid and cause demineralization of enamel.¹

Misinformation is one of the causes of ECC. Breast milk and bottle milk are risk factors for caries because they contain fermentable carbohydrate sucrose, which is a cariogenic food.¹ To address this problem, the WHO provides feeding guidelines for reducing caries prevalence.⁵

In Indonesia, there is an increasing number of people of low economic status; to meet the needs of households, mothers help by going to work. Mothers with lack of education and health knowledge rarely breastfeed or only breastfeed for a short period of time. Breast milk is replaced with formula or sweet drinks like sweet tea and condensed milk. Mothers with low economic status have a tendency to substitute breast milk with bottled milk and high-sugar foods too early. This is due to the price of very expensive formula.⁹ The United Nations International Children's Fund reports the prevalence of mothers who breastfeed until the child is 12 months in developed countries is 74% while in developing countries it is 12%.⁵

The American Academic of Pediatric Dentistry stated that breastfeeding pattern causes ECC. The aim of this research is to analyze breastfeeding pattern with ECC in Bukittinggi, Indonesia. To prevent the occurrence of ECC, the WHO makes guidelines for breastfeeding patterns. The WHO recommends that breastfeeding should be given exclusively until the child is 6 months old and

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followed by breastfeeding plus complementary food until the age of 2 years.⁵ This study aims to analyze the pattern of drinking milk with ECC in children aged 2 to 3 years.

MATERIALS AND METHODS

This research was a cross-sectional study in Posyandu in the city of Bukittinggi. Bukittinggi is a city with diverse socioeconomic status. Samples are taken from all districts in Bukittinggi. The number of samples was determined by the WHO manual.¹⁰ Research subjects were chosen by purposive sampling technique of 66 pairs of mothers and children ranging in age from 2 to 3 years with criteria of four upper anterior teeth already erupted. Research subjects were observed once about risk factors and effects according to current circumstances. The data were taken by six young dentists of the Faculty of Dentistry, Andalas University who were trained at first. The data were collected under the supervision of the head of the researcher.

Permission for the research was obtained from Research Ethics, Faculty of Medicine, Andalas University, Padang West Sumatera. Informed consent was given before retrieving the data. The pattern of breastfeeding in children aged 0 to 6 months and milk drinking patterns of children aged 6 months to 2 years were observed using questionnaires that have been tested for reliability and validity. Early childhood caries was examined using the WHO index deft criteria for epidemiological studies. Early childhood caries is categorized into three groups, i.e., mild (deft index 0–2.6), moderate (≥ 2.6 –4.4), and high (≥ 4.4). Data analysis was performed using Statistical Package for the Social Sciences, version 15. Significance of an effect was stated when $p < 0.05$ (significance level 95%). The prevalence of caries between two groups was tested using chi-square test.

RESULTS

A sample of 66 people was selected, of which 34 people had caries (51.5%), with an average deft index of 1.00 ± 2.76 [confidence interval (1.61–2.97)]. The sample consisted of 25 males (37.8%) and 41 females (62.0%) of age 2 to 3 years with an average age of 2.5 years. Children with exclusive breastfeeding (13, 19.6%) and children who received breast milk and complementary food from the age of 6 months to 2 years (37, 56%) (Table 1) were selected.

Males have higher average deft than females and children aged 3 years have a higher average deft than those aged 2 years. The prevalence of ECC was highest in children in the 3-year age group (Table 1). Children with exclusive breastfeeding have a lower average deft than who are not exclusively breastfed. Children with breastfeeding, bottle milk, and complementary foods have the highest average deft. The highest prevalence of ECC is in

Table 1: Prevalence of ECC (\times deft) based on characteristics

| Variable | n | Prevalence of ECC | \times deft | SD |
|---------------------|------------|-------------------|---------------|-------|
| Sex | | | | |
| Male | 25 (37.8%) | 13 (52%) | 2.56 | 3.203 |
| Female | 41 (62.2%) | 20 (48.8%) | 2.21 | 2.48 |
| Age (months) | | | | |
| 24 | 33 (50%) | 13 (39.4%) | 1.45 | 2.166 |
| 36 | 33 (50%) | 22 (66.7%) | 3.12 | 3.059 |

SD: Standard deviation

Table 2: Prevalence of ECC (\times deft) based on breastfeeding

| Variable | n | Prevalence of ECC | \times deft | SD |
|---|------------|-------------------|---------------|-------|
| Exclusive breastfeeding | 12 (18.2%) | 5 (41.7%) | 1.42 | 2.065 |
| Nonexclusive breastfeeding | 54 (81.8%) | 29 (53.7%) | 2.48 | 2.875 |
| Breastfeeding with complementary foods | 37 (56.1%) | 23 (62.1%) | 2.27 | 2.446 |
| Nonbreastfeeding with complementary foods | 29 (43.9%) | 9 (31%) | 2.48 | 2.875 |

SD: Standard deviation

Table 3: Prevalence of ECC (\times deft) based on feeding pattern from 6 to 24 months

| Variable | n | Prevalence of ECC | \times deft | SD |
|-------------------------------------|------------|-------------------|---------------|-------|
| Frequency $\leq 7\times$ | 53 (80.3%) | 21 (39.6%) | 2.17 | 2.827 |
| Frequency $> 7\times$ | 13 (19.7%) | 13 (100%) | 2.77 | 2.522 |
| Duration ≤ 15 minutes | 42 (63.6%) | 19 (45.2%) | 2.02 | 2.580 |
| Duration > 15 minutes | 24 (36.4%) | 14 (58.3%) | 2.75 | 3.054 |
| Not as lullaby | 2 (3.3%) | 1 (50.0%) | 4.00 | 3.567 |
| As lullaby | 64 (96.7%) | 33 (51.6%) | 2.23 | 2.695 |
| No formula feed | 36 (54.5%) | 19 (52.7%) | 2.19 | 2.505 |
| Formula feed | 30 (45.4%) | 17 (56.7%) | 2.40 | 3.081 |
| Stop breastfeeding < 24 months | 44 (66.7%) | 23 (52.3%) | 2.27 | 2.732 |
| Stop breastfeeding > 24 months | 22 (33.3%) | 11 (50.0%) | 2.32 | 2.901 |
| Stop drinking milk ≤ 14 months | 33 (50%) | 19 (57.6%) | 2.18 | 2.551 |
| Stop drinking milk > 14 months | 33 (50%) | 15 (58.1%) | 2.09 | 2.989 |

SD: Standard deviation

children with breastfeeding and complementary feeding groups (Table 2).

Based on breastfeeding pattern, the prevalence of ECC is highest in children who stop drinking bottled milk when they are older than 14 months. The highest deft index was found in children who were not lactating (Table 3).

The ECC distribution by WHO category is 59.1% low, 16.7% medium, and 24.2% high. Exclusive breastfeeding group was with the category of ECC 66.7% low, 16.7%

Table 4: Breastfeeding pattern and ECC

| Variable | Mild | Moderate | High | p-value |
|---|------------|------------|------------|---------|
| Exclusive breastfeeding | 8 (66.6%) | 2 (16.7%) | 2 (16.7%) | 0.783 |
| Nonexclusive breastfeeding | 21 (38.8%) | 9 (16.7%) | 14 (25.9%) | |
| Breastfeeding with complementary foods | 19 (51.4%) | 10 (27.0%) | 8 (21.6%) | 0.038* |
| Nonbreastfeeding with complementary foods | 20 (69.0%) | 1 (3.4%) | 8 (27.6%) | |
| Frequency < 7 times/day | 33 (62.3%) | 8 (15.1%) | 12 (22.6%) | 0.565 |
| Frequency ≥ 7 times/day | 6 (46.2%) | 2 (23.1%) | 4 (30.8%) | |
| Not as lullaby | 27 (64.3%) | 5 (11.9%) | 10 (23.8%) | 0.349 |
| As lullaby | 12 (50.0%) | 6 (25.0%) | 6 (25.0%) | |
| No formula feed | 19 (52.8%) | 9 (25.0%) | 8 (22.2%) | 0.138 |
| Formula feed | 20 (66.7%) | 2 (6.7%) | 8 (26.7%) | |
| Stop breastfeeding <24 months | 26 (59.1%) | 8 (18.2%) | 10 (22.7%) | 0.138 |
| Stop breastfeeding >24 months | 13 (59.1%) | 3 (13.6%) | 6 (27.3%) | |
| Stop drinking milk ≤14 months | 15 (45.5%) | 10 (30.3%) | 8 (24.2%) | 0.009* |
| Stop drinking milk >14 months | 24 (72.7%) | 1 (3.0%) | 8 (24.2%) | |

*Significance difference, $p < 0.05$

medium, and 16.7% high. Exclusive breastfeeding group with EEC category is 57.4% low, medium 16.7%, and 25.9% high. The ECC with high category was found more in the nonexclusive breastfeeding group. There was a significant relationship between breastfed children plus complementary foods from 6 months to 2 years of age compared with those with breast milk, bottles, and complementary foods ($p < 0.05$) (Table 4).

DISCUSSION

The exclusive breastfeeding coverage in this study (19.6%) was lower than the national exclusive breastfeeding coverage (52.3%) in 2004 while the exclusive breastfeeding coverage of West Sumatra Province was 73.6%. World Health Organization in 2011 recommended exclusive breastfeeding until the age of 6 months and then breastfeeding should be accompanied by complementary food until the age of 2 years. Exclusive breastfeeding according to Government Regulation No. 33 of 2012 is to provide breast milk to infants from birth to 6 months of age, without adding or replacing with food or drink except essential drugs, vitamins, and minerals. Breast milk is the ideal nutrition for babies and provides immunological protection. Intestines not only provide nutritional intake but also psychosocial care through the bonding of affection with mother and health based on immunological substances contained in breast milk.^{11,12}

The results showed that 56% children got breast milk until the age of 2 years. The results of this study were lower than the previous study conducted by Ragama, in which they got 71.6% as result.¹³ The survey results of Hellen Keller in Jakarta showed that only 1% of children who got breast milk until age 6 months.¹⁴ At this time, many women are working to help the family's economy. This causes a limited breastfeeding to the baby. According to the National Health Survey 2012, 47.9% of women who

work in Indonesia. In Jakarta, of 44.8% of women who work, 28.7% had children under the age of 5 years.^{12,14}

The prevalence of ECC in this study was 51.5% with an average deft of 1.00 ± 2.76 , similar to that of Sugito et al⁹ in DKI Jakarta in children under 3 years of age. The prevalence was 52.7% with an average deft of 2.85, and research results at Mount Anyar¹⁵ showed an ECC prevalence of 30.8% for children aged 6 months to 3 years. This is still far from the WHO target of 90% of children under 5 years of age who are caries free. Primary teeth are more susceptible to caries because the enamel structure is less dense and thinner than permanent teeth.² Boys have an average deft higher than girls and children aged 3 years have an average deft higher than the age of 2 years but statistical test results have no significant relationship.

Children with exclusive breastfeeding had a lower deft average than no breastfeeding, but statistical test results showed no significant association, this result was similar to that of Perera et al.¹³ Breastfed children and with complementary foods from 6 months to 2 years had a lower deft average and from statistical tests, there was a significant association. Calcium and phosphate in breast milk will protect teeth from caries by stimulating remineralization in enamel.¹

The frequency of drinking milk of less than seven times in a day and the duration of drinking milk less than 15 minutes has a lower deft average, but from the statistical test results, there is no significant relationship. The results of Lida et al¹⁶ in the United States are also the same.

Children who were breastfed or had infant formula at night had a higher deft average than those who did not, but statistical tests showed no significant association. The results of Perera et al¹³ and Bahuguna et al¹⁷ showed that daytime milk feeding is a risk factor for ECC. When sleeping, saliva production is very little and the remaining milk in the mouth will be fermented by bacteria,

resulting in demineralization of enamel especially in the upper anterior teeth. Breastfeeding at night will be stopped when the first tooth erupts.¹

Children who drink bottle milk and sweetened milk had a higher deft index but no statistically significant test results. Bahuguna et al's¹⁷ results suggest that bottle-feeding and sweetener addition are risk factors for ECC. In the process of making formula milk sweeter like breast milk, sucrose is added. Sucrose and other sweeteners are cariogenic, causing dental demineralization.^{18,19}

Children who stop breastfeeding at age 2 years and stop drinking bottle milk before the age of 14 months have a lower deft average, but statistical test results have no significant relationship. The results of Tyagi and Bahuguna showed that there was a relationship between duration of drinking of breast milk and ECC. Breastfeeding period will affect the child's diet.^{18,20}

The main limitation of this study is the oral glass that was used in the study was unacceptable to some children. The study also used headlamp in assessing caries presence.

CONCLUSION

Children who get exclusive breastfeeding and breast milk plus complementary foods aged 6 months to 2 years have a lower deft average. Exclusive breastfeeding has no significant association with ECC but breastfeeding plus complementary feeding from 6 months to 2 years of age has a significant relationship with ECC.

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