



Evaluation of Co-Relation between Maternal Behavior Characteristics and Early Childhood Caries in Children of Wardha District

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim: To find the prevalence of ECC with respect to various maternal behavioral characteristics.

Study Design: Cross-sectional study

Place and Duration of Study: Department of Pediatric and Preventive Dentistry, Sharad Pawar Dental college, Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra, India between 2012-2013

Methodology: The study comprised of 540 children aged 6 months to 6 years attending the OPD. Structured questionnaire consisting of questions related to maternal factors affecting ECC was formatted for the study. Maternal factors included number of siblings in family, education, occupation, socioeconomic status, feeding practices, oral hygiene practices of mother and child. Age wise comparison of dental caries was done with every parameter along with number of teeth affected.

Results: Out of 540 children, 43.33% children were affected with dental caries and 56.67% children were not affected with dental caries. There was no statistically

significant difference among the variables like number of siblings, occupation, socioeconomic status, feeding habits, oral hygiene status of mother and child except for educational qualification of mother.

Conclusions: Epidemiological data of the present study evaluating the co-relation between maternal behavior characteristics and ECC in children of Wardha district can be utilized for improved public oral health service planning within the region.

Keywords: Early childhood caries; maternal behavioral factors; dental caries.

1. INTRODUCTION

Early Childhood Caries (ECC) is the disease characterized by the presence of 1 or more decayed (non-cavitated/cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of 6 [1,2]. ECC is frequent chronic disease occurring in young children, with incidence as early as when the tooth erupts [3]. As suggested by Berg and Slayton [4], ECC can be broadly classified as biological and social-factors depending on the risk-factors [4].

Biological risk-factors consist of early colonization by cariogenic micro-organisms, feeding habits and nutritional factors while social-risk factors include low-socioeconomic status, low parental education, and lack of awareness of oral diseases [5]. Among the parents, mother is the primary caregiver for infants and takes care of the dietary habits of child throughout day.

Etiology of ECC among infants can be due to frequent and prolonged nursing bottle/prolonged breast feeding. ECC is also associated with sweetened pacifier usage, poor oral hygiene, early colonization and high levels of cariogenic bacteria, other factors such as socioeconomic-status, parental education level, and maternal flora [6]. Working mothers cannot pay attention towards nutritional requirement and fulfillment of her child due to her unavailability at home during day-time and child is left to be taken care by caregiver. One of the predisposing factor for ECC is educational level of mother. Most of mothers educated with higher degrees have been found to be working mothers. Mothers, whose educational level is low, have poor knowledge about the oral health care, so they may not maintain their own oral health as well as their children. Also, as the number of order of siblings increases, attention paid to elder sibling becomes less. So, all these maternal factors influence ECC in infants.

Clinical pattern of ECC includes multiple carious teeth, development of caries soon after its eruption and carious involvement of teeth surfaces which are at low risk of caries.

In India, caries prevalence reported for 8 months-48 months old children is 44% [7]. Very few studies are available in India which describes maternal factors influencing ECC. So, this study was planned to find out maternal factors like socioeconomic status, low education level, feeding practices by mother, oral hygiene status of mother on development of ECC.

2. MATERIALS AND METHODS

This study was conducted as cross-sectional study in the outpatient department of Pedodontics and Preventive Dentistry, Sharad Pawar Dental College and department of Pediatrics, Jawaharlal Nehru Medical College, Wardha. Five hundred forty children of 6 months to 6-year age groups were included in the study, out of which 46.6% were males and 53.33% were females (Table 1). Children with any severe systemic disease and immunocompromised conditions were excluded from the study. Prior to dental examination of each child, a questionnaire was prepared consisting of questions related to the number of siblings in family, occupation of mother, education status of mother, socioeconomic status, type of feeding by mother, oral hygiene status of mother and child. Questionnaire was prepared in local language (Marathi). Consent of mother was taken for the study before doing dental examination of children. Dental examination of each child was carried out as per WHO criteria using sterile mouth mirror and dental probe in the visible day light. The SPSS software version 12.0 was used for analysis by using Chi-square test. Chi-square test assessed the relationship between various maternal behavior characteristics with independent variables.

3. RESULTS

- 540 children participated in the study with no statistically significant gender difference with $P = .60$ (Table 1).
- Three hundred and six children were not affected with caries among which maximum number of children were having one sibling followed by children with zero, two and three siblings. Data was statistically non-significant with P value= .26 (Table 2).
- It was found that as the educational qualification of mothers increased, children affected with caries were less. Data was statistically significant as P -value=.000 (Table 3).
- Total caries incidence in children of housewives (47.33%) were more, with maximum percentage children having two teeth affected followed by children with 3 teeth affected. Total caries incidence in children of working mothers was less i.e., 5.34% (29). Difference was not statistically significant as P -value= .59 (Table 4).
- Overall caries was found to be more in average socio-economic status. Caries incidence was low in poor socioeconomic status. But the difference was not statistically significant as P -value= .19 (Table 5).
- Out of 43.33% children affected with caries, incidence was more in breast fed children followed by bottle fed and fed by both the practices. Difference was statistically significant with P -value= .69 (Table 6).
- Overall caries incidence in children was found to be of whose mothers showed average oral hygiene status followed by good oral hygiene status and poor oral hygiene status. Difference was not statistically significant with P -value=.80. This suggests that mother's oral hygiene status is not always related with less incidence of dental caries occurrence in their children (Table 7).
- Overall caries incidence was found to be more in children showing average oral hygiene status followed by good oral hygiene status. No statistically significant difference was found P -value=.055 (Table 8).

Table 1. Age-wise and sex-wise distribution of children

Sex	Age						Total
	6 months to 1 year	1-2 years	2-3 years	3-4 years	4-5 years	5-6 years	
Male	14(2.6%)	25(4.6%)	47(8.7%)	72(13.3%)	29(5.3%)	65(12.03%)	252(46.6%)
Female	7(1.29%)	43(7.96%)	43(7.96%)	79(14.81%)	54(10%)	62(11.29%)	288(53.33%)
Total	22(4%)	68(12.67%)	90(16.67%)	151(28%)	83(15.33%)	126(23.33%)	540(100%)

χ^2 -value=3.62, P -value=.60, NS

Table 2. Comparison of dental caries with respect to number of siblings

Dental caries	Siblings				Total
	No sibling	One	Two	Three	
Not Affected	68(12.67%)	173(32%)	58(10.67%)	7(1.33%)	306(56.67%)
Affected with caries	32(6%)	108 (20%)	86 (16%)	7(1.29%)	234 (43.33%)
One	11(2%)	40(7.40%)	14(2.67%)	0(0%)	65(12%)
Two	11(2%)	25(4.67%)	36(6.67%)	0(0%)	72(13.33%)
Three	0(0%)	7(1.33%)	14(2.67%)	4(0.67%)	25(4.67%)
Four	0(0%)	7(1.33%)	4(0.67%)	0(0%)	11(2%)
Five	0(0%)	14(2.67%)	4(0.67%)	0(0%)	18(3.33%)
Six	4(0.67%)	4(0.67%)	0(0.00%)	0(0%)	7(1.33%)
More than six	4(0.67%)	7(1.33%)	11(2.00%)	4(0.67%)	25(4.67%)
All	4(0.67%)	4(0.69%)	4(0.67%)	0(0%)	11(2%)
Total	101(18.67%)	281(52%)	144(26.67%)	14(2.67%)	540 (100%)

χ^2 -value=27.85, P -value=.26

Table 3. Comparison of dental caries with respect to educational qualification of mother

Dental caries	1-4 std	5-10 std	11-12 std	Graduate	Post-Graduation	Total
Not Affected	97(18%)	112(20.67%)	61(11.33%)	36(6.67%)	0(0%)	306(56.67%)
Affected with caries	36(6.67%)	68(12.66%)	57(10.67%)	65(12%)	7(1.33%)	234(43.33%)
One	1(2.67%)	11(2%)	11(2%)	29(5.33%)	0(0%)	65(12%)
Two	7(1.33%)	25(4.67%)	22(4%)	18(3.33%)	0(0%)	72(13.33%)
Three	0(0%)	7(1.33%)	7(1.33%)	11(2%)	0(0%)	25(4.67%)
Four	0(0%)	7(1.33%)	0(0%)	4(0.67%)	0(0%)	11(2%)
Five	0(0%)	4(0.67%)	11(2%)	0(0%)	4(0.67%)	18(3.33%)
Six	0(0%)	0(0%)	4(0.67%)	0(0%)	4(0.67%)	7(1.33%)
More than six	11(2%)	7(1.33%)	4(0.67%)	4(0.67%)	0(0%)	25(4.67%)
All	4(0.67%)	7(1.33%)	0(0%)	0(0%)	0(0%)	11(2%)
Total	133(24.67%)	180(33.33%)	119(22%)	101(18.67%)	4(1.33%)	540(100%)

χ^2 -value=84.14, P-value=0.000

Table 4. Comparison of dental caries with respect to occupation of mothers

Dental caries	Housewife	Working	Total
Not Affected	256(47.33%)	50(9.33%)	306(56.67%)
Affected with caries	205(38%)	29(5.34%)	234(43.33%)
One	47(8.67%)	18(3.33%)	65(12%)
Two	65(12%)	7(1.33%)	72(13.33%)
Three	25(4.67%)	0(0%)	25(4.67%)
Four	11(2%)	0(0%)	11(2%)
Five	18(3.33%)	0(0%)	18(3%)
Six	7(1.33%)	0(0%)	7(1.33%)
More than six	22(4%)	4(0.67%)	25(4.67%)
All	11(2%)	0(0%)	11(2%)
Total	461(85.33%)	79(14.67%)	540(100%)

χ^2 -value=6.48, P-value=0.59, NS, p>0.05

Table 5. Comparison of dental caries with respect to socio-economic status

Dental caries	Good	Average	Poor	Total
Not Affected	43(8%)	230(42.67%)	32(6%)	306(56.67%)
Affected with caries	54(10%)	158(29.33%)	22(4%)	234(43.33%)
One	18(3.33%)	36(6.67%)	11(2%)	65(12%)
Two	14(2.67%)	50(9.33%)	7(1.33%)	72(13.33%)
Three	4(0.67%)	22(4%)	0(0%)	25(4.67%)
Four	11(2%)	0(0%)	0(0%)	11(2%)
Five	4(0.67%)	14(2.67%)	0(0%)	18(3.33%)
Six	0(0%)	7(1.33%)	0(0%)	7(1.33%)
More than six	4(0.67%)	18(3.33%)	4(0.67%)	25(4.67%)
All	0(0%)	11(2%)	0(0%)	11(2%)
Total	97(18%)	389(72%)	54(10%)	540(100%)

χ^2 -value=20.64, P-value=0.19

Table 6. Comparison of dental caries with respect to type of feeding

Dental caries	Breast	Bottle	Both	Total
Not Affected	166(30.67%)	50(9.33%)	90(16.67%)	306(56.67%)
Affected with caries	137(25.33%)	32(6%)	65(12%)	234(43.33%)
One	32(6%)	14(2.67%)	18(3.33%)	65(12%)
Two	36(6.67%)	14(2.67%)	22(4%)	72(13.33%)
Three	22(4%)	0(0%)	4(0.67%)	25(4.67%)
Four	7(1.33%)	0(0%)	4(0.67%)	11(2%)
Five	14(2.67%)	0(0%)	4(0.67%)	18(3.33%)
Six	7(1.33%)	0(0%)	0(0%)	7(1.33%)
More than six	7(1.33%)	4(0.67%)	14(2.67%)	25(4.67%)
All	11(2%)	0(0%)	0(0%)	11(2%)
Total	302(56%)	83(15.33%)	155(28.67%)	540(100%)

χ^2 -value=12.73, P-value=0.69

Table 7. Comparison of dental caries status of children with respect to oral hygiene status of mother

Dental caries	Good	Average	Poor	Total
Not Affected	82(15.33%)	198(36.6%)	25(4.67%)	306(56.67%)
Affected with caries	43(8%)	169(31.4%)	18(3.33%)	234(43.33%)
One	14(2.67%)	47(8.67%)	4(0.67%)	65(12%)
Two	14(2.67%)	47(8.67%)	11(2%)	72(13.33%)
Three	7(1.33%)	14(2.67%)	4(0.67%)	25(4.67%)
Four	0(0%)	11(2%)	0(0%)	11(2%)
Five	0(0%)	18(3.33%)	0(0%)	18(3.33%)
Six	4(0.67%)	4(0.67%)	0(0%)	7(1.33%)
More than six	4(0.67%)	22(4%)	0(0%)	25(4.67%)
All	0(0%)	7(1.33%)	4(0.67%)	11(2%)
Total	126(23.33%)	367(68%)	47(8.67%)	540(100%)

χ^2 -value=11.04, P-value=0.80

Table 8. Comparison of dental caries with respect to oral hygiene status of child

Dental caries	Good	Average	Poor	Total
Not Affected	101(18.67%)	202(37.33%)	4(0.67%)	306(56.67%)
Affected with caries	43(8%)	158(29.34%)	32(6%)	234(43.33%)
One	11(2%)	50(9.33%)	4(0.67%)	65(12%)
Two	14(2.67%)	47(8.67%)	11(2%)	72(13.33%)
Three	7(1.33%)	14(2.67%)	4(0.67%)	25(4.67%)
Four	0(0%)	11(2%)	0(0%)	11(2%)
Five	0(0%)	11(2%)	7(1.33%)	18(3.33%)
Six	4(0.67%)	4(0.67%)	0(0%)	7(1.33%)
More than six	4(0.67%)	18(3.33%)	4(0.67%)	25(4.67%)
All	4(0.67%)	4(0.67%)	4(0.67%)	11(2%)
Total	144(26.67%)	360(66.67%)	36(6.67%)	540(100%)

χ^2 -value=25.89, P-value=.055

4. DISCUSSION

ECC is caused by interaction of various social, behavioural and microbiological factors. Various maternal factors are responsible for its causation [8]. The factors which were studied are, number

of siblings, occupation of mother, socioeconomic status, mother's educational qualification, feeding practices, oral hygiene status of mother and child. In present study, total 234 children were affected with caries and its prevalence was 43.33%. Prevalence of present study was found

to be similar with the prevalence observed by M. Viridi et al. [9]

There is an increased risk for ECC among children with history of dental caries and in those whose primary caregiver or siblings had severe dental caries [10,11]. In present study, correlation between number of siblings and caries incidence was evaluated and it was found that the child with one sibling had more caries incidence followed by children having two, zero and three siblings. Proper dental care of child with no sibling can be taken by parents compared to those with siblings. When number of siblings increased, caries incidence is found to be reduced. Possible reason behind it could be deficient cariogenic food availability in the family.

Studies have shown that there is co-relation between education level of parents, occurrence and severity of ECC in their children [12,13]. High parental education has been related to lower caries incidence and lower mean dmft [12]. In present study also, out of 540 mothers, 12.66% (68) mothers having educational qualification between 5-10th standard had children affected with caries. While only 1.33% (7) children of mothers having post-graduate qualification were affected with caries. This shows that children of mother's higher educational qualification showed less caries prevalence. There-fore maternal education is a solid predictive variable for ECC [14]. Higher maternal education results in better child oral health care. Studies have also shown that less awareness and knowledge regarding types of cariogenic food and ideal oral health practices is associated with mother's lower educational qualification. This group of mothers may offer more cariogenic foods to their children [15,16]. That may be the reason why mothers with low educational level have children with high caries status. Study carried out by Feldens CA et al. [17] has recommended that there should be improvement in educational level, a crucial policy for reducing a whole gamut of childhood diseases.

Present study reveals that housewives had children with more number of carious teeth than the working mothers. Reason behind this could be that housewives are available at home all the time to take care of her child. All dietary requirements including in between snacking habits throughout day are fulfilled by mother who is housewife. In between snacking may involve use of sugary products which are cariogenic. This happens in

housewife mothers who are having poor knowledge about oral health due to low education qualification regarding oral health. In present study total caries incidence in children of housewives was more i.e. 38% (205), out of which 12% (65) children had two teeth affected, while total caries incidence in children of working mothers was less i.e. 5.34% (29).

The current study showed that caries rate was directly proportional to the income. This contradicts with the findings of other studies which concluded having inverse relationship between caries prevalence and income [6,18,19]. Jose and King conducted study to find out the ECC prevalence in preschool children of Kerala state and its relationship with feeding habits and hygiene practices. The study showed caries prevalence of 44% and dmft index as 1.84. Hence study concluded that the preschool children in Kerala, who were at high risk from developing caries lesions were having poor oral hygiene, who consumed snacks which was given to them in the form of reward, and those who belonged to lower socio-economic status [20]. A positive correlation has been established between the occurrence of dental caries and lower socioeconomic status [21,22]. In many developing countries a high prevalence of dental caries was reported amongst children of higher socio-economic class than children from lower social class and this was attributed to dietary factors [23,24]. Children from socially deprived backgrounds had shown higher caries incidence [25,26]. In present study, overall caries was found to be more in average socio-economic Status [29.33% (158)] and low in poor socioeconomic status [4% (22)].

Present study showed that children who were breast fed had more percentage of caries incidence in 2 teeth [6.67% (36)]. In bottle fed, 6% (32) children had equal percentage of involvement of 1 and 2 teeth [2.67% (14)]. In both breast as well as bottle feeding, 4% (22) children had 2 teeth affected followed by 3.33% (18) children with involvement of 1 tooth. This finding is in accordance with the study carried out in Brazil by Dini et al. who also could find increase in prevalence of caries of children who were exclusively breast fed [13]. One should not consider the type of feeding habit as the only criteria to determine the severity of caries. Other predisposing factors related to feeding practices like on demand breast feeding, contents of bottle, feeding at night should also be taken into consideration.

An association was found between parents' oral health status and the oral health status of their infants [27]. Better oral hygiene levels were found to be associated with lower caries levels in children [28,29]. Reducing caries in young children may require improving the oral health of their mothers [30]. But in present study, caries incidence was more in mother [31.4% (169)] and child [29.34% (158)] having average oral hygiene status followed by good oral hygiene. Prevalence of caries was less in child [6%(32)] and mother [3.33% (18)] having poor oral hygiene.

Mothers are usually more involved in childcare, especially feeding, in the first five years of life of the child [31,32]. Not only the reservoir of cariogenic bacteria, but mother's dental knowledge, behavior, as well as the general care of her child are also some of the factors that contribute to caries risk. Awareness regarding importance of oral health as well as ideal oral hygiene practices to lessen caries incidence is important [33].

5. CONCLUSION

Early childhood caries is of complex etiology including dietary practices, social, cultural, economic influences, genetic influences. It is very important to minimize magnitude, complexity, and infectious nature of ECC. Epidemiological data of present study evaluating the co-relation between maternal behavior characteristics and ECC in children of Wardha district can be employed for upgraded public oral health services.

CONSENT

Patient's informed consent was taken.

ETHICAL APPROVAL

The ethical approval was acquired from the Institutional Ethics Committee (Ref No. DMIMS (DU)/IEC/2012-13/1046) before starting the study.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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