Australian Journal of Basic and Applied Sciences, 5(2): 122-126, 2011
ISSN 1991-8178

Anaemia Prevalence among Under-five Children in Imo State, Nigeria

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Abstract: A cross-sectional study of children aged 6-60 months was carried out in nine Local Government Areas (LGAs). A total of four hundred (400) under-five children were selected by purposive sampling method. Two hundred were from the urban and another two hundred from the rural locations. Height, weight, and mid-upper arm circumferences of the children were measured. Weighed 3-day food record for 20% of the sub sample was analyzed for proximate composition. Blood samples for determination of haemoglobin (Hb), packed cell volume (PCV), and vitamin C levels were obtained by vein puncture. Stool samples were collected to determine parasitic infestations. Structured and validated questionnaire was administered to elicit information related to socio-economic status of the parents and health status of the children. Statistical analysis was done using SPSS/PC (version 13), level of significance taken as $P<0.05$. The results showed that70.5% of under-fives were anaemic and 48.1% were iron deficient. Vitamin C necessary for iron absorption was below recommended allowances. Anaemia was prevalent in both rural and urban locations; however it was more in rural settings. Educational levels of parents, mosquito bites, child's size and appearance ratings, and vitamin/mineral drops consumption were the socio-economic factors associated with prevalence of anaemia. Based on these findings high premium for nutrition of mothers is advocated.

Key words: Anaemia, under-five children, haemoglobin, prevalence, micronutrient.

INTRODUCTION

Anaemia is a pathologic deficiency in oxygen-carrying haemoglobin in red blood cells (Rosenbaum, 2004). It is one of the micronutrient deficiencies that affect both developed and developing nations under-five children (Wardlaw *et al.* 2004; FAO/WHO, 1992). Anaemia results when the haemoglobin level is significantly depressed to result in a haemoglobin or haematocrit below the 90% or 95% of the range of a healthy reference sample of the same age and sex (Bowman and Russel, 2001). Anaemia is the best known manifestation of iron deficiency. It retards physical and cognitive development, and affects about two billion people worldwide (Black, 2003). Iron deficiency affects children under five years of age more than any other group. This is because iron stores are exhausted between 4 months and 6 months after which the child needs iron supplementation in the diet (Domellof *et al, 2001*). During the period from birth to two years, the growth rate is high, and so is the need for nutrients. The need for food and good nourishment is increased for the under-five to support the rapid growth and development. When nutrients are limiting at this critical phase, growth slows down and may even stop. Unfortunately, more than half of the children in developing countries are iron-deficient in critical stages of brain development. This occurs between 6 and 24 months *(UNICEF, 2004;* Maziya-Dixon *et al*, 2004; Baker, 2007).

In developing countries, about one-third of the children less than five years of age are short and underweight for their ages (Weigley *et al*, 2003*).* Under nutrition is at the heart of the problem. To grow, the children need to consume adequate amounts of energy, protein, calcium, iron, zinc and other nutrients. Solid foods are given to children at about 6 months of age. These would supply the needed extra iron for the growing child. Failure to provide the extra nutrients precipitates deficiency of essential micronutrients prevalent among children in developing countries, including Nigeria. Under nourished under-fives are unable to learn and this is carried to adult life. One of the most devastating to under-fives is micro nutrient deficiency of iron.

The brain, central nervous system and immune systems are all affected when the under-fives are iron deficient (Fredrickson,2000). Other effects include stunting, wasting and underweight which have been documented severally (Schrimpton, 1992; Caulfield *et al,* 2006*;* Stoltfz*fus et al,* 2004; Ibe, 2002*).* To determine

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the state of under-five children in relation to the above factors, this study focused on assessment of prevalence of anaemia among under-five children in Imo State of Nigeria.

MATERIALS AND METHODS

This study was done in Imo State, Nigeria using information from the socio-economic characteristics of under-five parents, health status of mother during pregnancy, health status of under-five children, breastfeeding/ weaning-dietary habits, health facilities/sanitary practices, nutrition knowledge of parent. Anthropometric measurements of under-5s- weight (kg), height (cm), and mid-upper arm circumference (cm.) were taken. Biochemical assessments using blood specimens (2ml) tested for Haemoglobin levels Haematocrit (PCV) level Ascorbic acid (vitamin C) level. Stool samples were collected to check for worm (helminthes) infestation. Food records which involved weighing of actual foods consumed by under-fives for three consecutive days, including one day weekend were taken. The samples of meals consumed were analyzed in the laboratory to find out their energy (kcal), protein (gm), fat (gm), carbohydrate (gm), iron (mg), and ascorbic acid (mg). Statistical analysis was done using Statistical Package For Social Sciences version 13 (SPSS/PC).Significance level was $P<0.05$.

RESULTS AND DISCUSSION

The results showed that the overall mean haemoglobin of the subjects investigated (n=400) aged 12-60 months was 10.478g/dl. Figure 1 shows the prevalence of anaemia using haemoglobin (Hb) levels of the children. Among the surveyed children (n=400), 29.5% were normal and 70.5% were of varying degrees of anaemia. Using the WHO/UNICEF/UNN (2001) classification 38.0% had mild anaemia, 31.8% were moderately anaemic and 0.8% was severely anaemic (Fig. 1). The prevalence of anaemia (70.5%) in Imo State was higher than the WHO (2007*)* estimated 40% for South East Asia and Sub-Saharan Africa. However, because there were no fixed figures for all countries, the PHNI (2003*)* statistics reported the prevalence of anaemia in many WHO countries of the world. For example, in Ghana (1999) the prevalence was 84%, Mali was 82.7% for children 6-59 months in 2001. Gambia had 76% for 1-5years which was higher than that of the present work. Other studies in African countries and Southern Asia confirmed high prevalence of anaemia as observed by W.H.O. The prevalence in India was 74.3% for children 6-35 months*;* Nepal had 78% for children 6-59 months in 1997 and 70% in 1998. In Kazakhstan (1995) it was 73.7% for children 0-23 months and 69.2% for children more than 3 years. In Eastern Mediterranean, anaemia prevalence was 70% of pre-school children (PHNI, 2003).

These results confirmed that in South East Asia and Sub-Saharan Africa the prevalence was high. However, in developed countries, the figures fell below 30% for instance in Mexico (1999) it was 48.8% in children 6-23 months and 27.2% in children 6-59 months. Europe/Central Asian countries had low prevalence. Armenia in 2000 had 23.9% of children 6-59 months that were anaemic, 0.4% were severe, 9.6% moderate and 14% were mild (PHNI,2003). These present results were higher than the previous ones in this zone. The value was 27.5% (NFCS 2004) in Nigeria. Stoltzfus *et al* (1997*)* and Hall *et al* (2002*),* and others like Tatala (2004*)* reported the prevalence of anaemia in Tanzania at 80.0%. Bangladesh had 68.0% for 48-59 months olds. The highest prevalence was among children aged 12-23 months (Stallkamp *et al*, 2006*).* The present work had similar observations.

Figure 2 shows that the number of children that were severely anaemic in different age groups were 0%, 0.9%, 2.0% and 6% for 12-23, 24-35, 36-47 and 48 –60 months age groups, respectively. The children that were moderately anaemic had 47.5% for 12-23 months age groups. The rest 24-35, 36-47, and 48-60 months age groups were 36.9%, 24.3% and 26.0%, respectively. The figures for those that had mild anaemia were 37.3%, 41.5%, 43.4% and 33.9% for 12-23, 24-35, 36-47, and 48-60 months age groups, respectively. The most affected age group was 12-23 months (84.8%). This value was similar to that reported in Bangladesh (Stallkamp, *et al*, 2006).

The prevalence of anaemia decreased with age group i.e. 84.8%, 78.4%, 69.7% and 65.9%. These results agree with those of Stalkam*p et al*, (2006). They observed 92% prevalence among 6-11 months, 85% for 12-23 months and 58% for 24-59 months old. These results affirmed what Malin and Stones (1988*)* found among Indian under-fives where 182 children were investigated for anaemia. The prevalence was significantly higher among children weaned (73%) as compared with those fully weaned (30%). The under-three groups were more anaemic than children aged 3-5years. This suggests the need for a specific health programme directed to this age group.

***Prevalence of Anaemia Based on Location*:**

The prevalence of anaemia in urban and rural Imo State communities was compared. Figure 3 summarizes the anaemia status of the children in different locations. Fig.3 shows prevalence of anaemia generally, in urban and rural locations. The anaemic children made up to 70.5% of the study group. Based on the results, prevalence of anaemia in rural was 78.7% and in urban 62.0%. Some, 22.6% of urban children had moderate anaemia as compared to 41.0% who had moderate anaemia in rural areas. A few children (39.2%) had mild anaemia in urban areas and 37.2% were mildly anaemic in rural areas. The total anaemic figures from both urban and rural had strong correlation (r = 0.160, P = 0.001) between the locations of the children and severity of anaemia. The number of children aged 1-5 years, whether or not the child was well in the past 3 months and whether or not the child was bottle-fed were highly significant (Table 1).

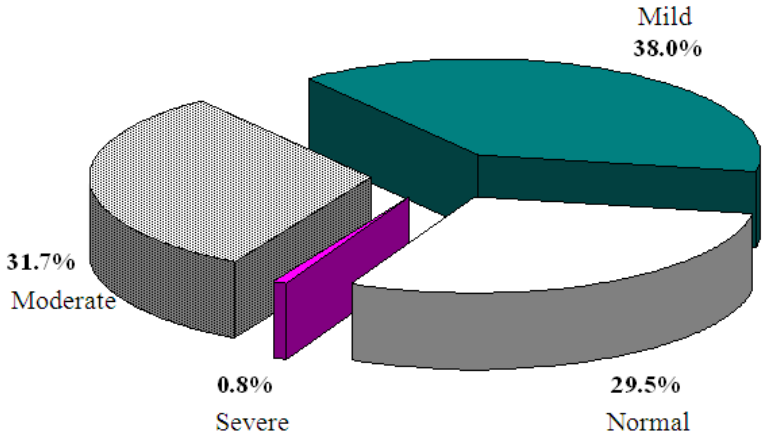

Fig. 1: Level of anaemia in under – five children.

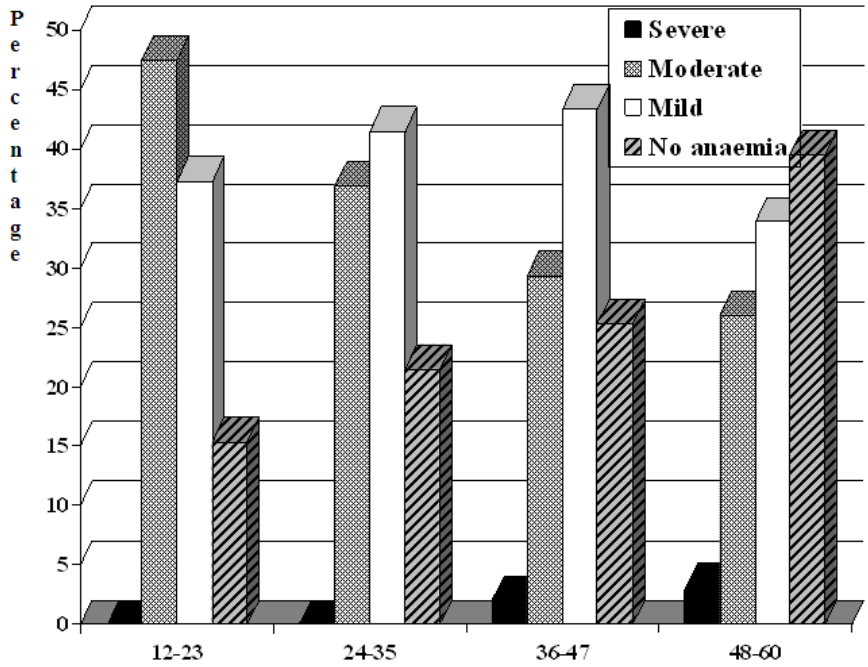

Fig. 2: Prevalence of anaemia by age group.

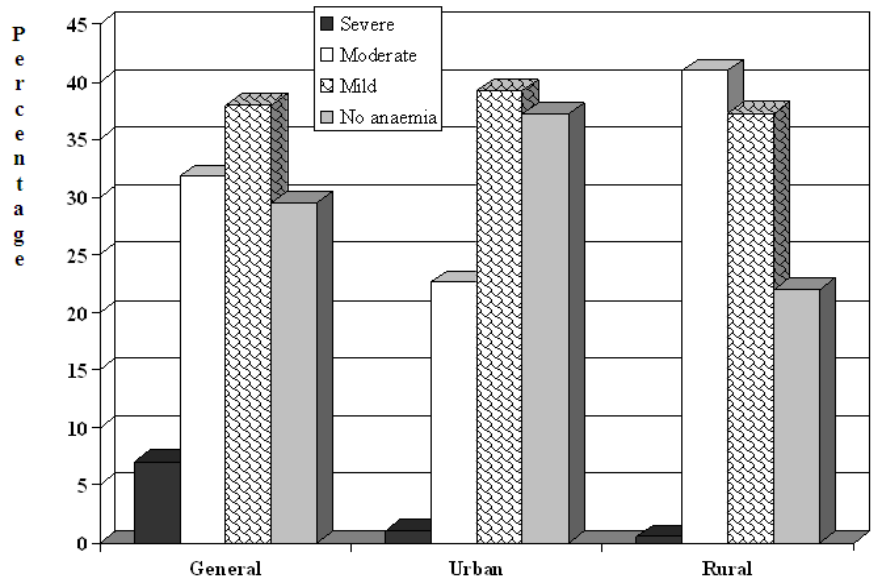

Fig. 3: Prevalence of anaemia based on Location**.**

Table 1: Socio-economic, health and food habit variables related to iron status.

Variables	Pearson's coefficient
Number of children aged 1-5	0.140 (p = 0.005)
Has the child been entirely well the past 3 months	0.143 (p = 0.004)
Has the child been treated for diarrhea in the past 3 months`	-0.113 (p = 0.024)
Has the child had worms before	-0.127 (p = 0.011)
Are you satisfied with child's appearance	0.138 (p = 0.006)
Does he/she feel sleepy, weak or tired	-0.101 (p = 0.044)
Did you give vitamin/mineral drops	0.099 (p = 0.047)
Did you bottle fed	-0.132 (p = 0.008)
As the child grew did you add any other food	0.103 (p = 0.039)

Conclusion:

Anaemia was the public health disease a larger proportion of under-five children suffered in Imo State. About 70.5% of the under-fives were anaemic. . The most affected age group was 12-23 months (84.8%). This value was similar to that reported in Bangladesh (Stallkamp, 2006*)*.Anaemia was much more prevalent in rural (78.7%) than urban (61.3%) areas. There was no difference in anaemia among the boys and girls in Imo State.

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