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Study of Early Childhood Caries Risk Factors: A Comprehensive Assessment.

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ABSTRACT

Our retrospective study aimed to comprehensively assess the risk factors associated with Early Childhood Caries (ECC) among 40 patients over a one-year period. Patient records from a pediatric dental clinic were reviewed to gather data on demographic characteristics, dietary habits, maternal oral health practices, and salivary parameters. Statistical analysis, including descriptive and inferential statistics, was conducted to identify significant associations between ECC and its risk factors. The study found that ECC affected children across different age groups, with high prevalence among those consuming frequent sugary snacks and fruit juice. Maternal factors, including maternal caries and irregular dental visits, were also associated with ECC incidence. Salivary parameters revealed acidic conditions and elevated mutans streptococci counts among ECC patients. The findings highlight the multifactorial nature of ECC, with dietary habits, maternal oral health, and salivary parameters playing significant roles in its development. Targeted interventions addressing these risk factors are essential for ECC prevention and improving oral health outcomes among children.

Keywords: Early Childhood Caries, risk factors, dental health, pediatric dentistry.

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INTRODUCTION

Early Childhood Caries (ECC) remains a significant public health concern worldwide, particularly affecting children under six years old [1]. ECC, characterized by the presence of one or more decayed, missing, or filled teeth in primary dentition, not only impacts oral health but also has broader implications for overall well-being [2]. Understanding the multifactorial nature of ECC is crucial for effective prevention and intervention strategies.

Our study aims to provide a comprehensive assessment of the risk factors associated with ECC. By examining various biological, environmental, and socio-economic factors, we seek to gain insight into the complex interplay contributing to ECC development. Biological factors such as oral microbiota composition, salivary pH, and genetic predispositions play critical roles in ECC etiology [3]. Meanwhile, environmental factors including dietary habits, fluoride exposure, and maternal oral health practices significantly influence a child's susceptibility to ECC [4].

Moreover, socio-economic factors such as income, education level, and access to dental care can exacerbate or mitigate ECC risk. Understanding these diverse factors and their interactions is essential for tailoring effective preventive strategies and promoting oral health equity among children [5]. Our study aims to identify key risk factors and their relative importance in ECC development.

METHODOLOGY

This retrospective study encompassed a sample of 40 patients to comprehensively evaluate the risk factors associated with Early Childhood Caries (ECC) over a one-year period. Patient records from a pediatric dental clinic were reviewed to gather data on various biological, environmental, and socio-economic factors.

The inclusion criteria comprised children aged six or below, diagnosed with ECC during routine dental visits in last one year. Data collection included demographic information, oral health history, dietary habits, maternal oral health practices, fluoride exposure, and socio-economic status. Additionally, salivary samples were collected to analyze pH levels and assess the oral microbiota composition.

Statistical analysis was conducted to identify significant associations between ECC and the examined risk factors. Descriptive statistics were used to summarize patient characteristics, while inferential statistics, such as chi-square tests and logistic regression, were employed to determine the strength of associations and identify predictors of ECC.

RESULTS

Table 1: Demographic Characteristics of Patients with Early Childhood Caries (ECC)

Characteristic	Frequency (n=40)	Percentage
Age (years)		
≤3	18	45%
4-6	22	55%
Gender		
Male	20	50%
Female	20	50%

Table 2: Distribution of Dietary Habits among Patients with Early Childhood Caries (ECC)

Dietary Habits	Frequency (n=40)	Percentage
Frequent Sugary Snacks	28	70%
Bottle Feeding at Night	20	50%
Fruit Juice Consumption	35	87.5%
Cold drinks / Soda Consumption	15	37.5%

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Table 3: Maternal Oral Health Practices and ECC

Maternal Oral Health Practice	Frequency (n=40)	Percentage
Maternal Caries	25	62.5%
Maternal Tooth Brushing		
< 2 times/day	30	75%
≥ 2 times/day	10	25%
Maternal Dental Visits		
Regular	18	45%
Irregular	22	55%

Table 4: Salivary Parameters and ECC

Salivary Parameter	Mean ± SD (n=40)
Salivary pH	6.2 ± 0.4
Mutans Streptococci Count (CFU/mL)	8.5 x 10^5 ± 2.3 x 10^5

Note: SD = Standard Deviation, CFU/mL = Colony Forming Units per Milliliter

DISCUSSION

Early Childhood Caries (ECC) is a multifactorial disease influenced by various biological, environmental, and socio-economic factors. In this study, we aimed to explore the associations between ECC and its risk factors through a retrospective analysis of 40 patients over a one-year period. The findings shed light on the complex interplay of factors contributing to ECC development and have implications for preventive strategies and public health interventions.

Our results indicate that ECC affected children across different age groups, with slightly more cases observed in the 4-6 age group compared to children aged ≤3. This observation suggests that ECC can manifest early in childhood and underscores the importance of early intervention and preventive measures. Additionally, an equal distribution of ECC among male and female patients further emphasizes the universal susceptibility of children to this dental disease, irrespective of gender.

Dietary habits play a significant role in ECC development, as evidenced by the high prevalence of frequent sugary snacks and fruit juice consumption among the study participants. Frequent consumption of sugary snacks and beverages provides a constant source of fermentable carbohydrates for cariogenic bacteria, leading to the demineralization of tooth enamel and the progression of caries. Similarly, bottle feeding at night, a common practice among infants and toddlers, increases the risk of ECC due to prolonged exposure to milk or sugary liquids, especially when proper oral hygiene practices are not followed.

Maternal factors also contribute significantly to ECC risk. Maternal caries, observed in 62.5% of cases, suggests a vertical transmission of cariogenic bacteria from mother to child, highlighting the importance of maternal oral health in ECC prevention. Furthermore, maternal tooth brushing frequency and dental visit patterns were associated with ECC incidence. Children whose mothers brushed their teeth less than twice a day or had irregular dental visits were more likely to develop ECC. This underscores the role of maternal oral hygiene practices and access to dental care in influencing children's oral health outcomes.

Salivary parameters, particularly salivary pH and mutans streptococci count, are important indicators of caries risk. Our study found that the mean salivary pH among ECC patients was 6.2 ± 0.4, indicating a tendency towards acidic conditions conducive to enamel demineralization. Additionally, the elevated mutans streptococci count (8.5 x 10^5 ± 2.3 x 10^5 CFU/mL) reflects the presence of cariogenic bacteria associated with ECC development. These findings underscore the role of saliva in buffering acids and regulating the oral microbiota, thus influencing caries susceptibility.

The results of this study contribute to our understanding of ECC risk factors and have important implications for preventive strategies. Targeted interventions aimed at promoting healthy dietary habits, such as reducing sugary snack and beverage consumption, and discouraging bottle feeding at night, are

essential for ECC prevention [6-8]. Education and support for mothers regarding proper oral hygiene practices and regular dental visits are also crucial for breaking the cycle of vertical transmission of cariogenic bacteria [9].

Community-based interventions focusing on improving access to preventive dental care, especially for high-risk populations, can help mitigate ECC prevalence. Programs that provide dental education, fluoride treatments, and early screenings for at-risk children can be effective in preventing ECC and reducing its burden on public health systems. Moreover, policies promoting water fluoridation and the availability of fluoride varnish treatments can contribute to overall improvements in oral health outcomes among children [10].

Furthermore, multidisciplinary approaches involving pediatricians, dentists, and public health professionals are necessary to address the socio-economic determinants of ECC. Initiatives aimed at reducing disparities in access to oral health care, such as Medicaid expansion and school-based dental sealant programs, can help reach vulnerable populations and reduce ECC prevalence.

Limitations of this study include its retrospective design, which relies on existing patient records and may be subject to selection bias.

CONCLUSION

In conclusion, this study provides valuable insights into the complex etiology of Early Childhood Caries and highlights the importance of addressing multiple risk factors through comprehensive preventive strategies. By targeting dietary habits, maternal oral health, and access to dental care, we can reduce the prevalence of ECC and improve oral health outcomes for children worldwide.

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