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EIBF, EBF & IYCF- The Behavioral Trio & Deciduous Teeth

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Abstract

There is a trio of behaviors in the first 1000 days of life & the relation of this trio in the formation of deciduous teeth. Technically, the first behavioral component is Early Initiation of Breast Feeding (EIBF) followed by Exclusive Breast Feeding (EBF) & the next is the Infant & Young Child Feeding (IYCF). One can surely ponder what role does the Colostrum rich milk has which only flows for the first five days of life has in the formation of deciduous teeth. The next question is to elicit the role of Mature Breast Milk (MBM) in the development of deciduous teeth. Finally, the question arises about the role of Complementary Feeding (CF) or IYCF has in the development of the deciduous teeth. This article focuses on the burden of the issue of deciduous teeth development through the above- mentioned indicators. Thereafter through literature reviews, it delineates the role of these trio behaviors. The article also delves into the literature regarding the deciduous teeth before entering the domain of the behavior trios. In nutshell, the trio of behaviors such as EIBF, EBF & IYCF in the first 1000 days life is the independent variable of this article & the development of deciduous teeth is the dependent variable. As these behaviors are proven & effective interventions/strategies, the linear correlation that emerges among both the variables is 'behaviors like EIBF, EBF & IYCF positively impact the development of deciduous teeth'.

Keywords- HC, BC, EIBF, EBF, IYCF, NFHS, SRS, Deciduous teeth.

INTRODUCTION

Colostrum is the milk that is secreted by the mammary gland in the first 4 to 5 days after a baby is born. It is rich in carotenoids, proteins, calcium, sodium, immunoglobulin especially immunoglobulin A & vitamins especially Vitamin A. Zinc is also present in the colostrums at concentrations reportedly 17 times higher than in maternal circulation. Lactose & fat levels are low [1,2]. The following paragraphs details out the contents of deciduous teeth & thereafter relate these teeth with the colostrum.

Deciduous teeth, the official term used for baby teeth, milk teeth or primary teeth. Deciduous teeth start developing during the embryonic stage and then commonly begin to come in about 6 months after birth. There are typically 20 primary teeth, 10 upper and 10 lower. Commonly, most of them erupt by the time the

child is about 2½ years old. Typically, teeth start coming in when they're about 6 months old. The first tooth to come in is usually the central incisor followed by the middle & front tooth on the lower jaw. The second tooth to come is usually right next to the first, the second central incisor on the lower jaw [3].

The next four teeth to come in are usually the four upper incisors. They usually start erupting about two months after the same tooth on the lower jaw comes in. The second molars are usually the last of the 20 deciduous teeth, coming in when your baby is about 2½ years old. Everyone is different as some get their baby teeth earlier, some get them later. The child's 20 baby teeth will be replaced with 32 permanent teeth or adult teeth. One can expect your child to begin losing their deciduous teeth around the age of 6. The first ones to go are commonly the first that came in i.e. the central incisors. The child will usually lose the last deciduous tooth, typically the cuspid or second molar, around the age of 12 [3].

The differences between primary teeth and adult teeth are given below in a nutshell in this paragraph. Enamel is the hard outer surface that protects your teeth from decay. It's usually thinner on primary teeth. Deciduous teeth often look whiter. This can be attributed to thinner enamel. Primary teeth are typically smaller than permanent adult teeth. Front permanent teeth often come in with bumps that tend to wear off over time. Roots of baby teeth are shorter and thinner because they're designed to fall out [3].

Summarizing, we see that deciduous teeth also known as baby teeth, primary teeth are the first teeth to develop. They start developing during the embryonic stage and start to erupt through the gums about 6 months after birth. All 20 of them are typically in by age 2½. The deciduous teeth start falling out around age 6 to be replaced by 32 permanent adult teeth [3].

Studies also reflect on the anthropological & medico-legal aspects on these primary teeth. Some authors reviewed a discussion of permanent & deciduous teeth, trait heritability & thresholds, data collection & analysis. In the study, the authors also highlighted the importance of studying teeth within biological anthropology as a means to answer questions of anthropological & medico-legal interest [4].

Literature Lens

In this section, there are five studies that have been reviewed on the aspect of use of colostrum in the development of oral health or primary teeth. The status of oral health is not restricted to colostrum only. It extends to EBF & IYCF as well. The studies also deal with the aspects of maternal nutrition also.

The first study is on the positive effects of Human Colostrum (HC) on cancer & the oral micro biome. The finding of this study done in 2023 demonstrated the in vitro carcinogenic activity of human colostrums by encouraging *Streptococcus Mutans (S. Mutans)* to produce biofilms. On the other hand, the study found that Cell Free Supernatant (CFS) of isolated Human Colostrum (HC) probiotics was proven to have good anti *S. Mutans* & anti bio films effects. The study further mentions that the findings open the way for early oral micro biome control & pursuing caries uprooting while emphasizing the importance of breast feeding from the first hours of an infant's life [5].

The same study also advocates other in vivo research with greater sample sizes assessing *S. Mutans* in the saliva of newborns before & after colostrum administration, micro biome alteration after the transition to Mature Breast Milk (MBM) & comparing HC to MBM after a normal delivery [5].

The second study assessed the effects of Human Colostrum (HC) as a storage medium on the success of tooth re-plantation. Tooth avulsion is defined as total tooth displacement from the alveolar socket. The best treatment is re-plantation of the tooth. Human milk influences body health, growth & development related to the presence of micro & macro nutrient components. The study concluded that tooth loss is minimized by using HC as storage medium in re-plantation of an avulsed tooth after a one hour period compared to Hank's Balanced Salt Solution (HBSS) & water [6].

In the above-mentioned study, the upper left incisor of 30 adult male Wistar rats was extracted & the rats were divided into three groups according to the storage medium of the extracted tooth for re-plantation. The groups were HBSS, tap water & HC. The research gap identified by the study was that earlier studies have used HBSS & milk as storage medium but no study used HC as a storage medium [6].

Another study of 2022 evaluated the effectiveness of Bovine Colostrum (BC) as bone regeneration material in peri-odontitis. The study showed that all cases showed reduction in Probing Depth (PD) thus suggesting that the BC could favor periodontal regeneration. The clinical significance of the study indicates that BC is Cost Effective (CE) & easily available & enhances bone regeneration. It can therefore be used as an alternative to bone grafts during periodontal surgeries. [7]

A study worked on the relation between EBF & colonization of *S. Mutans*. The study published in 2024 corroborated that EBF limits the colonization of *S. Mutans* compared to those infants who receive formula or mixed feeding. The results impacts the clinical impact on the dental health of infants by having a lower presence of one of the main etiological factors involved in dental caries & the type of micro biome established in the oral cavity.[8]

The study also elicited the relation between maternal nutrition & oral flora. It mentions the great importance of maternal nutrition is corroborated not only by the impact it has on the immune system but also by the impact on the establishment of the oral flora in regard to protection against early caries in conjunction with oral hygiene.[8]

The early establishment of S. Mutans is a risk for the development of early caries. The type of diet consumed within the first 6 months is of vital importance as it impacts the type of micro biome established in oral cavity.[8]

Besides the various uses of HC, there is one mouth care product in which bovine colostrum is used. Mouth care products are defined as products that are intended to be used in the oral cavity for some time having a cleaning, healing, prophylactic action but which are not intended to be swallowed. The mouth care product in question is based on the surprising discovery that colostrum and more in particular bovine colostrums when incorporated in an oral care product is able to produce all the required functions of a mouth care product.[9]

It is especially noted that the presence of colostrum in the oral care product strengthens the natural defense system & results in improved healing of gums [9].

Burden at the national level

The indicators related to EIBF, EBF & IYCF are mentioned by the National Family Health Survey 5th (NFHS 5) round. The indicators are mentioned under the heading 'child feeding practices & nutritional status of children'. There are 5 indicators. The first indicator is on EIBF which is based on the last child born in the 3 years before the survey. The EBF indicator is next & that is based on the youngest child living with the mother. The three IYCF related indicators are based on the following concept.[10]

Breastfed children are those receiving 4 or more food groups & a minimum meal frequency. Non breastfed children who are fed with a minimum of 3 IYCF practices. The first practice is that the children are fed with other milk or milk products at least twice a day. The second practice is that children are fed with a minimum meal frequency that is receiving solid or semisolid food at least twice a day for breastfed infants 6-8 months. Similarly, it is 3 times a day for breastfed children 9-23 months. For giving solid or semi solid foods, the foods should be from at least four food groups not including the milk or milk products food group.[10]

The following table gives the performance of the five indicators at the national level.

Table 1: Child feeding practices & nutritional status of children of India (Source- NFHS 5) [10]

Serial number of Indicator	Details of the Indicator as mentioned in the NFHS 5 fact sheet	Performance in percentage
1.	Children under age 3 years breastfed within one hour of birth	41.6
2.	Children under age 6 months exclusively breastfed	54.9
3.	Children age 6-8 months receiving solid or semisolid food & breast milk	42.7
4.	Breastfeeding children age 6-23 months receiving an adequate diet	14.3
5.	Total children age 6-23 months receiving an adequate diet	9.6

When we decipher these indicators to numbers, only then one can gauge the burden in the country. Assuming the projected population of India as 150 crores (1 crore=10 millions) or 1500 millions[11], one can see that numbers for each indicator. In the first indicator, the denominator is children under 3 years of age. As per the last census 2011, U3 children constitute 6% of a population.[12] Hence, 1500*6/100=90 millions are total number of U3 children in India. Out of that, only 42% (rounding up 41.6%) or 90*42/100=37.8 million children receive colostrum. Children U1 constitute 2% of a population. Here the denominator is children under 6 months & these children constitute 1% of a population. So 1500*1/100= 15 million are children under 6 months of age. Out of these million, almost half of them do not get EBF. The next denominator is children age 6-8 months who are again 1% of the population. Hence, out of 15 million, almost 60% of them do not receive IYCF. The numbers of children who receive IYCF are 1500*42.7=64050. The next denominator is children in the age group of 6-23 months. They constitute 3% of a population. Hence, their numbers are 1500*3/100=45 million & out of this only about 15% receive an adequate diet or only about 7 million are receiving breast milk & an adequate diet. Further, only 10% of these children receive an adequate diet only which means only 4.5 million children receive an adequate diet irrespective of whether they receive breast milk or not.

As the current article primarily focuses on colostrums, it is seen that 90-38=52 million U3 children do not receive colostrums & are at risk of poor oral health & poor development of deciduous teeth. Accordingly, the poor oral healths because of poor EBF & IYCF practices are also reflected in the sections above.

CONCLUSION

The current study highlights the benefits of interventions that are cost effective, therapeutically effective and has no side effects unlike the

pharmacological intervention. These trios are completely physiological interventions. Through the vast network of public health in the government, nongovernment, corporate, civil societies & community-based platforms; these trios should be promoted at large scale so that millions of kids have improved oral health in their lives.

India as a nation can be the front runner in this aspect as it can transmit the public health message to other nations while integrating these behaviors trio in the National Oral Health Program.

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