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Prevalence and Pattern of Anemia in Toddlers (12-36 Months) in Urban Area

Medical Science

KEYWORDS : Anemia, Nutrition, pediatrics, risk factors

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ABSTRACT

Aim: *To study the prevalence and pattern of anemia among toddlers (12 – 36 months) in urban area*

Methods: *Cross sectional observational study in 60 Children in the age group 1-3 years (12 -36 months), mothers of the children were asked questions based on the format prepared to include the cause, type of anemia and the various socio-economic factors in relation to anemia.*

Results: *Among the 60 toddlers, 23.3 % (14) were normal, mild anemia were 31.7% (19), moderate anemia 40% (24) and severe anemia 5% (3). Total anemic toddlers were 46 (76.7%).*

Conclusion: *IDA is highly prevalent in toddler in the present study. Further studies may be needed on large population of toddlers to make recommendation for therapeutic iron supplementation in this age group.*

INTRODUCTION

Around two billion people world wide suffer from anemia, most commonly Iron deficiency anemia, a major cause of cognitive deficits in young children which can cause permanent affect of motor development and school performance. Toddlers (12-36 months) in India have high prevalence of Iron deficiency anemia as per National Family Health survey (72%)[1]. Iron deficiency anemia is avoidable by simple treatment with iron provided we realize the importance in treating iron deficiency/anemia promptly and effectively. Nearly 74% of Toddler (12-36 month) age group is Anemic as Per NFHS (National Family Health Survey) – 2 data. This shows ¾th of the Toddler Population as Anemic. Among the subtype Iron deficiency Anemia occupies ¾th of the total anemic population. Toddler needs more than half the food the mother eats. This should be given in frequent servings. As Toddlers are more interested in play they must be coaxed eat. Insufficient food, unbalanced food pushes them into the dig of mal nutrition. Food intake in Toddlers can be increased in the form of group eating (or) by using Akshayapatra a special container for the child into which small pieces of food can be added in order to make the child eat during play[2].

AIM:

To study the prevalence and pattern of anemia among toddlers (12 – 36 months) in urban area

MATERIALS AND METHODS:

Cross sectional observational study was done in department of pediatrics, Tirunelveli Medical College. 60 Children in the age group 1-3 years (12 -36 months) were included in the study. The mothers of the children were asked questions based on the format prepared to include the cause, type of anemia and the various socio-economic factors in relation to anemia. The consent for taking blood samples was obtained. Anthropometric measurements, physical examination was done for further correlation. The anthropometric measurements of head circumference, mid arm circumference were done by weight scale (in kg) and by stadiometer with proper position

RESULTS:

The prevalence of anemia among the Toddlers was classified as mild, moderate and severe based on their Hemoglobin level and tabulated as follows: Among the 60 toddlers, 23.3 % (14) were normal, mild anemia were 31.7% (19),moderate anemia 40% (24) and severe anemia 5%(3). Total anemic toddlers were 46(76.7%).Among the 46 anemia cases,39.1% (18) were males and 60.9% (28) were females. In respect of age, 9 children (15%) were 1 year old , the remaining toddlers 20(33%) and 31(51.7%) were in the age of 2 and 3 years respectively. Regarding PEM 20 (33.3%) were in grade I, 7 (11.7%) was grade 2 PEM and only 1 (1.7%) was in grade 3 PEM. Among the 60 toddlers, 85% (51) were normal in mid arm circumference and only 15% were below normal. In the cow's milk fed children 7.1% (1) were not anemic and 13 (92.9%) were normal fed cases. 47.8% of PEM toddler was anemic in comparison to 52.2% of normal toddlers with anemia. Iron deficiency anemia ranks the top list with 63% of cases. Anemias of chronic diseases were reported in 6.5%. IDA is more common in low socio economic status class 4 and 5 (upper lower and lower)

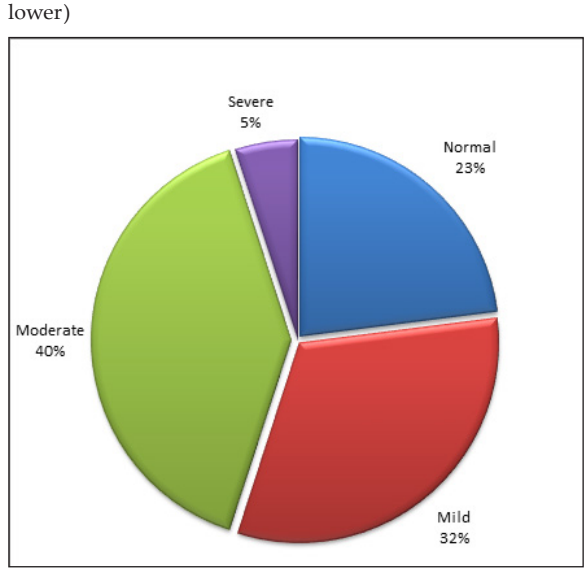

Figure 1 Prevalence and Grades of Anemia in Toddlers

Table 1 Percentage distribution of Toddlers according to their demographic characteristics (Sex wise)

Demographic Variables	Components	Male n=27		Female n=33		Total n=60	
		No	%	No	%	No	%
Age	1	2	7.4	7	21.2	9	15.0
	2	10	37.0	10	30.3	20	33.3
	3	15	55.6	16	48.5	31	51.7
PEM	Grade I	12	44.4	8	24.2	20	33.7
	Grade II	01	3.7	6	18.2	7	11.7
	Grade III	0.0	0.0	1	3.0	1	1.7
Kuppusamy Classification	Class II	1	3.7	0	0.0	1	1.7
	Class III	1	3.7	0	0.0	1	1.7
	Class IV	24	88.9	30	90.9	54	90.0
	Class V	1	3.7	3	9.1	4	6.6

Table 2 Comparison of Anthropometric and Hb level between Male and Female.

Variable	Total		Male		Female	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Height (CM)	83.1	5.8	85.3	3.9	82.2	6.8
Weight (Kg)	10.2	1.5	10.5	1.3	10	1.6
MAC (CM)	14.2	0.8	14.4	0.7	14.1	0.8
Hb level (Gram)	9.8	1.4	10.4	1.5	9.6	1.3

Table 3 Comparison of anemia prevalence among the Anthropometric and clinical variables

Anthropometric and Clinical Variable	Variable Group	Normal =14		Anemia=46							
			Mild		Moderates		Severe		Total		
		No	%	No	%	No	%	No	%	No	%
MAC	Normal	14	100	17	37	18	39.1	2	44	37	80.4
	Below Normal	0	0	2	4.3	6	13.0	1	2.2	9	19.6
PEM	Normal	8	57.1	13	28.3	10	21.7	1	2.2	24	52.2
	Grade I	6	42.9	3	6.5	10	21.7	1	2.2	14	30.4
	Grade II	0	0.0	2	4.4	4	8.7	1	2.2	7	15.2
	Grade III	0	0.0	1	2.2	-	0	0	-	1	2.2
Early cow's milk initiation	Yes	1	7.1	5	10.9	15	32.6	1	2.22	21	45.6
	No	13	92.9	14	30.4	9	19.6	2	4.4	25	54.4
Clinical Finding	PICA	1	7.1	5	10.9	19	41.3	3	6.5	27	58.7
	Loose Stools	0	0.0	2	4.4	1	2.2	0	0.0	3	6.5
Kuppuswamy Classification	II	0	0.0	1	2.2	0	0	0	0	1	2.4
	III	1	7.1	0	0.0	0	0	0	0	0	0.0
	IV	13	92.9	16	34.8	23	50	2	4.4	41	89.1
	V	0	0.0	2	4.4	1	2.2	1	2.2	4	8.7

Table 4 Anemia pattern based on RBC indices (MCV/MCH/MCHC)

Type of Anemia	No	%
Microcytic Hypo Chromic	33	71.73%
Normocytic Normochromic	12	26%
Mixed	1	2.17
Megaloblastic	0	0

DISCUSSION

Among the pattern of anemia Iron deficiency anemia ranks the top list. Various studies conducted in other developing countries also show similar trends. As per IIPS 2000[3] the prevalence of IDA among various States in India are 80% prevalence of IDA in Punjab, Bihar, Rajasthan, Chattisgarh, Haryanad. 74% prevalence in Tamilnadu. 50% prevalence of IDA in Nagalnad, Kerala, Manipur. As per Kapur et al 65% of the Indian Toddlers are anemic with 3.3% of cases severely anemic. The prevalence in developed countries remains very low compared to developing countries. Cross Sectional Study done in convenience sample of 12-36 months old children by Schneider[4] Julie M et al at Department of nutrition, University of California in Toddlers attending special supplemental nutrition programme observed prevalence of anemia – 11.1% and that of IDA – 3.2 – 3.4%. Study in urban population of 504 children (1 – 3 years) in USA by Alwin N eden et al[5] detected the prevalence of iron deficiency as 7% and Iron deficiency anemia 10%. Iron deficiency and cognitive impairment is significantly related and various studies observe the irreversibility in correction of Neurological symptoms following Iron therapy. Study done by Lozoff et al[6] had shown positive correlation between cognitive impairment, mental and psychomotor impairment and iron deficiency states. Study conducted in Brooklyn New York in urban population of Toddlers too observed significant correlation. The cause of Iron deficiency Anemia is mainly due to decreased intake of Iron which may not be associated with under nutrition. OBESITY is associated with IDA in developing countries. As per NHANES (National Health and Nutritional Survey) Study from 1999-2002 in America 20% obese Toddlers were observed with IDA. Study conducted by National Nutritional monitory Bureau of India shows 50% of healthy Toddlers with clinical evidence of IDA Study conducted by George KA et al[7] Kerala showed moderate under nutrition related more to IDA than mild under nutrition. The next frequent cause for IDA in Toddlers is associated with early cow's milk feeding in infancy. Cow's milk causes local gut allergy and micro blood loss resulting in Iron Deficiency anemia. Cow's milk supplemented in Bottles was observed as a marker for Iron Deficiency Anemia as per various studies. Study by Jane M Brotarek et al[8] showed highly significant association between early cow's mil feed and IDA. Similar study conducted in south East Asian Toddler observed positive correlation between early cow's milk in infancy and IDA. PICA is well documented feature of IDA in 70-80% of children Koilonychia, Platynychia, Glossitis, Stomatitis; Angular cheilitis are the other common features. An iron deficiency state is diagnosed when any two of Iron studies are abnormal. Low serum Iron, Increased TIBC, Decreased ferritin, Low Transferrin saturation predict accurately iron deficiency states. In infection states[10] TIBC, serum Iron and transferring saturation constitutes good evidence of Iron deficiency than serum ferritin.

CONCLUSION

IDA is highly prevalent in toddler in the present study. Further studies may be needed on large population of toddlers to make recommendation for therapeutic iron supplementation in this age group. The iron supplementation can be done as fortification with food stuffs than iron tablets which has disadvantage of non palatability of toddlers. Iron supplementation is important in toddlers since early intervention like prophylaxis with iron supplementation will prevent irreversible neurological impairment.

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