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Original Research Article

Association between breastfeeding practices and anemia in children aged 6-60 months

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ABSTRACT

Background: Anemia is one of the most common nutritional problems in India. Anemia is significantly influenced by dietary factors. Objective was to study the association between breast feeding practices and occurrence of moderate to severe anemia in children aged 6-60 months in relation to those without anemia, admitted to SAT Hospital.
Methods: Case control study done at SAT Hospital. 85 moderates to severe anemic children and 85 non anemic children were enrolled in the study. Detailed history was taken including dietary history stressing infant and young child feeding practices. Physical examination was done including anthropometric measurements. Relevant haematological investigations were done.
Results: Highest percentage of cases 76.4 % were from the age group 6 months to 24 months. Out of 85 cases 58.8% were with exclusive breastfeeding<6 months and among controls is 37.6%. Association of lack of exclusive breastfeeding for 6 months and anemia is statistically significant. Lack of timely introduction of complementary feeding, poor score for infant and young child feeding practices, male gender, lack of iron rich foods, small for gestational age babies were also significantly associated.
Conclusions: Maximum number of anemic children were belonging to 6 months to 24 months, Lack of exclusive breastfeeding for 6 months was a major risk factor for developing anemia in children. Lack of timely introduction of complimentary feeding at 6 months and poor infant and young child feeding practices were significant risk factors for developing nutritional anemia.

Keywords: Anemia, Association, Breastfeeding practices, Children

INTRODUCTION

Anemia is caused by deficiency of micronutrients especially, iron deficiency, is the most important nutritional problem in the world. Despite the considerable economic and scientific development seen in the last few decades regarding anemia, its global prevalence decreased only marginally. The highest prevalence's are found in children below 5 years of age and pregnant women. In developing countries, 47.4% of the children below 4 years of age group are anemic.[1]

Etiology of anemia is multifactorial. Several factors like age of the child, birth weight, sex, socioeconomic status, dietary habits, breast feeding practices can influence development of childhood anemia. One factor of particular interest in this context is feeding practices like breastfeeding and Infant and Young Child Feeding practices (IYCF).

The relationship between feeding practices and anemia is of considerable policy relevance since feeding behaviors in theory can be affected through policy interventions

more easily, than can more permanent socioeconomic and demographic characteristics such as educational attainment or household income.[2] However, there is only few studies regarding this in India.

So, the present study is to find out the association between breast feeding practices and occurrence of moderate to severe anemia in children aged 6-60 months in relation to those without anemia, admitted to SAT Hospital.

METHODS

This is a hospital based case control study carried out in a tertiary care hospital in South India (government medical college Trivandrum) during a period of two years.

The Study design was case control study, study setting is SAT hospital, Pediatrics Department, Government Medical College, Trivandrum, Kerala, India. Study period was 18 months (January 2016 to June 2017), and Study subjects is 85 cases and 85 controls.

Inclusion criteria

Cases: 85 Children aged 6-60 months, who are diagnosed to have moderate to severe anemia according to WHO definition ie., Moderate Hb 7-9.9 g/dl and Severe <7 g/dl Controls:85 Children aged 6-60 months admitted in the same setting having no anemia, Hb> 11 g/dl.

Exclusion criteria

Those who are not willing to give consent, Subjects who are suffering from hereditary anemia hemolytic anemia and other hematological problems like bleeding, coagulopathy, bone marrow disorders (Haemophilia, Von Willebrand disease, idiopathic thrombocytopenic purpura) and hematological malignancies.

After getting written informed consent from parents, consecutive cases and controls satisfying both inclusion and exclusion criteria were recruited for the study. Interviewer administered structured pretested questionnaire was used to collect information on socio demographic factors and clinical features of the children.

Detailed history including dietary history stressing IYCF practices like breast feeding, Complementary feeding, food groups, food frequency table elicited.

Physical examination was done including anthropometric measurements. Dietary practices were assessed with IYCF score and food frequency table.

IYCF score (Table 1).[3] It is done by scoring of the 10 desirable interventions related to IYCF practices as advocated by UNICEF with a maximum score of 20; higher the score, better the outcome. Good practice >80%, fair practice 50-80%, poor practice <50%.

Table 1: IYCF score.

IYCF score as per the 10 interventions advocated by UNICEF
Timely initiation of breast feeding within 1hour of birth
Exclusive breastfeeding during the first 6 months of life
Timely introduction of complementary foods at 6 months
Age-appropriate foods for children 6 months to 2 years
Hygienic complementary feeding practices
Immunization, and bi-annual vitamin A supplementation with deworming
Appropriate feeding for children during and after illness
Therapeutic feeding for children with severe acute malnutrition
Adequate nutrition and support for adolescent girls to prevent anemia
Adequate nutrition and support for pregnant and breastfeeding mothers

IYCF Score: Total Score 20 - Higher the score, Better the outcome; In each 10 interventions, the best practice is to given a score of 2 and less optimum practice 1 and 0 if not practising it; Item 9 and 10 refer to the respective mother's care; Any item not applicable shall be removed from the denominator and numerator while making the score %.

Data analysis

Data collected using predetermined proforma was entered into Microsoft excel sheet and analyzed with the help of statistical package for the social sciences (SPSS VERSION 22). Categorical variables were expressed as proportions and quantitative variables were expressed as mean and standard deviation.

Statistical test of significance -chi square test for categorical variables and students t test for quantitative variables. Analysis done include descriptive statistics, univariate analysis for crude odds ratio and Multivariate analysis for adjusted odds ratio. Association between each exposure variable and outcome variable studied.

RESULTS

In this study, highest percentage of cases 76.4% (n= 65) were from the age group 6 months to 24 months. In which maximum number of cases 37.6% (n=32) were obtained from the age group 6-12 months of age, followed by 21.2% (n=18) in 1year to 1year 6 months. Mean age was 1.57 years and standard deviation was 1.07 years among cases and mean age was 2.42 and standard deviation was 1.34 among controls.

Among cases 64.7% (n= 55) were males whereas in controls 43.5% (n=37) were males. In cases 43.5% (n=37) were 1st born, and in controls 45.9% (n=39) were 1st born. 11.8% (n=10) were preterm among cases and among controls it is 12.5% (n=11). 61.2% (n=52) cases belong to BPL and 62.4% (n=53) controls belong to BPL. Out of 85 cases 58.8% (n=50) were with lack of

exclusive breastfeeding and among controls 37.6% were with lack of exclusive breastfeeding (Figure 1).

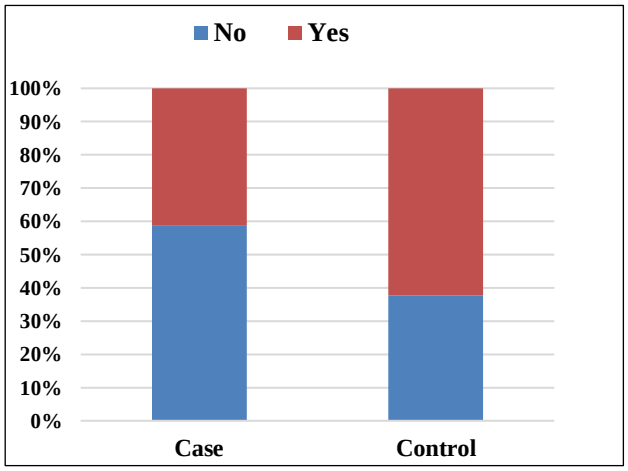

Figure 1: Association of exclusive breastfeeding for 6 months and anemia.

In cases 68.2% (n=58) were timely initiated breastfeeding within 1 hour and in controls it is 80% (n=68). In cases 44.7% (n=38) were given formula feeds and among controls 35.3 % were given formula feeds. 49.4% cases (n=42) were not given timely introduction of complementary feeds at 6 months and among controls it is only 18.8% (n=16).

In anemic children 36.5% (n= 31) were with poor IYCF score and among controls it is 10.6%n (n=9) (Figure 2).

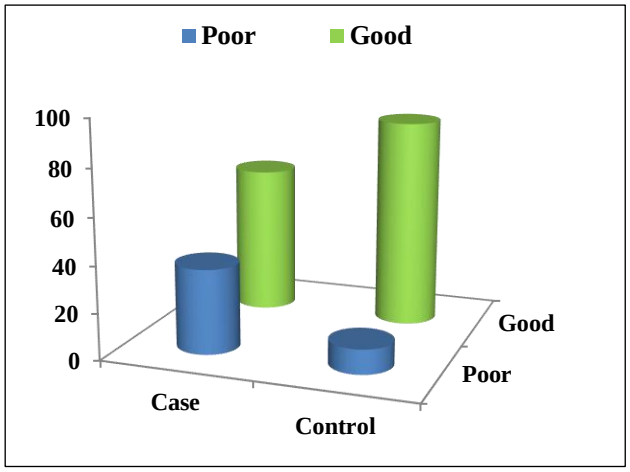

Figure 2: Association between IYCF score and anemia.

In cases 75.3% (n=64) were given age appropriate foods for children 6 months to 2 years and among controls it is 87.1% (n=74). 68.2% cases (n=58) were followed hygienic complementary feeding practices and in controls it is 80% (n=68). Out of 85 cases 94.1% (n=80) were received immunisation and biannual vitamin A supplementation and same result in control group. There is only 2.4% (n=2) anemic children with severe acute malnutrition and were received therapeutic feeding. In control group there is no one with severe acute malnutrition. 48.2% (n=41) and 32.9% (n=28) of anemic children's mothers were received adequate nutrition and support to prevent anemia during her adolescent period and during pregnancy respectively.

Among controls it is 64.7% (n=55) and 30.6 (n=26) respectively. In cases 28.2% (n=24) were not taking ion rich foods and in controls it is 5.9% (n=5). Among cases 77.6% (n=66) were with dietary diversity and among controls it is 88.2% (n=75). 85 cases 34.1% (n=29) were with underweight, 24.7% (n=21) were with stunting, 35.3% (n=30) were with wasting and among controls is 25.9%(n=22)were with underweight, 21.2% (n=18) were with stunting, 24.7% (n=21) were with wasting.

Risk factors for the development of anemia

Binary logistic regression was done to find out the risk factors for development of anemia (Table 2).

Table 2: Risk factors for the development of anemia.

Risk factors	Probability (p) value	Significance	Odds ratio
Lack of Exclusive breast feeding for 6 months	0.045	Significant	1.967
Male gender	0.035	Significant	2.033
Lack of Iron rich foods	0.001	Significant	5.65
SGA baby	0.046	Significant	2.528

A significance level of less than 0.05 was used for assigning co variates to the regression model. We excluded one variable (IYCF score) as it is a known confounder for exclusive breastfeeding.

DISCUSSION

In this study mean hemoglobin value among cases is 8.35 and standard devaiation is 0.899. A study conducted by Narayan R et al, showed mean hemoglobin level was 8.79 gm%.[4] Quaderi HR et al, found mean of 9.2 gm% and Meghanga FP et al, found 7.87 as mean hemoglobin in their study.[5,6]

In this study, maximum number of anemic cases 76.4 % (n= 65) were from the age group 6 months to 24 months. In which 37.6% (n=32) were obtained from the age group 6-12 months of age, followed by 21.2% (n=18) in 1 year to 1 year 6 months. A study conducted by Narayan R et al, in a Teaching Hospital in Rural Haryana, India showed that most affected age group of children suffering from anemia observed in the age group between 6 months to 24 months. A total 60.55% children belonging to this age group had anemia.[4]

In the present study among cases 43.5% (n=37) were first born and among controls 45.9% (n=39) were first born. No significant association was found between birth order and anemia. Various studies conducted in different parts of the world has shown that there is significant association between anemia and higher birth order. A study conducted by Cardoso et al, in Amazonian Children found that maternal parity >2 were positively associated with anemia.[7]

In this study 23.5% anemic children who were born as SGA babies and in non-anemic group it is Only 10.6%. Authors found that SGA babies are a major risk factor for developing anemia. A study conducted by Karaduman et al, Ferritin levels were found lower in the SGA group.[8] In this study among anemic children 11.8% (n=10) were preterm and among controls 12.5% (n=11) were preterm. There is no significant association was found in the present study. This may be due to successful prophylactic iron therapy in preterm till 1 year which is strictly following in this institution.

The amount of iron accumulated by the fetus during intrauterine life is proportional to the amount of weight it gains during this period. Thus, the lower the birth weight, the lower the amount of organic iron. SGA babies has intrauterine growth restriction and hence lower iron stores and is a risk factor for developing anemia. Low ferritin concentration found in SGA infants results from insufficient placental iron transport or from the characteristically enhanced erythropoiesis in conditions of chronic fetal hypoxia, which is often associated with intrauterine growth restriction.

Out of 85 cases 68.2% (n=58) were timely initiated breastfeeding within 1 hour and out of 85 controls 80% (n=68) were timely initiated breastfeeding within 1 hour. No significant association was found between timely initiation of breastfeeding within one hour and anemia. National Family Health Survey (NFHS-3) 2005-2006 estimates are lower for India, only 23.5% of children were received timely initiation of breastfeeding within an hour of birth.[9] Another recent Indian study from Madhya Pradesh recorded similar low 26% mothers initiating breastfeeding in first hour.[10]

The higher percentage found in this study can be attributed to the fact that the NFHS was done about 9 years ago and it was based on community based survey. Discrepancies from other Indian studies can be due to regional and cultural differences in different states. Higher percentage of children received breastfeeding within an hour of birth in this study may be due to higher female literacy rate, implementation of BFHI in this hospital and optimal and appropriate IYCF practices.

In this study out of 85 cases 58.8% (n=50) were with lack of exclusive breastfeeding and among controls 37.6% were with lack of exclusive breastfeeding and there was significant association was found between lack of exclusive breast feeding and aneamia. Study conducted by Narayan R et al, shows that vulnerable children for aneamia are those who did not take breast feeding for the first 4-6 months.[11] A study done by Pita et al, in under five years in Eastern Cuba also showed that there is significant association between anemia and lack of exclusive breastfeeding less than 6 months.[12] Early initiation of breastfeeding and exclusive breastfeeding of children below six months are considered the most decisive indicators for assessing breastfeeding practices in young children and infants.[9]

In this study out of 85 anemic children, 49.4% (n=42) were not given timely introduction of complementary feeds at 6 months and among nonanemic group it is only 18.8% (n=16). Significant association was found between lack of timely introduction of complementary feeds at 6 months and anemia. A study done Pita et al, showed similar observation and is showed that introduction of other liquid or solid foods during the first six months of life can interfere with absorption of iron from breast milk.[12] Other studies also have identified weaning after 6 months as a risk factor for iron deficiency anemia in resource-limited countries, where infants are more likely to have lower iron stores at birth.[13,14]

In this study it was found that poor IYCF practices were significantly associated with development of anemia in children. Out of 85 cases 36.5% (n= 31) were with poor IYCF score and among controls 10.6% (n=9). A study done by Sathish Kumar et al, in Tamilnadu showed that who were not fed according to guidelines were significantly associated with anemia. No other studies are available in India to compare the data.

In this study out of 85 cases 34.1% (n=29) were with underweight, 24.7% (n=21) were with stunting, 35.3% (n=30) were with wasting and among controls is 25.9% (n=22) were with underweight, 21.2% (n=18) were with stunting, 24.7% (n=21) were with wasting. In this study there is no significant association was found between anthropometry and anemia in young children. Similar study done by Khan et al, among 6-59 months aged children in Bangladesh showed that childhood anemia was significantly associated with chronic malnutrition of child.[15] A study done by Quaderi et al, showed that chronic anemia may lead to slowdown of growth in children.[16]

CONCLUSION

Maximum number of anemic children were belonging to 6moths to 24 months, in which highest percentage was found in late infancy. Among breastfeeding practices, lack of exclusive breastfeeding for 6 months was a major risk factor for developing anemia in children. Lack of timely introduction of complimentary feeding at 6months and in general poor IYCF practices were significant risk factors for developing nutritional anemia. Male gender, small for gestational age babies, Lack of iron rich foods

in diet were also risk factors for developing anemia. Anthropometric parameters were not significantly associated with anemia.

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