

# Iron Deficiency Anaemia among Adolescent Males in Warri Metropolis, Nigeria

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## ABSTRACT

*Little or no economic improvement in the local communities studied has sustained poverty and causes growing inequality in health and nutrition that affect the most vulnerable groups of the population, including children and adolescents. This study is designed to determine the level of anaemia and some of its determinants among adolescent males in Warri districts of Delta State, Nigeria. Following informed consent, pretest counseling and obtaining of required blood sample by venepuncture, serum iron is determined by photometric test for iron with lipid clearing factor (LCF). Haemogram is done by standard methods. Results indicate that 21.5% of the adolescent males had iron deficiency anaemia. The differences in the results for pack cell volume (PCV), haemoglobin (Hb), red blood cell count, mean cell haemoglobin concentration (MCHC) mean cell volume (MCV) and serum iron between the anaemic and non-anaemic adolescent males were statistically significant. It is therefore concluded that Anaemia is a significant problem among the adolescent males. Measures to improve their nutritional status and as well minimise malaria infection and worm infestation will benefit the subjects.*

**Keywords:** Iron deficiency anaemia, adolescent males, Warri metropolis

## INTRODUCTION

Anaemia currently affects two billion people throughout the world and represents a major public health problem among infants in poor countries (Ngnie-Teta, Receveur and Kuate-Defo, 2007). Moderate and severe anaemia are associated with increased child morbidity and mortality (Brabin, Premji and Verhoeff, 2001)

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and a deterioration of the physical and cognitive development of children (Pollit, 1997; Lozoff, 2000; Beard, Connor and Jones, 1993; Dommergues, 1989; Peirano, *et al* 2001). In developing countries, the aetiology of anaemia is related to both individual and environmental factors. According to Berger and Dillon (2002), Iron deficiency remains the main cause of anaemia in poor countries and contributes to almost half of the current cases. Other nutritional deficiencies such as folate, vitamin B<sub>12</sub> and vitamin A are also risk factors for anaemia (Stoltzfus, 2001a; Stoltzfus, 2001b; Baker and Maeyer, 1979).

Although malnutrition, inflammatory disorders, malaria and infection are known causes of anaemia, diets rich in phylates (Zijp, Korver and Tijburg, 2000) and poor in animal products (Bothwell, Baynes, MacFarlane and MacPhail, 1989) are also risk factors for anaemia. The prevalence of anaemia in target groups such as adolescent males remains under-studied in our society. The purpose of this study therefore is to examine the prevalence of anaemia and some haematological determinants of adolescent males in Warri metropolis of Nigeria.

## MATERIALS AND METHOD

The metropolitan wards of Warri and Ekpan in Delta State, South-South zone of Nigeria were selected for the study. The survey was conducted by random sampling. The subjects for the study were recruited prospectively and consecutively. A total of 88 adolescent males (13-18 years old) were enlisted into the study. Informed oral consent was obtained from the subjects and/or their parents or guardians prior to the collection of blood samples after explaining the purpose of the study to them. Blood samples were taken by venepuncture in each case and basic haematological investigations conducted by standard methods (International Nutritional Anaemia Consultative group, 1985; Mohammed, Ramana and Sastry, 2002; Dacie, 1984) in the School of Health Technology, Warri. Haemoglobin concentration was estimated by the indirect cyanmethaemoglobin method.

Twenty (20) micro liter of whole blood was placed in 5ml of Drabkin's solution, mixed and left for 5 minutes. Haemoglobin concentration was measured at a wavelength of 540nm by a spectrophotometer. Packed cell volume was measured by the microhaematocrit method. Serum Iron was determined by Iron Liquicolor (Human, Germany). In this test, iron (III) reacts with chromazurol B (CAB) and cetyltrimethylammoniumbromide (CTMA) to form a coloured ternary complex with an absorbance maximum at 623nm. The intensity of the colour produced is directly proportional to the concentration of iron in the sample. According to Dacie, (1984), all other haematological parameters were determined by standard methods. The results are presented using Chatfield (1983) statistical models.

## RESULTS AND DISCUSSION

The results of the measurement of haemoglobin concentration, packed cell volume and serum iron showed that the prevalence of anaemia among the 88 adolescent males was 21.5 percent. Anaemia was assessed according to World Health Organization (1968) criteria. According to Le *et al* (2005), adolescent males whose haemoglobin concentrations were below 12g/dl and their PCV below 0.34 were classified as anaemic. Differences in the results between the anaemic adolescent males and non-anaemic adolescent males for PCV, haemoglobin concentration, red cell count, mean cell haemoglobin concentration, mean cell volume and serum iron were statistically significant,  $p < 0.05$  in each case (table 1). This study reveals that anaemia is prevalent among a considerable percentage of adolescent males in the local communities studied, even as has been reported in some communities in other developing countries (Le *et al*, 2005; and Seshadadri, 1997). The average prevalence of anaemia among the 88 subjects was 21.5 percent. Poor economic improvement in the local communities has sustained poverty and a pattern of growing inequality in health and nutrition that affects the most vulnerable groups of the population, particularly women and children.

The findings of iron deficiency in 21.5 percent of the adolescent males agrees with a previous report that one in five people in developing countries do not consume enough food to meet minimum nutrient requirements (Gopalan, Rama and Barasubramanian, 1996). Other reports suggested that in similar setting such as ours, infection, inflammation and iron losses due to intestinal parasitic infestation are probably major causes of iron deficiency and iron deficiency anaemia. Protozoal infections, particularly malaria, are important, direct causes of anaemia. Bacterial infections may aggravate an existing anaemia and prevent optimal response to haematinics (Evatt, Lewis, Lothe and McArthur, 1983).

**Table 1:** Haematological result of the adolescent males in Warri metropolis

Subject	Results (mean $\pm$ SD)					
	PCV (L/L)	Hb (g/dl)	Rbc ( $\times 10^{12}$ /L)	MCHC (g/dl)	MCV (fl)	Serum iron (mmol/L)
Anaemic (n=19)	0.29 $\pm$ 0.03 (0.25-0.33)	9.7 $\pm$ 1.1 (8-11.7)	3.6 $\pm$ 0.7 (3.0-4.9)	29.8 $\pm$ 0.8 (28.5-38.2)	64.9 $\pm$ 15.4 (67.3-94.2)	8.9 $\pm$ 2.4 (5.7-14.7)
Non-Anaemic (n=69)	0.44 $\pm$ 0.02 (0.35-0.48)	14.7 $\pm$ 1.4 (11-16.2)	4.1 $\pm$ 0.9 (3.7-5.8)	33.0 $\pm$ 1.9 (30.0-37.7)	88.0 $\pm$ 16.4 (72.7-105.4)	18.6 $\pm$ 2.6 (8.8-24.8)
p Value	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

## CONCLUSION

This study is conducted to determine the level of anaemia and some of its determinants among adolescent males in Warri districts of Delta State, Nigeria. The differences in the results for pack cell volume (PCV), haemoglobin (Hb), red blood cell count, mean cell haemoglobin concentration (MCHC) mean cell volume (MCV) and serum iron between the anaemic and non-anaemic adolescent males

were observed to be statistically significant. Hence, the level of anaemia among adolescent males is considerable. Intervention is needed to improve nutrition, personal hygiene, iron and mineral supplementation in order to minimise anaemia among the group of adolescent males.

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