

A RETROSPECTIVE STUDY OF ASSOCIATION OF MALNUTRITION WITH SEVERE ANEMIA IN CHILDREN IN A TERTIARY CARE RURAL HOSPITAL OF MAHARASHTRA.

Paediatrics

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ABSTRACT

Introduction: Anemia and malnutrition are common health problems in developing countries with children being most vulnerable. They have negative impact on human performance, growth and development, both as cause and consequence of disease. The aim of this study was to evaluate the malnourishment causing anemia in children aged between 6 months to 5 years of age. **Material and methods:** The retrospective study was done in Dr. Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni over a period of two years from September 2015 to September 2017 between the age group of 6 months to 5 years admitted with anemia of hemoglobin <7 gm/dl were included in this study and previously diagnosed hemoglobinopathies were excluded. **Result:** Out of total 7562 patients 300 cases of severe anemia, Of which 68.3%(205) were severely malnourished and 29.7%(89) were moderately malnourished. There is statistical significance ($p < 0.02$) comparison with the sex it is found that 64.6% (84) males and 71.2%(121) females had severe malnourishment while 32.3% (42) male and 27.6%(47) female had moderate malnourishment. And more prone age group is 3-5years when compared between 6m to 5years. **Conclusion:** This study revealed that there is significant association of anemia and malnutrition. Severe anemia is more common in severe acute malnutrition. Females are more prone than males. Action should be taken from the time of birth and continues scrutiny of anthropometrical measurements with regular checkups and nutritional counselling is mandatory with high risk children.

KEYWORDS

Severe Acute Malnutrition, Moderate Acute Malnutrition, Anemia, Paediatrics

INTRODUCTION:

Anemia and malnutrition are one of the most common health problems affecting children. Anemia affects populations in both rich and poor countries. It is an indicator of both poor nutrition and poor health [1] Malnutrition commonly affects all groups in a community, but infants and young children are the most vulnerable because of their high nutritional requirements for growth and development [2]. Child is said to be anemic when the hemoglobin and or hematocrit is two standard deviation below the mean for that particular age and sex

Malnutrition:

Defined as imbalance between nutrients requirement and intake or delivery that then results in deficits of energy protein or micronutrients. Patients with malnutrition may present with growth deceleration altering growth or even weight loss, as measured by anthropometric parameters including weight, height/length, skin folds and mid upper arm circumference[3]

Malnutrition refers to deficiencies and excesses, or imbalances in a persons intake of energy and/or nutrients classified into 3 broad groups [4]

1 Undernutrition 2 Micronutrient Related Malnutrition 3 Overweight, Obesity And Diet Related Non Communicable Diseases

In this study I am taking undernutrition into consideration for my study. However, sometimes the terms malnutrition and protein energy malnutrition are used interchangeably with undernutrition[5]

WHO classification for Undernutrition[6]

	Moderate malnutrition	Severe malnutrition
Symmetrical edema	No	Yes
Weight for Height (measure of wasting)	SD -2 to -3 (wasting)	<-3 (severe wasting)
Height for Age (measure of stunting)	SD -2 to -3 (stunting)	<-3 (severe stunting)

SAM children 6-59 months of age defined by WHO and UNICEF as any of the following

1. Weight for height <-3SD of the median WHO growth reference
2. Visible severe wasting
3. Presence of bipedal edema
4. Mid upper arm circumference <11.5cms

3 immediate causes of undernutrition:

- 1.Low dietary intake
- 2.Low birth weight
- 3.Infection

It is one of the most significant problems facing mankind today. Rapid population growth, inadequate food production, poverty, regional conflicts, and social, political, and educational factors have significant role in malnutrition. Protein-energy malnutrition is the most common form, affecting mainly young children[7] Children's physical and cognitive abilities could be affected with malnutrition. Moreover, damages the child immune systems.[8]

Clinical signs in malnutrition:

Face: Moon face(kwashiorkor), simian facies (marasmus)
 Eye: Dry eyes, pale conjunctiva, Bitots spots, periorbital edema
 Mouth: Angular stomatitis, chelitis, glossitis spongy bleeding gums, parotid enlargement
 Teeth: enamel mottling, delayed eruption
 Hair: Sparse, dull, brittle hair with hypopigmentation, flag sign (alternate bands of light and normal color) brook stick eyelashes alopecia
 Skin: Loose and wrinkled (marasmus), shiny and edematous (kwashiorkor), dry follicular keratosis, patchy hypo and hyper pigmented, erosions with poor wound healing
 Nails: koilonychia, thin and soft nail plates
 Muscle: muscle wasting particularly at buttock and thigh
 Skeletal: deformities usually due to vitamin C and D deficiency
 Abdomen: distended, hepatomegaly with fatty liver and ascities
 Cvs: bradycardia, hypotension, reduced cardiac output
 Neurological: Global developmental delay, loss of knee and ankle reflexes
 Hematological: Pallor, petechiae and bleeding diathesis
 Behavior: Lethargic, apathetic and irritable on handling

ANEMIA:

Anemia results when oxygen carrying capacity of the blood is decreased. This is generally caused by having fewer than the normal number of blood cells or less than a normal quantity of the hemoglobin in the blood and different causes

- 1 Decrease substrate (decrease iron, folic acid, vit B12)
- 2 Adnormal production (chronic infection, chronic renal failure, endocrinal, liver disease, malignancy and drugs)
- 3 Abnormal destruction: (hemolysis, autoimmune hemolytic anemia, MAHA, hypersplenism, infections)

The WHO guidelines of hemoglobin and hematocrit levels in anemia

Age or gender group	Hb.gm.	Hematocrit	
1.	Children 6-59 month	11gm%	68.3%
2.	Children 5y-11y	11.5gm%	71.3%
3.	Children 12y-14y	12gm %	74.5%

Hemoglobin level below 7gm/dl is considered severe anemia,

Anemia is a public health problem that affects more than one-third of the world's population in both developing and developed nations.

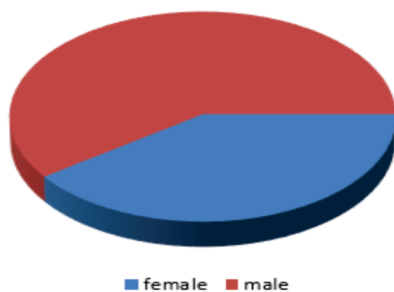
METHODS:

The present retrospective study was conducted in department of Paediatrics, Dr. Vitthalrao Vikhe Patil Pravara Rural hospital Loni, Maharashtra, India for a period of 2 years (September 2015 to September 2017). All patients in the age group 6 months to 5 years with hemoglobin

Data collection for this study included a retrospective review of hospital medical records of all children aged 6months to 5 years who were admitted to pediatric ward. Laboratory investigations reports such as complete hemogram, peripheral blood smear, reticulocyte count, osmotic fragility, sickling test, Hb - electrophoresis, etc. and renal function tests, liver function tests were noted. Various data on demographic, nutritional status and clinical profile were noted.

RESULTS:

A total of 7562 children were admitted to pediatric ward during the study period. As per the diagnostic criteria defined for severe anemia according to hemoglobin level and after fulfilling the inclusion and exclusion criteria, A total of 300 children were enrolled in the study. Out of this 40% were male and 60% were female. Girls were more affected as compared to boys



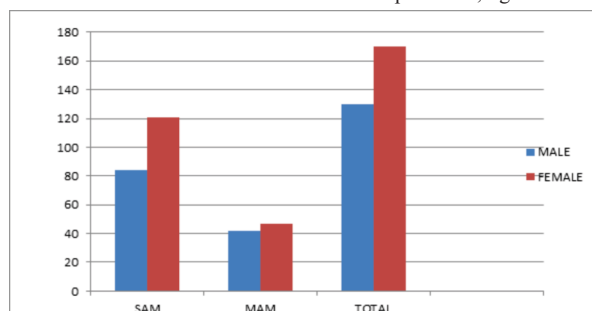
Out of 300 cases of severe anemia 68.3% were severely malnourished and 29.7% were Moderately malnourished. Out of SAM children 64.6% were males and 71.2% females while 32.3% male and 27.6% female had moderate malnourishment. There is statistically significant association ($p < 0.02$) between male and female with nutritional status and anemia.

Classification According to Nutritional Status

Sex	Nutritional Status		
	SAM	MAM	Normal
Male(n=130)	84(64.6%)	42(32.3%)	4(3.1%)
Female(n=170)	121(71.2%)	47(27.6%)	2(1.2%)
Total (n=300)	205 (68.3%)	89 (29.7%)	6 (2.0%)

Value = 7.233

$p = 0.0231$, significant

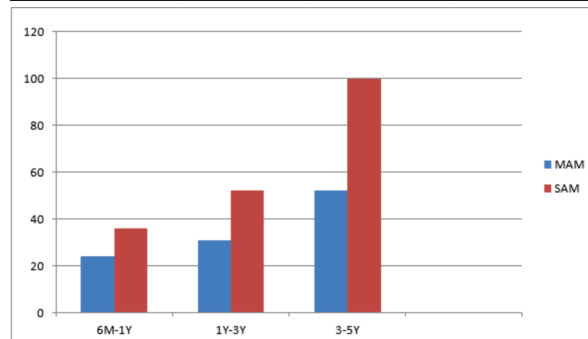


Age Wise Distribution Of Sam And Mam

Total number of cases are 300 students, 294 children are malnourished among them 3-5 year age group are affected more than other age groups, 6m-1y children with SAM are 19.14% i.e 36 and MAM are

22.6% i.e 24 ; At 1-3 yr age SAM are 27.6% i.e 52 and MAM are 28.9% i.e 31 and at 3-5 yr SAM are 53.2 % i.e 100 and 48.5% i.e 52. This study shows that age group which is more prone for malnutrition

AGE	SAM	MAM	TOTAL
6 M TO 1 YEAR	36 (19.14)	24 (22.4)	60(41.54)
1-3 YEAR	52 (27.6)	31 (28.9)	82(56.2)
3-5 YEAR	100 (53.2)	52 (48.5)	152(101.7)
TOTAL	188	107	294



DISCUSSION:

Comparison of Sex Wise Distribution of Case Among Various Studies

	Male	Female
Domellof Magnus et al.	78%	22%
Kapur Deeksha et al"	48%	52%
Srinivas Madoori et al	54.7	45.2%
Venkatesh G et al	49%	51%
Present study	40%	60%

This study show the female preponderance in severe anemia and malnutrition when compared to males and one of the any reasons can be the importance that is given to male child when compared to female child.

Increasing grade of malnutrition there is a higher association of severe anemia and vice-a-versa. And present study shows the similarities with Kapur Deeksha et al"[14] and Venkatesh G et al but difference with Domellof Magnus et al. and Srinivas Madoori et al maybe due to there sample size and in this study it showed 60% female and 40 male which is showing the large affected population is females

And the present study regarding the association of malnutrition and anemia shows that SAM children are more associated with anemia when compared with MAM and normal children , this type of studies more seen in developing and developed countries because of more infectious diseases and no awareness or not knowing importance of proper health and hygiene

	Georg K.A., Suresh Kumar N et	Dr. T. Sreedhar et	Present
SAM	58%	5.2%	68.33%
MAM	22%	57.8%	29.67%
NORMAL	20%	37%	2%

These findings are in similar with that of George K.A., Suresh Kumar N et al¹⁴ and contrast with Dr. T. Sreedhar et al¹⁵ where they found a significant association between mild and moderate undernutrition and anemia. And of the two, moderate under nutrition had strong association with anemia. This might be due to having taken a vast age group of 5year- 18years in study of all types of anemia. While our study comprised of only severe anemia cases in the age group of 6months-12years.

In the present study, the percentage of nutritionally healthy children according to weight for age using IAP classification was only 6 (2%), rest 294 (98%) cases showed varied degree of malnourishment. Thus it indicates that the prevalence of severe anemia is more in malnourished infants. On further sub classification we found that out 294 malnourished children, 205 (68.33%) cases were severely malnourished while 89 (29.67%) had moderate degree of malnutrition. Thus, it was noticed that females showed greater degree of severe malnutrition. These findings suggest that SAM is more prone to anemia than MAM. And 3-5 year age group was more prone to malnutrition when compared with 6months to 3 years.

CONCLUSION:

Anemia and malnutrition is more prevalent and significantly associated in India and these are the two conditions that are prone to morbidity and mortality if not taken care of. This can be reduced if proper care from the birth and also maternal nutrition and educating people regarding the importance of health and hygiene and taking care at health care centres like anganwadi and PHC and primary schools where the children and parents in contact with the government and health care system. These areas are the contact points where counseling regarding the complimentary diet and nutritional supplementation like iron, vitamin B12 and regular checkup and screening tests can be done. As it showing 3-5 year children are more affected as age growing from birth the care to be taken as to reduce the malnutrition.

Conflict of interest: We have no conflict of interest.

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Ethical approval: The study was approved by the Institutional Ethics Committee.

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