

Employment and The Occurrence of Early Childhood Caries (ECC) in Children Aged 2–3 Years at Posyandu Rambipuji Village, Jember Regency

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Abstract

Introduction: Early Childhood Caries (ECC) is one of the most common oral health problems in early childhood and can cause both short-term and long-term impacts on children's quality of life, including the growth and development of permanent teeth. The occurrence of Early Childhood Caries (ECC) is closely related to the level of parental involvement, particularly mothers' involvement in paying attention to and supervising children's oral hygiene habits from an early age. This level of involvement is strongly influenced by the amount of time mothers can spend with their children in daily life. Therefore, maternal employment status is presumed to be associated with the availability of such time, which in turn may affect the intensity of maternal supervision and guidance in children's oral health care.

Objective: This study aimed to determine the relationship between maternal employment and the occurrence of Early Childhood Caries among children aged 2–3 years at Posyandu Rambipuji village, Rambipuji District, Jember Regency.

Method: This study employed an observational analytic design with a cross-sectional approach. The study subjects consisted of 63 children aged 2–3 years who met the inclusion criteria. Data on ECC were obtained through clinical examination using the def-t index, while data on maternal employment status were collected using a demographic questionnaire. Data analysis was conducted using univariate and bivariate analyses with Fisher's Exact Test.

Results: The results showed a statistically significant association between maternal employment status and the occurrence of Early Childhood Caries among children aged 2–3 years. Children of working mothers tended to have higher def-t scores compared to those of non-working mothers. The Fisher's Exact test showed a p-value of 0.018, indicating a statistically significant association between maternal employment status and Early Childhood Caries occurrence.

Conclusion: There is a significant relationship between maternal employment status and the occurrence of Early Childhood Caries among children aged 2–3 years at Posyandu Rambipuji village. This study can serve as an initial screening to identify children who are at a higher risk of developing dental caries, particularly those whose mothers are employed. By understanding the characteristics of maternal employment and the potential limitations in time that may affect mothers' involvement in children's oral health care, preventive efforts can be implemented earlier and in a more targeted manner. Therefore, promotive and preventive oral health interventions can be focused on high-risk groups to more effectively reduce the occurrence of dental caries in early childhood.

Keywords: Early Childhood Caries; ECC; Maternal Employment; Early Childhood; Def-T Index.

1. Introduction

Early Childhood Caries can lead to various negative impacts, including pain, difficulty chewing, decreased appetite, sleep disturbances, psychological changes, and impaired daily activities.[2] If ECC is not promptly treated by dental professionals and does not receive adequate attention from parents, it may result in destruction of the tooth crown. This condition increases the risk of premature tooth loss, which can subsequently cause orthodontic problems during the mixed dentition phase and later permanent dentition development. Premature tooth loss allows adjacent teeth to migrate into the space, leading to space loss and resulting in malposition of permanent teeth, such as crowding, rotation, or ectopic eruption.[3]

Primary teeth begin to erupt at approximately six months of age, and complete eruption of the primary dentition occurs between 2.5 and 3 years of age.[4] Many parents perceive oral health problems in children, such as dental caries, as unimportant because primary teeth will eventually be replaced by permanent teeth. This misconception often leads parents to neglect their children's oral hygiene and delay dental visits.[5]

Parents, particularly mothers, play a crucial role in maintaining and promoting children's oral health. Mothers are instrumental in establishing oral hygiene habits from an early age.[6] Children who are not accustomed to proper oral hygiene practices early in life are at a higher risk of developing dental problems, including ECC.

Maternal involvement in monitoring children's oral health is closely related to maternal employment status. Non-working mothers generally have more time to interact with and directly supervise their children's health.[7] A study [8] entitled "Do Children of Working Mothers Experience More Dental Caries?" reported that children of working mothers had a higher likelihood of experiencing dental caries compared to those of non-working mothers. This condition is presumed to be associated with time constraints faced by working mothers in accompanying and supervising their children's oral hygiene, which may increase the risk of caries development.[8]

Jember Regency is one of the most populous regions, with a population exceeding 2.6 million residents (Central Bureau of Statistics of Jember Regency, 2024). The Jember Regency Health Office reported 10,239 cases of dental caries across all public health centers in 2024. Rambipuji District ranked second with the highest number of caries cases, totaling 573 cases. Furthermore, the Jember Regency Health Office (2025) reported 926 caries cases recorded from January to April across all public health centers, with Rambipuji District remaining in second place with 96 cases. Although the recorded percentage of caries cases represents only approximately 0.39% of the total population, this figure does not reflect the true prevalence of dental caries in the community. Dental caries is known to be a disease with a high level of underreporting, as many cases remain undetected or unrecorded in health care facilities.

Based on direct observations during the preliminary survey, a considerable number of children aged 2–3 years were found to exhibit signs of Early Childhood Caries, such as dental cavities and discoloration of primary teeth. Interviews with mothers at Posyandu in Rambipuji Village revealed diverse maternal occupations, including laborers, civil servants, and traders, which may influence the level of maternal involvement in maintaining children's oral and dental health.

Based on the above considerations, the author is interested in conducting a study among children aged 2–3 years at Posyandu in Rambipuji Village, Rambipuji District, using the def-t index. The def-t index is used to assess the number of decayed, extracted due to caries, and filled primary teeth in children under 36 months of age who experience ECC.[9] Researching children aged 2–3 years is expected to identify ECC risk factors before the condition becomes more severe. Promotive and preventive interventions are also expected to be more effective when implemented at an early stage.

2. Methods

This study was an observational analytic study with a cross-sectional design. This approach was used to determine the association between maternal employment status and the occurrence of Early Childhood Caries (ECC) among children aged 2–3 years at the same point in time. The study was conducted at Posyandu in Rambipuji Village, Jember Regency, Indonesia. Rambipuji Village consists of six hamlets with a total of 15 Posyandu units. Data collection was carried out from October to November 2025. The study population comprised children aged 2–3 years who attended Posyandu in Rambipuji Village. An oral and dental examination of the child was conducted using a dental probe and a mouth mirror. At the same time, the child's mother completed a structured questionnaire. A total of 63 children were included in the study. The sampling technique used was probability sampling with a proportionate random sampling method to ensure proportional representation from each Posyandu.

3. Results

Based on the data obtained from the research, data was obtained from 105 students who had carried out research to describe the malocclusion Angle Dewey modification implemented at Jember Regency SLB in 2024.

Table 3.1: Output Fisher's Exact Test

Uji	Exact Sig. (2-sided)
Fisher's Exact Test	.018

Based on the bivariate analysis, Fisher's Exact Test showed a p-value of 0.018 ($p < 0.05$), indicating a statistically significant association between maternal employment and the occurrence of Early Childhood Caries (ECC) among children aged 2–3 years. The results of Fisher's Exact Test further confirmed that the association between the two variables remained statistically significant ($p = 0.018$); therefore, the research hypothesis was accepted.

Table 2: Frequency Distribution by Child's Age

Characteristics	Frequency (N)	Percentage (%)
Child's Age		
2 Years	30	47,6%
3 Years	33	52,4%
Total	63	100%

Table 2 shows the total frequency distribution of respondents based on children's age, comprising 63 children. The majority of the respondents were 3 years old, totalling 33 children (52.4%), while 30 children (47.6%) were 2 years old.

Table 3: Frequency Distribution by Maternal Occupation

Characteristics	Frequency (N)	Percentage (%)
Maternal Occupation		
Not Employed	36	57,1%
ASN	9	14,3%
Laborer	3	4,8%
Trader	15	23,8%
Total	63	100%

Table 3 shows that the majority of mothers were not employed, totalling 36 respondents (57.1%). Mothers working as traders accounted for 15 respondents (23.8%), followed by those employed as civil servants with 9 respondents (14.3%). The smallest proportion was observed among mothers working as laborers, with only 3 respondents (4.8%).

Table 4: Frequency Distribution of Early Childhood Caries (ECC) Categories

Characteristics	Frequency (N)	Percentage (%)
Child Dental Caries		
ECC Free	21	33,3%
Low Caries	19	30,2%
Moderate Caries	19	30,2%
High Caries	4	6,3%

Table 4 presents the frequency distribution of children's dental caries based on the def-t index, covering categories ranging from ECC-free to high caries. A total of 21 children (33.3%) were classified as ECC-free, while 19 children (30.2%) were categorized as having low caries, and another 19 children (30.2%) as moderate caries. These findings indicate that the majority of respondents had mild to moderate levels of dental caries, whereas only 4 children (6.3%) were classified as having high caries.

Table 5: Cross-Tabulation of Maternal Occupation and ECC Occurrence

Maternal Occupation	Free ECC	Low Caries	Moderate Caries	High Caries	Total
Not Employed	15 (41,7%)	9 (25%)	10 (27,8%)	2 (5,6%)	36 (100%)
ASN	4 (44,4%)	3 (33,3%)	2 (22,2%)	0 (0,0%)	9 (100%)
Laborer	1 (33,3%)	0 (0,0%)	0 (0,0%)	2 (66,7%)	3 (100%)
Trader	1 (6,7%)	7 (46,7%)	7 (46,7%)	0 (0,0%)	15 (100%)

Table 5: The findings demonstrate differences in the pattern of Early Childhood Caries (ECC) occurrence among children according to maternal occupation. In the group of non-working mothers, the majority of children (41.7%) were classified as ECC-free; however, proportions of children with moderate ECC (27.8%) and low ECC (25.0%) were still observed, with a small percentage experiencing high ECC (5.6%). Among mothers employed as civil servants, most children were classified as ECC-free and low ECC, with 44.4% ECC-free and 33.3% low ECC, while only 22.2% had moderate ECC, and no cases of high ECC were identified. This indicates that the majority of children in this group experienced dental caries at a mild level.

In contrast, among mothers working as laborers, most children were classified as having high ECC (66.7%), while the remaining children were ECC-free (33.3%), and no cases of low or moderate ECC were observed, indicating a higher tendency toward severe caries in this group. In the group of mothers working as traders, the majority of children experienced low and moderate ECC, each accounting for 46.7%, whereas only 6.7% of children were ECC-free, and no cases of high ECC were found. These findings suggest that nearly all children in this group had experienced ECC at mild to moderate levels.

4. Discussions

This study involved 63 male and female children aged 2–3 years as respondents. The respondents were within the age range of 2 to 3 years, as presented in Table 2. Children at this age are not yet capable of performing independent oral care due to limitations in fine motor skills and cognitive understanding. At this stage, fine motor skills are still developing; although children are able to grasp objects, their movements remain unstable.[10] Therefore, parents, particularly mothers, play a crucial role in establishing toothbrushing habits in children at this age. Mothers need to be directly involved during toothbrushing to ensure optimal oral hygiene.

Maternal employment may influence the opportunity for mothers to be involved in their children's oral care. Table 3 shows that the respondents in this study consisted of both non-working mothers and working mothers with various types of occupations. The diversity of occupational types reflects differences in daily activities and indicates variations in time availability, work-related stress, and daily routines, all of which may affect maternal roles in accompanying and caring for children.[11]

In this study, 15 children aged 2–3 years in the non-working mother group were classified as ECC-free. Children of non-working mothers tended to have a lower occurrence of dental caries, as shown in Table 5. This condition may be associated with the greater amount of time non-working mothers can spend with their children, allowing for more consistent supervision during daily activities.[13] This greater time availability may support closer monitoring of children's habits, including oral hygiene practices, which in turn may contribute to a lower prevalence of dental caries among children aged 2–3 years.

Children whose mothers were employed as civil servants (Aparatur Sipil Negara/ASN) demonstrated the lowest caries occurrence among the working-mother groups, with 4 children classified as ECC-free and 3 children experiencing low ECC. In contrast, children whose mothers worked as laborers exhibited the highest def-t scores, with 2 children categorized as having high ECC. The trader group showed an intermediate pattern, with 7 children experiencing low ECC and 7 children experiencing moderate ECC. These findings suggest that different types of maternal occupations, each with distinct characteristics, may have varying impacts on the occurrence of dental caries in children.

Mothers employed as civil servants generally have structured and more regular working hours. [13] Such conditions may facilitate more consistent supervision of children's health, which is reflected in the low proportion of children with moderate or high ECC in this group. In contrast, mothers working as laborers are often required to work intensively to meet productivity targets. These high work demands may indirectly reduce the amount of time available to spend with family[14], thereby limiting maternal time and energy to attend to children's needs, including oral health, which may contribute to the higher occurrence of ECC among children of laborer mothers.

Mothers working as traders generally have flexible but unpredictable working hours. Trading is often perceived as a relatively less demanding occupation because individuals can regulate their own work patterns and rules. This flexibility, however, may result in varying amounts of time spent with children on a daily basis.[15] This condition may explain why ECC occurrence among children of trader mothers was at an intermediate level lower than that observed in the laborer group but higher than that in the civil servant group.

5. Conclusion

Based on the results of this study, it can be concluded that there is an association between maternal occupation and the occurrence of Early Childhood Caries (ECC) among children aged 2–3 years at Posyandu in Rambipuji Village, Jember Regency. This association was confirmed by the results of Fisher's Exact Test, which showed a p-value of less than 0.05, specifically 0.018. In this study, children of non-working mothers tended to have better oral health conditions, as indicated by a higher proportion of caries-free children (41.7%). This

finding may be attributed to the greater opportunity for non-working mothers to consistently supervise their children's toothbrushing habits, dietary patterns, and oral care practices.

Among working mothers, the severity of Early Childhood Caries (ECC) varied according to the type of maternal occupation. Children whose mothers were employed as civil servants (Aparatur Sipil Negara/ASN) were predominantly classified in the low ECC category (44.4%), whereas among mothers working as traders, ECC was most frequently observed in the moderate ECC category (46.7%). The highest proportion of high ECC was found among children whose mothers worked as laborers (66.7%). These findings suggest that working mothers may face limitations in time and consistency when assisting with their children's oral and dental care due to occupational demands.

6. Research Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design only describes associations at a single point in time and cannot establish causal relationships between maternal employment and ECC occurrence. Second, the study was conducted in a single village with a relatively small sample size, which may limit the generalizability of the results to broader populations. Additionally, other factors known to influence ECC, such as parental education level, household income, children's dietary habits, frequency of toothbrushing, and access to dental services, were not analyzed in depth in this study. These factors may act as confounding variables affecting ECC occurrence.

7. Suggestions

Future studies are recommended to involve larger and more diverse populations across different regions to improve the representativeness of the findings. Longitudinal research designs are also suggested to better understand causal relationships between maternal employment and ECC development over time. Further research should include additional variables such as family income, feeding practices, oral hygiene behavior, and access to dental care services to provide a more comprehensive understanding of ECC risk factors. Moreover, community-based oral health promotion programs targeting parents, particularly working mothers, should be strengthened to support preventive efforts and reduce ECC prevalence in early childhood.

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