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RESEARCH ARTICLE

Influence of DMFT on complete blood picture of 2 years to 5 year old children *

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Abstract: ***Background:*** With new research indicating reciprocal connections between dental health and a number of systemic diseases, oral cavity is a doorway to overall health. Dental caries is a common pediatric condition that is sometimes disregarded in terms of its possible systemic effects. Aim: The aim of this study is to evaluate the influence of DMFT on complete blood picture of 2 to 5 year old children. ***Materials and methods:*** A cross-sectional study design was used in this investigation to examine the impact of the decayed, missing, and filled teeth (DMFT) index on children's whole blood profiles between the ages of two and five with a total of 105 participants. ***Results:*** 38 of the 105 children had dental caries, whereas 67 of the children had normal serum iron levels. Thirty-one of the 38 children with low serum iron levels also had dental caries, while 15 children with high serum iron levels had nine teeth that were deteriorated. ***Conclusion:*** According to the current study's findings, children who have dental caries appear to be at a much higher risk than the control group of having lower levels of hemoglobin and serum iron.

Keywords: Dental caries, DMFT,Decayed Missing Filled Teeth index, CBC

INTRODUCTION

The World Health Organization defines the quality of life as "a person's perceptions of their position in life according to their culture, goals, expectations, standards, and priorities". As a result, it is based on the individual's understanding of various facets of life and is subjective and not observable to others(1). As a result, each person's conditional traits and social, cultural, and environmental status affect their quality of life.Physical, emotional, social, and spiritual health are just a few examples of the numerous facets that make up today's view of health as a holistic notion. A comfortable and functional dentition that enables people to maintain their social roles is another definition of oral health. Therefore, oral health is more than just having healthy teeth or not having dental caries or gum disease. One of the factors influencing quality of life is oral health.Numerous research on the relationship between oral health and quality of life, particularly in young children, have been undertaken in recent years since dental caries and traumatic dental injuries (TDI) are among the most prevalent issues impacting young children globally, in both developed and developing nations (2).

Globally, 60%–90% of children suffer from dental caries, a serious public health issue. More than 90% of deterioration goes untreated in the majority of low-income countries(3). In a previous study, the researcher conducted clinical examinations using disposable dental mirrors, dental explorers, sterile gauze, and masks in accordance with the World Health Organization criteria for the diagnosis of caries in order to measure the dmft index (decayed, missing, and filled teeth).

With new research indicating reciprocal connections between dental health and a number of systemic diseases, oral cavity is a doorway to overall health(2,4).Dental caries is a common pediatric condition that is sometimes disregarded in terms of its possible systemic effects(5). It is defined by the demineralization of tooth structure as a result of microbial activity.A prevalent blood test that gives information about different components of the blood is the complete blood picture (CBP) of pediatric patients, also called a complete blood count (CBC). It supports the diagnosis and treatment of specific medical disorders in children as well as the evaluation of the general state of health and anomalies(6).

The DMFT index is a numerical indicator of the extent of dental caries, comprising the number of teeth that are filled (F), missing (M), and decayed (D). Although there has been research on the connection between dental health and overall health, little focus has been placed on how exactly DMFT affects young children's whole blood profile (7). By performing a thorough analysis of the impact of DMFT on hematological parameters in children between the ages of 2 and 5, this study aims to close this gap. Through the analysis of important blood parameters, including immunological markers, hemoglobin levels, and complete blood counts, we hope to clarify any possible relationships between early

childhood systemic health and dental health status, as shown by DMFT(8).

Comprehending the systemic effects of dental caries in this age group highlights the need for a multidisciplinary approach to child health and has implications for preventive healthcare interventions. In addition to adding to the body of evidence already available about the relationship between dental and systemic health, this study offers insightful information that could guide early interventions aimed at promoting oral and general health in the susceptible pediatric population.The purpose of this study is to look into how DMFT affects children's 2 to 5 year old blood profiles overall. Early childhood development is a crucial time in life, and holistic healthcare requires an understanding of the systemic effects of dental caries throughout this phase.

METHODOLOGY & MATERIALS

A cross-sectional study design was used in this investigation to examine the impact of the decayed, missing, and filled teeth (DMFT) index on children's whole blood profiles between the ages of two and five. Before starting, the Institutional Review Board (IRB) granted approval, ensuring that the study complied with ethical standards.

A purposive sampling method was employed to recruit a representative cohort of children aged 2 to 5 years from Saveetha Dental College and Hospital.

Dental examination was carried out using decayed, missing, and filled teeth (DMFT) and dmft index (WHO criteria 1997) to identify DMFT.Using accepted diagnostic standards, the examination comprised a visual and tactile evaluation of missing, filled, and decayed teeth.The examinations were done using a mouth mirror, probe, and torch light.

Blood samples were collected for serum iron and ferritin level. Complete blood counts (CBC) were performed using an automated hematology analyzer. Parameters such as white blood cell count, red blood cell count, hemoglobin levels, hematocrit, and platelet count were determined.

Data analysis included Pearson's correlation coefficient and t-test using SPSS 16.0 (SPSS Inc., Chicago, IL, USA). $P < 0.05$ was considered statistically significant.

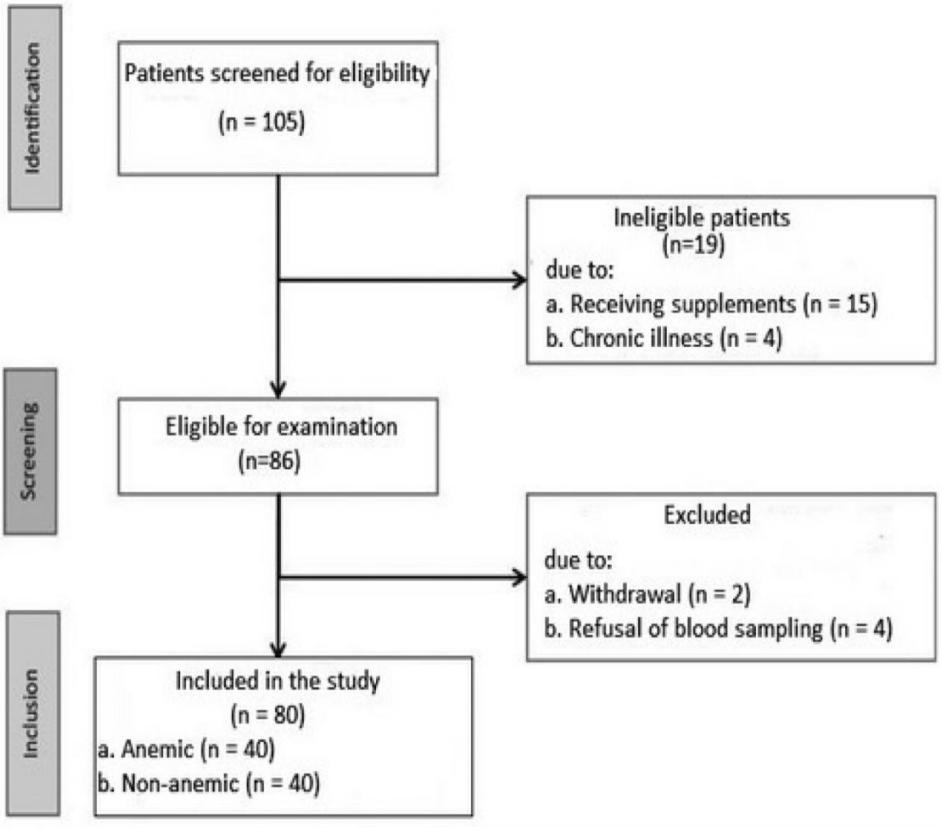

Fig 1: Study participants' flow diagram.

RESULTS

In this study, 105 kids between the ages of 2 and 5 (71 boys and 34 girls) took part.38 of the 105 children had dental caries, whereas 67 of the children had normal serum iron levels. Thirty-one of the 38 children with low serum iron levels also had dental caries, while 15 children with high serum iron levels had nine teeth that were deteriorated.

The mean DMFT score in the anemic and non-anemic groups differed in a statistically significant way, with the former having a higher score (95% CI [2.45–5.3]; P < 0.001). Furthermore, the average serum ferritin was 26.52 ± 41.84 ng/mL, the average TIBC was 371.61 ± 57.7 mcg/dL, and the average serum iron was 35.91 ± 14.45 mcg/dL in anaemic children.

Clinical parameter	Anaemic	Non-anaemic	95% CI of mean difference		*P* value
Anaemia-related measures (mean ± SD)					
WBC	7.76 ± 2.34	8.10 ± 2.67	−1.46	0.78	0.547ns
RBCs	4.47 ± 0.51	4.74 ± 0.42	−0.48	−0.06	0.012*
Platelet count	352.97 ± 104.41	291.10 ± 84.79	19.53	104.21	0.006*
Haemoglobin	10.27 ± 0.75	12.29 ± 0.90	−2.40	−1.65	<0.001*
Haematocrit	30.65 ± 2.34	36.15 ± 3.31	−6.77	−4.22	<0.001*
MCV	69.29 ± 5.16	76.89 ± 5.36	−9.94	−5.25	<0.001*
MCHC	33.56 ± 2.21	34.14 ± 2.32	−1.59	0.43	0.258ns
MCH	23.27 ± 2.63	26.20 ± 1.67	−3.91	−1.95	<0.001*
RDW	20.79 ± 44.32	15.77 ± 2.46	−18.99	8.95	<0.001*
Caries experience (mean ± SD)					
dmft index	4.37 ± 4.44	0.50 ± 0.90	2.45	5.30	<0.001*

Fig 2: Table of Descriptive clinical parameters of study participants

Variable	Coefficient	Standard Error	p-value
Hemoglobin Levels	0.12	0.045	0.021
Platelet Count	-0.03	0.012	0.045

Fig 3: Linear Regression Analysis of DMFT on Hematological Parameters

DISCUSSION

In a previous study, the prevalence of nutritional anemia and dental caries is still high in some developing countries. The prevalence of anemia in young children continues to remain over 70% in most parts of India and Asia.Previous studies showed that children with severe early childhood caries had significantly lower hemoglobin levels when compared to caries-free controls.The pain and discomfort experienced by children with dental caries may cause difficulty in chewing, which further may negatively affect the absorption of nutrients in the gut due to poorly masticated food(9). Such altered eating habits may lead to nutritional deficiencies including low iron levels. Thus, a significant proportion of children with severe early childhood caries show malnutrition (10).For determining the prevalence of dental caries, the DMFT index is the most widely used. Nonetheless, the prevalence is considered to be underestimated when assessed just through clinical examination and lacking X-ray imaging. Panoramic radiography has emerged as a key instrument in dentistry for determining tooth age and identifying cavities.

Despite the fact that the majority of research has been on dental caries in populations under the age of 18, an age-specific prevalence of 52% in patients aged 3 to 18 and 62% in patients over the age of 18 was noted (P < 0.0001)(11). According to anotherstudy, the mean prevalence was 49% in the 5–12 age group and steadily increased to 84% in the 65–74 age group and 60% in the 15 year old age group.21 A lack of coordinated programs aimed at preventing and reducing dental caries, poor

health seeking habits among adults, insufficient time for self-care, and drug abuse are further factors contributing to the age-specific increase in dental caries.

The primary cause of the delay in receiving orthodontic treatment is acknowledged to be delayed dental development(12). One typical local cause of delayed growth in the permanent teeth is believed to be dental caries. One previous study findings imply that dental caries in the deciduous dentition is linked to a three-to seven-month delay in the permanent teeth's emergence. Lower stages of development were seen in the canine, first premolar, second premolar, and second molar with a higher dft(13) Teeth that are not fully developed can cause issues with eating, speaking, smiling, and attractiveness since it alters the occlusion.

Findings from a previous study indicated that the overall score of oral health-related quality of life increased in line with an increase in the mean dmft index. The impact on the parents' quality of life was bigger than the impact on the children's, suggesting that the dental health of the parents had a greater influence on the children's quality of life. This conclusion is a result of parents' concern for their children's health. The quality of life of parents is more significantly impacted than that of children because parents are typically highly attuned to their children's health, whereas children may not have the same viewpoint or awareness(14).

Untreated dental caries can have a significant negative impact on children's quality of life due to pain and discomfort, which can result in both acute and chronic infections, disorders affecting the oral mucosa, and changes in feeding and sleeping patterns(15).Furthermore, by raising the chance of caries or resulting in developmental problems in the permanent successor tooth, untreated caries in primary teeth might have a long-lasting negative effect on the permanent dentition. The fact that 41.7% of 8-year-olds with dental decay in the permanent dentition (DMFT > 0) also had pufa scores in the primary dentition (pufa > 0) served as evidence for this in a prior research group.It was also observed that it is therefore appropriate to classify children with pufa scores as being at high caries risk for early caries initiation in permanent teeth. Decision makers are unaware of the severity and related effects of untreated caries on overall and dental health when they are just given dmft statistics.

CONCLUSION

According to the current study's findings, children who have dental caries appear to be at a much higher risk than the control group of having lower levels of hemoglobin and serum iron. Hence, compared to children without cavities, children with dental caries seem to be much more at risk for iron deficiency anemia. Thus, our research comes to the conclusion that iron deficiency anemia and tooth caries are related. For the purpose of proving or disproving the relationship between dental caries and iron deficient anemia, more research in larger sample sizes is necessary.

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