Original Research Article

Anemia among 6 - 59 months children in a rural area of Bareilly district: a cross sectional study

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ABSTRACT

Background: Anemia is a global health problem affecting mostly in developing countries. Iron deficiency anemia is a significant health problem and especially in developing countries. It's the most neglected micronutrient deficiency disorder among under-five children. The objective of the study was to assess the prevalence and determinants of anemia among under-five children and to suggest suitable remediable measures to prevent and control of anemia.
Method: This is a cross-sectional study. Household survey carried out in twelve villages in a rural practice area Dhaura, Bareilly. A total of 396 children were contacted for obtaining blood samples by taking 33 children from each village. Blood samples were taken from all children between the 6th month to 59 months of age using simple random sampling. After the collection, data will be analyzed using the SPSS software version 20.
Result: A total of 47.5% of the children were found to have anemia. Among them 25.5% had mild, 63.3% had moderate and 11.2% had severe anemia. The majority of them were male 269 (67.9%). The mean age of participating children was 17.351±7.785 months. 48.2% of anemic children were low birth weight.
Conclusion: High prevalence could be due to deficiency in iron nutrition among under-five children associated with poor food availability, due to lack of nutritional education and other sociodemographic conditions, child's age and worse household conditions also contributed to the prevalence of anemia.

Keywords: Anemia, Cross-sectional study, Malnutrition, Prevalence

INTRODUCTION

Iron deficiency anemia is a significant public health problem that occurs worldwide in both developing and developed countries, most common in developing countries. In 1980, the World Health Organization (WHO) estimated that 700 million people suffered from anemia and more than two billion people have been affected by it all over the world. Approximately 50% of anemia cases were caused by iron deficiency.[1] Iron deficiency has been described as the most common deficiency in the world.[2] About 1.2 billion people worldwide demonstrate varying levels of iron deficiency.[3] Yip and lynch were defined as Iron deficiency as functional tissue iron deficiency and the absence of iron store with or without anemia.[4] Iron deficiency is usually the result of inadequate bioavailability of dietary iron. Increased iron requirement during a period of rapidly increased loss. Infants and young children are at particular risk of undernutrition because of the high demand for energy and essential nutrients at this stage of rapid growth.[5] The consequences of anemia among women include reduced energy and capacity for work and poor pregnancy outcomes that further enhance maternal

mortality.[6] Community education on exclusive breastfeeding and introduction of complementary foods should be improved. Mothers should be educated about nutrition, in general, as well as potential use of micronutrient powder to improve the nutritional quality of complementary foods.

Objective of this study was to assess the prevalence and determinants of anemia among 6-59 months of children and to suggest suitable remediable measures to prevent and control anemia.

METHODS

The study was conducted at Dhaura Tanda, SRMSIMS, Bhojpuri Block, Bareilly for a period of 6 months from October 2018 to February 2019, after ethical approval from the institute. This was a cross-sectional study. Purposive sampling was done covering at least 33 children age 6-59 months in each of twelve villages. A semi-structured questionnaire was used for the collection of data by taking interviews. Data collection and estimation of hemoglobin (Hb) were done during a family survey. House to house survey was conducted only after taking informed consent from the parents. Blood samples of children and mothers were taken by sterile lancets (To obtain the finger-prick blood). which was collected in the Hb test strip. The blood sample in the Hb test strip was loaded in the calibrated HemoCue photometer and reading will be noted.The prevalence of anemia is 62.7% from NFHS-4 in under-five children.[7] On the basis of the above NFHS data, the sample size is calculated using the following formula. Sample size (n)= $4PQ/L^2$, P= prevalence, Q= 100–p, L (allowable error)= 5%. The sample size (n) thus derived is 360. An additional 10% for non-response was added to give a sample size 396.

Inclusion criteria

Children of age 6 to 59 months were included.

Exclusion criteria

Children of age less than 6 months and more than 5 years and whose parents are not willing were excluded.

Data analysis

Data was analyzed using MS excel, SPSS 20 by appropriate statistical tests.

RESULTS

Table 1 The total number of study participants was 396. Their ages ranged from 6-59 months. Majority 211 (53.3%) of the children were in the age group of 13-24 months.

The majority of them were male 269 (67.9%), backward class, though no significant odds were observed for mild and moderate anemia. The mean age of participating children was 17.351±7.785 months. Muslim, joint family (52%) were more participants in the study than Hindu children or another family. Further, all types of anemia were highly dominant among poor groups.

Table 1: Socio-demographic characteristic of participants.

Characteristics	N	%
Age of child (month)		
6-12	110	27.8
13-24	211	53.3
25-35	67	16.9
36-59	8	2.0
Gender		
Male/female	269/127	(67.9/32.1)
Religion		
Hindu/Muslim	200/196	(50.5/49.1)
Cast		
General/OBC/SC/ST	130/296/3/1	32.8/66.2/8/3
Family		
Nuclear/joint	170/226	48/52
Father's education		
Illiterate	156	39.4
Just literate	158	39.9
Primary education	12	3
High school	17	4.3
Intermediate	29	7.3
Graduate or above	24	6.1
Mothers' education		
Illiterate	147	37.1
Just literate	62	15.7
Primary education	95	24
High school	70	17.7
Intermediate	4	1
Graduate or above	18	4.5
Father occupation		
Skilled worker	156	39.4
Unskilled worker	179	45.2
Service	13	8.6
Self-employed	34	3.3
Unemployed	10	2.5
Others	4	1.0
Mother occupation		
Housewife/working	268/128	67.7/ 32.3

Table 2: Determinants causing anemia.

Variable	Anemia (n=188)			No anemia (n=208)	Total (n=396)
	Mild (48)	**Moderate (119)**	**Severe (21)**		
Age (in months)	X^2=69.96	df=9	P value=0.000		
6-12	20	32	6	52	110
13-24	16	69	10	116	211
25-35	4	18	5	40	67
36-59	8	0	0	0	8
Gender (M/F)	X^2=8.43	df=3	P value=0.038		
Male	24	84	16	145	269
Female	24	35	5	63	127
Birth order	X^2=18.08	df=6	P value=0.000		
I	12	52	10	113	187
II & III	35	61	9	85	190
IV & more	1	6	2	10	19
Type of diet	X^2=3.02	df=3	P value=0.388		
Vegetarian	27	64	11	95	197
Non-vegetarian	21	55	10	113	199
Birth weight (in kgs)	X^2=6.429	df=3	P value=0.09		
<2.5	31	56	8	96	191
$\geq$2.5	17	63	13	112	205
Immunization history	X^2=20.90	df=3	P value=0.000		
Complete	30	33	4	81	148
Incomplete	18	86	17	127	248
H/o malaria	X^2=36.055	df=3	P value=0.000		
Present	13	84	15	148	260
Absent	35	35	6	60	136
H/o pica	X^2=18.03	df=3	P value=0.000		
Present	11	49	13	111	184
Absent	37	70	8	97	212
H/o diarrhea	X^2=29.34	df=3	P value=0.000		
Present	39	41	27	169	276
Absent	20	36	25	41	122

Table 2 shows various determinants which were highly associated with anemia. In multivariate analysis, the following factors remained as independent risk factors associated with anemia which were greater among the male of age group 13-24 months with history of (h/o) of incomplete immunization 248 (62.6%), malaria 260 (65.7%), diarrhea 276 (69.7%), eating earth (pica)184 (47.5%) and low birth weight 191 (48.2%).

Among them anemia was more common in whom consumption of meat (15.2%) and fruits (3.1%) was very low and also children of less than 2 birth order 187 (47.2%), WHO classification criteria were used to diagnose child anemia as concentration level: 10.0-10.9 g/dl (mild anemia), 7.0-9.9 g/dl (moderate anemia), <7 g/dl (severe anemia).[8] According to the WHO 1994, the cut-off value of hemoglobin was <11% among the under-five children, of the study population, were symptomatic anemic and >11 of children studies had symptomatic, not anemic.

About 47.5% (n=188) had anemia (Hb <11 g/dl). Younger children (under 2 years) (81.4%) were more likely to be anemic compared to their older. The overall prevalence rate showed an increasing tendency of up to 2 years of age.

Table 3 shows that the association of anemia with determinants on the basis of personal hygienic practice

were poor hand washing, dressing, barefoot walking and nail cutting.

Table 3: Determinants causing anemia on the basis of personal care.

Variables	Yes	%	No	%
Hand washing	293	73.9	103	26
Dressing	299	75.5	97	24.5
Barefoot walking	202	51	194	49
Nail cutting	281	71	115	29

Table 4 also shows an association of anemia with environmental factors like poor housing factor as un availability of pacca house, sanitary latrine facility and wholesome of water supply and clean and healthy environment around the house.

Table 4: Determinants causing anemia on the basis of poor housing.

Variable	N	%
House		
Kutcha	173	43.7
Semi Pakka	160	40.4
Pakka (concrete)	63	15.9
Source of drinking water		
Well	118	29.8
Government water supply	162	40.9
Hand pump	116	29.3
Sanitary latrines in the house		
Present	305	77.0
Absent	91	23.0
Cleanness surrounding the house		
Present	279	70.5
Absent	117	29.5

Table 5: Study participants according to the socioeconomic status and anaemic status.

BG Prasad classification (2019)	Mild (n=48)	Moderate (n=119)	Severe (n=21)	No anemia (n=208)	Total (n=396)
	X^2=13.635 df=9 P value= 0.136				
I	1	6	1	13	21
II	0	9	2	16	27
III	24	41	5	56	126
IV	23	63	13	123	222

In Table 5 It was observed that lower socio economic status is associated with the increase in the risk of development of anemia. this association between the socioeconomic status of the family and anemia in under-five children was found to be statically significant.

DISCUSSION

The present study entitled anemia among 6-59 month of children in a rural area of Bareilly district: a cross-section study was planned to find out the prevalence of anemia and understand the determinants among 6-59 month of children's and to suggest the suitable remedial measures to prevent and control of anemia. High prevalence of anemia could be due to deficiency of iron among under-five children associated with poor food availability, lack of nutritional education and other sociodemographic conditions, child's age and worse household conditions also contributed to the high prevalence of anemia. In the present study the overall prevalence of anemia was found to be 47.5% which is lower prevalence rate than the Tanzania demographic and health survey 58%.[9] In this study, 7.8 % of girls and 12.9% of the boys were severely affected, This is probably due to the higher growth rate among boys which increases the higher demand for iron, which cannot be supplied by the diet.[10] The age of child and mother's anemia level predicted childhood anemia,

similar to the findings of some other studies conducted in Burma, Benin, and Mali.[11,12] Consumption of vegetables and fruits was associated with rates of anemia. Further, almost 98% (n=428) of study children did not eat fruits, which may have contributed to the higher prevalence rate of anemia. Vitamin C, which originates from fruits, potentiates absorption of nonheme iron that is found in legumes and other plant-based meals.[13] Mehrotra et al have reported that 78.4% of anemic children in their study belonged to lower socio-economic status.[14] WHO/UNICEF strongly advocate that when there is a prevalence of anemia above 40%, a universal supplementation is required and it is not cost-effective to screen children for anemia.[15]

CONCLUSION

Anemia is an important health problem in a developing country. The study has documented a high prevalence of anemia of under-five children in the rural population in Bareilly district. Screening for iron deficiency anemia under 5 children in a developing country should be encouraged. It was found that the best predictors for anemia among under-five children living in a rural setting were low birth weight and-consumption of iron-rich foods. Further research into the cause of iron deficiency in this age group was recommended. This study has found

that a high prevalence of anemia among the under-five children was more likely associated with poor nutritional diet, lack of exclusive breastfeeding and poor personal and environmental hygiene. Introduction of nutritious complementary foods, such as iron-fortified cereals and meat/meat products, could have highly reduced the prevalence rate of anemia among the children.

In this study limitations are not able to carry out laboratory studies (e.g. blood culture). On the subject to rule out the presence of infection (which could apparently raise the serum ferritin level in iron deficiency state). This was due to limited access to the reagents for such lab studies.

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