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Original Research Article

Prevalence of anemia amongst preschool children in rural field practice area of medical college, Mumbai, Maharashtra

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ABSTRACT

Background: Anemia is a public health problem all over globe affecting both developed and developing countries. A situational analysis of local field practice area could ensure proper planning of preventive strategies. The objectives of the study were to assess the prevalence and distribution of anemia in preschool children in rural field practice area of medical college, Mumbai.
Methods: A cross-sectional study was conducted amongst 280 preschool children in the field practice area of Department of Community Medicine of T. N. Medical College, Mumbai during the period of May 2016 to April 2017. Hemoglobin colour scale indicator was used to grade the anemia.
Results: Majority of children had mild anemia (43.93%) followed by moderate to severe anemia. Female children had (23.21%) mild anemia followed by (18.93%) moderate anemia and (2.86%) severe anemia. Male children had (20.71%) mild anemia followed by (16.07%) moderate anemia and (3.21%) severe anemia. There was no significant association of anemia with gender in pre-school children. Age, religion, socio-economic status and parent's education showed significant association with presence of anemia.
Conclusions: Anemia still remains a public health problem in the rural area. Early and targeted interventions with regular follow up need to be undertaken at grass root level to reduce its prevalence in the population.

Keywords: Anemia, Rural area, Preschool children, Prevalence

INTRODUCTION

Anemia is defined as a reduction of the total circulating red cell mass below normal limits or reduction in Hemoglobin concentration of blood resulting in decrease in oxygen carrying capacity. Hemoglobin concentrations are normally higher at birth than at any other time of life, as a result of the adaptation of the fetus to the hypoxic environment of the uterus. In addition, the neonatal reserves of storage iron are relatively generous. Consequently, most newborn infants are well supplied with iron. Between birth and four months of age, there is almost no change in the total body iron in the term infant. The need for exogenous iron is therefore modest during this period. The abundant iron stores present at birth help to provide for synthesis of hemoglobin, myoglobin, and enzyme iron during the first four months. Additional iron from the hemoglobin breakdown is also made available to meet the iron needs because the concentration of hemoglobin declines from a mean of 17.0 g/dl at birth to a low of 11.0 g/dl at two months of age.[1]

In adults, the diet needs to replenish only the amount lost from the gastrointestinal tract which is roughly 5% of the daily iron needs. In infants and children diet needs to provide 30% of the daily iron needs because of the growth spurt and increase in muscle mass. At birth, and up to 4 months of age in a full term baby, the infant is in

a state of iron feast. This is the result of the generous neonatal reserves of storage iron and the iron replenished from hemoglobin breakdown as the concentration of hemoglobin declines from a mean of 17 g/dl at birth to a nadir of 11 g/dl at 2 months of age. At around 4 months of age, as nature shifts partial responsibility of iron balance to nurture, 'iron feast' transitions to 'iron famine'. The rapidly expanding blood volume from 4 to 12 months of age and thus the large amount of iron needed to maintain the mean hemoglobin concentration of 12.5 g/dl is responsible for this vulnerability. The problem is compounded by a diet which is often either poor in iron or rich in non-bioavailable iron. Although Iron deficiency is one of the most common cause of anemia, other causes of anemia include hereditary hemoglobinopathies, chronic infections, and folic acid deficiency. Multiple causes of anemia may coexist in an individual or in a population and contribute to the severity of the anemia.[2]

Basic research support the concerns that iron-deficiency anemia and iron deficiency without anemia during infancy and childhood can have long lasting detrimental effects on neurodevelopment. Therefore, pediatricians and other health care providers should strive to eliminate iron deficiency and iron-deficiency anemia.[3]

Anemia is a public health problem all over globe affecting both developed and developing countries. According to National Family Health Survey 4 (NFHS-4) children age 6-59 months who are anemic in urban area is 55.9% and in rural area is 59.4%.[4] Anemia prevalence shows reducing trend compared to NFHS-3 which is 69.4%.[5]

A situational analysis of local field practice area could ensure proper planning of preventive strategies. Hence the present study was carried out with aim of to assess the prevalence and distribution of anemia in preschool children in rural field practice area of Dept. of Community Medicine of T. N. Medical College, Mumbai.

METHODS

A community based cross-sectional study was carried out amongst 280 preschool children (1-4 yrs) during the period of May 2016 to April 2017 at rural field practice area of Dept. of Community Medicine of T. N. Medical College, Mumbai after obtaining administrative and ethical committee approval from the institute. Thorough literature review was carried out prior to study. Preschool children (aged 1-4 years), residing in the area for at least 6 months and whose parents assented to participate were included in the study, whereas children with acute illness or known hemoglobinopathies were excluded from the study. Based on previous studies the prevalence of anemia in preschool children was taken as 59.2% and with an admissible error of 10% the sample size was calculated to be 280.[6]

Sampling method

Total population of study area was 23,434. The number of children of age between 1 to 4 years of age enumerated by PHC was 2,543. List was prepared of these children. From this list first child will be selected by simple random sampling method and after that with the help of systematic random sampling method every 9th child will be selected for study till sample size of 280 is met. If house is locked or the child does not meet the inclusion criteria then the next child in the list will be selected for study purpose.

Anemia status among the study population was assessed by reading level of hemoglobinon instrument called hemoglobin colour scale (HCS) indicator. As per WHO, HCS has a sensitivity and specificity of 95% and 99.5% respectively.[7] The scale is inexpensive, portable and an easy method to screen anemia in the field.

Statistical analysis

The data was entered in Microsoft Office Excel Sheet. The quantitative data was analyzed by using percentages, mean and standard deviation and the association between various qualitative data was analysed by using chi-square test and $p<0.05$ was considered as level of significance.

RESULTS

It was seen from Table 1 that the majority of children are having mild anemia (43.93%) followed by moderate and severe anemia. Most of female children having mild anemia (23.21%) followed by moderate anemia (18.93%), and severe anemia (2.86%). Most of male children having mild anemia (20.71%) followed by moderate anemia (16.07%), and severe anemia (3.21%).

Table 1: Prevalence of anemia in preschool children.

Grades of anemia	Female No. (%)	Male No. (%)	Total (%)
No anemia	23 (8.21)	19 (6.79)	42 (15.0)
Mild anemia	65 (23.21)	58 (20.71)	123 (43.93)
Moderate anemia	53 (18.93)	45 (16.07)	98 (35.0)
Severe anemia	08 (2.86)	09 (3.21)	17 (6.07)
Total	149 (53.21)	131 (46.79)	280 (100)

It was seen from Table 2 that the percentages of children with moderate to severe anemia in age group 12 to 17 months are 7.8%, in age group 18 to 23 months are 7%, in age group 24 to 29 months are 27%, in age group 36 to 41 months are 33%, in age group 42 to 48 months are 25.2%. There is no statistically significant difference between normal and anemic children with reference to gender and religion.

Table 2: Association of socio-demographic characteristics with grade of anemia amongst preschool children.

Socio-demographic characteristics	No. of children (%)				Chi Square (p value)
	Normal	Mild anemia	Moderate to severe anemia	Total	
Age (in months)					
12-17	12 (28.6)	22 (17.9)	09 (7.8)	43 (15.36)	21.778 df=8 p<0.05
18-23	06 (14.3)	03 (2.4)	08 (7)	17 (6.07)	
24-29	09 (21.4)	32 (26)	31 (27)	72 (25.71)	
36-41	07 (16.7)	42 (34.1)	38 (33)	87 (31.07)	
42-48	08 (19)	24 (19.5)	29 (25.2)	61 (21.79)	
Gender					
Male	19 (45.2)	58 (47.2)	54 (47)	131 (46.79)	0.048 df=2, p=0.976
Female	23 (54.8)	65 (52.8)	61 (53)	149 (53.21)	
Religion					
Hindu	31 (73.8)	88 (71.5)	96 (83.5)	215 (76.79)	8.349 df= 4, p=0.08
Buddhist	05 (11.9)	24 (19.5)	09 (7.8)	38 (13.57)	
Muslim	06 (14.3)	11 (8.9)	10 (8.7)	27 (9.64)	
Socioeconomic					
Upper class	09 (21.4)	84 (68.3)	79 (68.7)	172 (61.4)	33.371 df=2, p<0.001
Middle class	33 (78.6)	39 (31.7)	36 (31.3)	108 (38.6)	
Type of family					
Joint	18 (42.9)	50 (40.7)	51 (44.3)	119 (42.5)	0.335 df=2, p=0.846
Nuclear	24 (57.1)	73 (59.3)	64 (55.7)	161 (57.5)	
Family members					
More than 5	15 (35.7)	34 (27.6)	31 (27)	80 (28.6)	1.249 df=2, p=0.536
Upto 5	27 (64.3)	89 (72.4)	84 (73)	200 (71.4)	
Fathers education					
Above secondary	38 (90.5)	38 (30.9)	06 (5.2)	82 (29.3)	108.259 df=2, p<0.001
Upto secondary	04 (9.5)	85 (69.1)	109 (94.8)	198 (70.7)	
Mothers education					
Illiterate	07 (16.7)	04 (3.3)	15 (13)	26 (9.3)	9.960 df=2, p=0.007
Literate	35 (83.3)	119 (96.7)	100 (87)	254 (90.7)	

(Note: Values in the brackets indicate column percentages).

DISCUSSION

In the present study, the percentage of female children with normal hemoglobin was 54.8% and male children were 45.2%. Percentages of female children with mild anemia are 52.8% and male children are 47.2%. Percentages of female children with moderate to severe anemia are 53% and male children are 47%. Similar findings were observed in a study done by Padhi.[6]

In this study, the majority of children belonged to families that subscribed to the Hindu faith 215 (76.79%) followed by Buddhist 38 (13.57%) and Islam 27 (9.64%). Similarly a study done by Padhi revealed that there was no impact of religion on prevalence of anemia.[8]

Whether the child belonged to a joint or a nuclear family was also not associated with presence of anemia. It was hypothesized that due in case of larger number of family members the nutrient demand of children might not be fulfilled, so anemia prevalence may increase but no such association could be found in the study. However, there was significant association between prevalence of anemia and education of parents. Also, children from families in the higher socio economic strata had lower prevalence of anemia. Similarly these findings were observed with the findings in NFHS-3.[5]

The association between parent's education and prevalence of anemia among their children is statistically significant. This shows that educated parent provide appropriate nutrition to their children. Education of the parents acts as a driving force for better health of the child as was found in the study. An educated couple is in better position to take decisions regarding pregnancies, rearing and child care. The general policy making emphasizing education of the individuals especially before attaining parenthood should be encouraged.[6]

Socio-economic status of the family has a significant effect on degree and prevalence of anemia, thus, a sincere attempt should be made by the policy makers to raise the standard of living of the people so as to be able to lead a healthy life and provide a healthy childhood to the future

generations. Increased per capita income leads to increased standard of living which eventually leads to better affordability and buying capacity. Parents could make choice of nutritious food irrespective of cost and thus with this increased standard of living, there is gradual decrease in prevalence of anemia among their offspring. Till the first child completes 5 years of age and goes to school the second pregnancy should be delayed. Family planning and birth spacing can help contribute in lowering the prevalence of anemia. Family planning measures should be advocated.

CONCLUSION

This study concluded that prevalence of anemia was around 31.1% amongst preschool children. Majority of children are having mild anemia (43.93%) followed by moderate to severe anemia. The children found anemic should receive iron folic acid tablets and vitamin supplements with proper diet chart. Anemia still remains a public health problem in the rural area. Early and targeted interventions with regular follow up need to be undertaken at grass root level to reduce its prevalence in the population.

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