Prevalence of Anaemia Based on Laboratory Findings in Patients Attending a Tertiary Health Facility in South-Eastern Nigeria: A 2-Year Review

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ABSTRACT

Background: Anaemia is a public health problem affecting millions of people globally, especially in low and middle-income countries. It leads to complications that affect patient's daily activities due to fatigue and impaired cognitive function. **Objectives:** To determine prevalence and patterns of anaemia amongst patients attending tertiary health institution. **Materials and Methods:** This was a retrospective study which used previous records obtained from the registers available at the Haematology Section of the Laboratory Complex, Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Amaku, Awka, Nigeria. These were records from 1st January 2016 to 31st December 2017. A proforma was used to collect data from the registers in the Haematology Department. Variables extracted were year, month, age, sex and patient's Department. Data were analysed using SPSS (Statistical Package for Social Science) version 20.0. Results were presented in tables. **Results**: A total of 4950 haemoglobin concentration test results were analysed. 2846 (57.5%) were females. Overall prevalence of anaemia regardless of degree of severity was found to be 62.9%. Severe anaemia was highest in males 15 years and above (15%). Children below the age of 5 had the lowest prevalence of anaemia. (62.5%). Mild anaemia was highest in Children aged 12 to 14 (35.1%). Patients older than 15 years constituted over half of the data collected. **Conclusion:** The prevalence of anaemia based on available laboratory results is alarmingly high in Awka, Nigeria, when compared to other related studies within Nigeria and beyond.

Keywords: Anaemia, Prevalence, Tertiary Health centre.

INTRODUCTION

Anaemia as defined by world health organisation (WHO) is the reduction of haemoglobin concentration of Hb < 12 g/dL in adult non-pregnant female, Hb < 11g/dL in pregnant females, Hb < 13g/dL in adult men, Hb < 12 g/dL in male children, Hb < 11 g/dL in female children, and Hb < 13 g/dL in newborns.[1]

These values are dependent on age, ethnicity and physiological status.[2]

It is a public health problem affecting millions of people globally but predominantly in the developing countries. [3] Anaemia is one of the leading causes of morbidity and mortality in children especially in developing countries.[4] It is also one of the most common and controllable nutritional issues in today's world.

Despite the fact that there are several causes of anaemia, iron deficiency anaemia is said to be the commonest cause of anaemia especially in children and women of reproductive Age.[4.5] Other causes of anaemia include other micronutrient deficiencies which include; folate, riboflavin, vitamins A and B12. Others are acute and chronic infections like malaria, cancer(which may be haematological or non haematological), tuberculosis and HIV), and inherited or acquired disorders that affect haemoglobin synthesis, red blood cell production or red blood cell survival (e.g. haemoglobinopathies).[6,7,8] Anaemia leads to complications that affect patient's daily activities due to fatigue and also impaired cognitive function. It may lead to dizziness, and fatigue, poor health, and reduced productivity among the general population.[8,9,10] Non-health-related consequences has also been reported and this include: high health-care expenditures, decreasing income, and related socio-economic problems among families and communities.[11]

Anaemia can impact negatively on the socioeconomic growth of a community and a nation at large. The findings of this study may help policy makers in understanding the magnitude and creating ways of curbing the burden of anaemia in our environment. Several studies in low and middle-income countries have shown various findings in prevalence of anaemia.[12,13,14] Such studies are not in existence in our locality.

We aim in this study to determine the prevalence of anaemia in our institution which will form an effective tool in creating strategies for control and management of anaemia.

MATERIALS AND METHODS

Study area: Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH) is a tertiary healthcare institution located in Awka-South Local Government Area (L.G.A), Anambra State, Nigeria. Awka, is the capital of Anambra state. Awka is an urban area with a population of about 301,657 and a land mass of 120km2 as of 2006 Nigerian census.

Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH) trains medical personnel and is affiliated to Chukwuemeka Odumegwu Ojukwu University. It offers the same range of medical services and diagnostics expected of a typical teaching hospital; of which provision of good Haematological Services are included.

Study design: This was a retrospective Study which used previous records obtained from the registers available at the Haematology Section of the Laboratory Complex, COOUTH, Amaku, Awka. These were records from 1st January 2016 to 31st December 2017.

Study population: This consisted of all the laboratory results of haemoglobin concentration tests done from 1st January 2016 to 31st December 2017 (24 months).

Inclusion criteria: Laboratory results of haemoglobin concentration test done from 1st January 2016 to 31st December 2017.

Exclusion criteria: patient information that were not properly documented.

Sampling technique: The sampling technique was a Total Population sampling, whereby all the results that fall within the duration of the study were included. We classified the severity of anaemia in this study based on the WHO classification which classified severity of anaemia according to age. Severe anaemia was said to be haemoglobin (Hb) less than 8g/dl for children between the ages of 5 and 14, non- pregnant women of 15 years and above, while

Hb level of less than 7g/dl was severe anaemia for pregnant women and children between 6 months to 59 months. Mild anaemia was said to be Hb of 10.0-10.9g/dl for children from 6-59 months and pregnant women, 11.0-11.9g/dl for children 12-14 years and non- pregnant women over 15 years. Hb of 11-12.9g/dl was said to be mild anaemia in males older than 15 years, while Hb of 11.0- 11.4g/dl is mild anaemia for children 5- 11 years old.[15] For ease of reference, anaemia was classified into as mild (Hb>10g/dl but below cut off levels), moderate (Hb 7-10g/dl), severe (Hb <7g/dl).[16]

Study instrument: A proforma was used to collect data from the registers in the Laboratory Department. The proforma contained the following items: Year, Month, Age, Sex, Haemoglobin Concentration and patient's department.

Data analysis: Data were entered into the computer and analysed using SPSS (Statistical Package for Social Science) version 20.0. Data errors were checked and corrected. Frequencies and proportions were determined. Results were presented in tables.

Ethical considerations: Approval was obtained from the COOUTH Ethical Review Committee. Permission was obtained from the management of the hospital and the Head of Laboratory services in COOUTH before accessing the laboratory registers. All collected information was kept confidential.

Limitations of the study: Poor recording system in the Laboratory Department resulted in incoherent data and shoddy data availability. Also we would have loved to look at more characteristics of the patients like the working diagnosis, but there was very scanty documented information about the patients in the laboratory register.

RESULTS

A total of 4950 haemoglobin concentration test results were analysed. 2846 (57.5%) were females. Most of the patients (65.4%) were over 15 years of age, while about a fifth were less than 5 years of age as seen in tables 1 and 2.

Males above 15 years had the highest number of normal haemoglobin levels 42.5%, while children between 5 and 11 years had the lowest number of normal haemoglobin levels (33.1%). Table 3

Anaemia was found to be highest amongst females older than 15 years (64.8%), while children below the age of 5 had the lowest prevalence (62.5%). Normal haemoglobin for age was found to be highest amongst males greater than 15 years (42.5%), while it was lowest for those within the ages of 5 and 11 years (33.1%). See table 3. Overall prevalence of anaemia regardless of degree of severity was found to be 62.9%.

Mild anaemia was highest in Children aged 12 to 14 (35.1%), Moderate anaemia was highest (42.9) in children between 6- 11 years, while severe anaemia was highest in males greater than 15 years (15%) as seen in tables 4..

Table 1: Participants age as at last birthday

Variable	Frequency	Percentage
Less than 5 years	1,010	20.4
5 to 11 years	490	9.9
12 to 14 years	211	4.3
15 years and above	3,239	65.4
Total	4,950	100.0

Table 2: Gender of study group

Gender	Frequency	Percentage
Male	2,017	40.7
Female	2,846	57.5
Missing	87	1.8
Total	4,950	100.0

Table 3: Prevalence of anaemia in the different age groups

Age group (years)	Normal Hb for age	Anaemic	Total
Less than 5	379 (37.5%)	631 (62.5%)	1,010 (100.0%)
5 to 11	162 (33.1%)	328 (66.9%)	490 (100.0%)
12 to 14	72 (34.1%)	139 (65.9%)	211 (100.0%)
Women 15 and above	723 (35.2%)	1,330 (64.8%)	2,053 (100.0%)
Men 15 and above	476 (42.5%)	645 (57.5%)	1,121 (100.0%)
Total	1,812	3,073	4,885

Table 4: Prevalence of anaemia in the under fives

HB classification (g/dl)	Frequency	Percentage
Normal (11.0 or higher)	379	37.5
Mild anaemia (10.0 to 10.9)	252	25.0
Moderate anaemia (7.0 to 9.9)	313	31.0
Severe anaemia (less than 7.0)	66	6.5
Total	1,010	100.0

Prevalence of anaemia in the under-fives was 62.5% (631 participants out of 1,010).

Table 5: Prevalence of anaemia among 5 to 11 years old

HB classification (g/dl)	Frequency	Percentage
Normal (11.5 or higher)	162	33.1
Mild anaemia (11.0 to 11.4)	71	14.5
Moderate anaemia (8.0 to 10.9)	210	42.9
Severe anaemia (less than 8.0)	47	9.6
Total	490	100.0

Prevalence of anaemia among those 5 to 11 years was 66.9% (328 participants out of 490).

Table 6: Prevalence of anaemia among the 12 to 14 years old

HB classification (g/dl)	Frequency	Percentage
Normal (12.0 or higher)	72	34.1
Mild anaemia (11.0 to 11.9)	74	35.1
Moderate anaemia (8.0 to 10.9)	49	23.2
Severe anaemia (less than 8.0)	16	7.6
Total	211	100.0

Prevalence of anaemia among the 12 to14 years old was 65.9% (139 of 211 participants).

Table 7: Prevalence of anaemia in women 15 years and above

HB classification (g/dl)	Frequency	Percentage
Normal (12.0 or higher)	723	35.2
Mild anaemia (11.0 to 11.9)	506	24.6
Moderate anaemia (8.0 to 10.9)	643	31.3
Severe anaemia (less than 8.0)	181	8.8
Total	2,053	100.0

Prevalence of anaemia among the 15 years and above women was 64.8% (1,330 of 2,053 participants).

Table 8: Prevalence of anaemia in men 15 years and above

HB classification (g/dl)	Frequency	Percentage
Normal (13.0 or higher)	476	42.5
Mild anaemia (11.0 to 12.9)	316	28.2
Moderate anaemia (8.0 to 10.9)	194	17.3
Severe anaemia (less than 8.0)	135	12.0
Total	1,121	100.0

Prevalence of anaemia among the 15 years and above men was 57.5% (645 of 1,121 participants)

DISCUSSION

Anaemia is the commonest blood disorder affecting millions of people because of poor diet, gastrointestinal disorders, infections, malignancies and other conditions. Symptoms of anaemia are easily ignored and hence may only be diagnosed by performing a blood test.[17]

We reported the overall prevalence of anaemia as 62.9%. There appeared to be more anaemic than normal people based on this classification which is quite worrisome. However, several studies have shown than haemoglobin level of whites is higher than that of blacks which was attributed to role of iron deficiency and alpha thalassemia on haemoglobin levels.[18,19,20] Dallman *et al* [21] reported that haemoglobin concentration in blacks was found to be 0.5-1g/dl lower than income matched whites in many large studies. This might explain the overwhelmingly high rate of anaemia amongst the study group. However, according to WHO, the high prevalence of anaemia in our study has been defined as a severe public health problem which was defined as a prevalence rate of anaemia of greater than 40%.[22] Our finding is lower than a similar study done at Peshawar, Pakistan that reported prevalence of anaemia as 66.8% in their tertiary hospital.[23]

We reported that overall prevalence of anaemia in males greater than 15 years was 57.5% with less than half (42,5%) having normal haemoglobin of more than 13g/dl, while females of same age group had a prevalence of 64.8%. This finding is over 100% higher than a related study on older people in Uganda, [10] where the same cut off values were used for their study group. Anaemia was associated with heavy hookworm infestation, malaria and HIV infections. We could not determine this in our study because we relied on laboratory results some of which were incompletely filled. This was a major limitation to this study. Contrary to our findings, anaemia was lower in males compared to females. This difference may be due to the fact that the age range used for our study was wider (>15 years) and probably had more premenopausal females that were at risk of iron deficiency anaemia than postmenopausal females. Our study was conducted on haemoglobin results of patients attending a tertiary institution and not on apparently healthy individuals.

A related study performed amongst adults patients within the age range of 15 and 30 years at Hawassa University referral hospital showed an overall prevalence of anaemia to be 13%, while 58.5% had mild anaemia, 19% and 22.5% had moderate and severe anaemia respectively.[24] They also reported higher prevalence of severe anaemia in males than females. This study is very similar to ours in the sense

that the study populations were both patients attending a tertiary institution. The overall prevalence of anaemia in our study is almost 5 folds higher than what was found in this Hawassa University study. This is indeed disturbing and reflects the poor anaemia control in our environment. Many people lack the habit of routine health checks to detect ailments early enough so as to avoid resulting complications. Also poverty is another major source of poor nutrition and poor health in our environment. These issues need to be addressed. There is need to educate people on importance of being attentive to one's health needs as well as basic nutritional facts.

In children anaemia was found to be present in 62.5% of the under-fives and 66.9% in school age children. The under-five prevalence is almost similar to overall prevalence of anaemia in preschool children in the whole of Africa which was stated as 64.6% according to WHO but our finding was way higher than the WHO's cut-off for school age children stated as 25.4%.[20] Our findings was also many folds higher than a similar study done in a Teaching Hospital in North Western Nigeria that reported a prevalence rate of 18.5% in the under- five age group, while that of school age children was 9.5%.[25] We reported prevalence of severe anaemia in the under- five age group as 6.5% which is lower than findings in a related study done in South Eastern Nigeria[26] and higher than findings made by Mainasara et al.[22] Anaemia is a reflection of poor nutrition and poor health. Poor nutrition can compromise the immune function and increase susceptibility to infections.[27] Children in our environment may suffer from poor nutrition due to poverty or ignorance of their care givers leading to ill health. It is essential to educate parents and care givers on importance basic balanced meals for children. Screening for common causes of anaemia in children like nutritional deficiencies, haemoglobinopathies, etc should be commenced early in childhood to avert avoidable anaemia.

This study has shown the age distribution of anaemia amongst patients attending COOUTH but is limited by the fact that we could not tell the cause of the anaemia due to incompletely filled data by the requesting physician.

In conclusion, the prevalence of anaemia is alarmingly high in our environment. In as much as this study was done using laboratory results of patients attending our teaching hospital, the prevalence of anaemia was a lot higher than what was obtainable in other related studies within Nigeria and beyond. There is an urgent need to create campaigns geared towards reducing prevalence of anaemia through health education and health policies geared towards anaemia control.

Author contributions

This work was carried out in collaboration of all authors; and all authors read and approved the final manuscript.

Data availability

The data used to support the findings of this study are available from the site publicly.

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Conflicts of interest: None declared.

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

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