

Cross-Sectional Study of Mother and Child Showing Iron Deficiency Anemia Leading to Severe Early Childhood Caries-Original Research Article

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ABSTRACT

Anemia is defined as decreased levels of hemoglobin (Hb). It may vary due to many factors but mainly age, gender and ethnicity. Globally nutritional deficiency anemia is seen in developing country of which iron deficiency anemia (IDA) is common. The causes and reasons may be many .Any level of Hb less than 13gm/dl in males and 12gm/dl is considered as anemia. Anemia is classified as mild, moderate and severe. In pregnant women if the Hb is between 8-10mg/dl-mild, 6-8mg/dl-moderate and less than 6mg/dl is considered as severe iron deficiency anemia in our country. Children born to pregnant women who are already iron deficient are more prone for dental caries-severe early childhood caries. The cross-sectional study was conducted in Northern Karnataka in pregnant women attending antenatal care in government hospitals suffering mainly from nutritional deficiency-iron deficiency anemia and data was obtained for all the 3 trimesters, natal and followed up to children of age 5yrs born to them. Total number of pregnant women who attended ANC were 168 who had iron deficiency anemia in the 1st trimester and Hb levels were recorded and followed till 3rd trimester and subsequently delivery .Children born to them were evaluated till 5 yrs for severe early childhood caries (SECC).Data was obtained for both mother and children born to them and were evaluated and concluded based upon observations and results that iron deficiency is the main reason for SECC which was opined both by the clinicians and dentists.

Introduction

Iron deficiency with or without anemia is more common in pregnant women¹.In fact, it is more than 35% in reproductive age group. The causes and reasons may be many .Any level of Hb less than 13gm/dl in males and 12gm/dl is considered as anemia. Anemia is classified as mild, moderate and severe. In pregnant women if the Hb is between 8-10mg/dl-mild, 6-8mg/dl-moderate and less than 6mg/dl is considered as severe iron deficiency anemia in our country. Severe anemia leads to maternal mortality and fetal development may differ. Iron deficiency in pregnant women is having strong evidence of association that in 6- to 24-month-old infants with IDA there is increased risk for poorer cognitive, motor, social-emotional, and neurophysiologic development^{2,3,4}.

Aims and objectives

Cross-sectional study was done in pregnant women who gave birth to anemic children leading to severe early childhood caries. This study was conducted in Northern Karnataka in pregnant women attending antenatal care in government hospitals suffering mainly from nutritional deficiency-iron deficiency anemia and data was obtained for all the 3 trimesters, natal and followed up to children of age 5yrs born to them.

Material and Methods

Children born to pregnant women who are already iron deficient are more prone for dental caries-severe early childhood caries. The experimental study was conducted in Northern Karnataka in pregnant women attending antenatal care in government hospitals suffering mainly from nutritional deficiency-iron deficiency anemia and data was obtained for all the 3 trimesters, natal and followed up to children of age 5yrs born to them. Total number of pregnant women who attended ANC were 168 who had iron deficiency anemia in the 1st trimester and Hb levels were recorded and followed till 3rd trimester and subsequently delivery. The diagnosis of maternal ID was done by blood tests which included a complete blood count, serum iron, total iron binding capacity, percent transferrin saturation (Fe/ TIBC), and serum ferritin in all the trimester health checks.

Total number of children evaluated were 102 whose mental and physical abilities were found to be normal. Children between 2-5 years for severe early childhood caries (SECC). Oral evaluation was done by dental doctors.

SECC is defined for 3-5-year-old children by the following criteria: (1) one or more cavities, (2) one or more missing teeth as a result of caries, (3) one or more filled surfaces in primary maxillary teeth, or (4) For primary teeth index, def surfaces index (defs) which measures the severity of dental caries, “d” which is mean decayed tooth, “e” which is mean tooth indicated for extraction, “f” which is mean filled tooth. There are a decayed, missing, or filled surfaces (defs) score that is ≥ 4 at 3 years of age, ≥ 5 at 4 years of age, or ≥ 6 at 5 years of age⁵.

Observations

Table.1. Pregnant women attended for ANC

Variables	Frequency	Percentage
Age (years)		
18 - 21	68	40.47
22 - 30	42	25
30-33	35	20.83
More than 33	23	13.69

Table.2. Socioeconomic status of family

Variables	Frequency	Percentage
Income /month		
1500-2000	63	37.5
2500-3000	51	30.35
3000-4000	34	20.23
4500-5000	20	11.9

Table.3.Definition of early childhood caries and severe early childhood caries

Age (months)	Early childhood caries	Severe early childhood caries
Less than 12	One or more defs surface	One or more defs surface
12-23	One or more defs surface	One or more defs surface
24-35	One or more defs surface	One or more defs surface
36-47	One or more defs surface	One or more cavitated, filled, or missing (due to caries) defs surface; smooth surfaces in primary maxillary anterior teeth or defs score 4
48-59	One or more defs surface	One or more cavitated, filled, or missing (due to caries) defs surface; smooth surfaces in primary maxillary anterior teeth or defs score 5
60-71	One or more defs surface	One or more cavitated, filled, or missing (due to caries) defs surface; smooth surfaces in primary maxillary anterior teeth or defs score 4

defs Z d: decayed (noncavitated or cavitated lesions), e: extracted; f: filled tooth surfaces; ECC Z early childhood caries; S-ECC Z severe early childhood caries, as classified by the American Academy of Pediatric Dentistry.

Discussion:

Iron deficiency with or without anemia is more common in pregnant women¹. Undernutrition in children is a major risk marker for SECC⁶. Risk factors for childhood caries are: microbiological risk factors dietary risk factors and environmental risk factors Microbiological risk factors are due to streptococcus mutans and streptococcus sobrinus^{7,8}. [Lactobacilli plays major key role within the decay progression. This infection will be transmitted by vertical and horizontal transmission. Vertical transmission is carried between mother or father and child. Dietary risk factors are due to high-sugared drinks increase the danger of this illness additionally to infection. streptococcimutans and lactobacilli process the sugar to acid by metabolic process and fermentation^{9,10} This produced acid cause demineralization of tooth structure.

Environmental risk is because of S streptococcus mutans bacteria which is acquired at an early age, thereby causing early childhood caries, wherever other necessary factors, like economic and monetary situation, the utilisation of fluoride and alternative connected factors, will contribute to the event or prevention of early childhood caries^{11,12}. Chronic infections decrease the haemoglobin levels which contribute for anaemia. Children feeding on bottle milk also is one of the contributing fact for causing childhood caries.

Sadeghi et al., 2012, reported that children with ECC showed lower ferritin levels and there is a statistical difference in ferritin levels (P: 0.040) when children with ECC and children without

ECC are compared. Among different types of ECC, type III early childhood caries which is the S-ECC shows lower levels of ferritin¹³. Schroth et al., investigated the relationship between S-ECC and nutritional iron status Schroth et al., also indicated that children with S-ECC had significantly lower hemoglobin levels than the caries free controls Schroth's et al., and Koppal et al., studies, children with SECC had significantly lower serum ferritin levels than non-caries control group, suggesting that ferritin is an acute phase protein and its level is an indicator of body iron storage¹⁴.

Conclusion

Children with S-ECC significantly have low ferritin status and lower haemoglobin levels when compared with caries free controls and appear to be at significantly greater odds for iron deficiency anaemia than cavity-free children.

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