Burden of anaemia among In- and Out-Patients at the University of Benin Teaching Hospital, Benin City, Nigeria

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Abstract

Background*: On a global scale, anaemia is a significant public health problem. Most affected are developing nations including Nigeria. Anaemia, in form of low haematocrit, is the commonest haematology laboratory feature among hospital patients. It is useful as an indicator and monitor of disease burden and overall treatment outcomes in the community and hospitals.*

Objectives*: This study seeks to evaluate the overall prevalence, distribution and severity of anaemia among patients and clients receiving care from different units at the University of Benin Teaching Hospital.*

Methodology*: This study is a descriptive, retrospective study conducted at the University of Benin Teaching Hospital. Patients' haematocrit documented in various laboratory units in the hospital over a six months period were retrieved, collated and analysed. Anaemia was defined by haemoglobin levels less than 11g/dl (haematocrit less than 33%). Results were presented in tables, frequency counts and percentages.*

Result*: The overall prevalence of anaemia was determined to be 27.3%. Most cases of anaemia were mild to moderate in severity. In-patients had a higher burden of anaemia. The most severe forms occurred among patients seen at the Accident and Emergency Unit.*

Conclusion*: The prevalence of anaemia among hospital patients is high. Its treatment and control is crucial to improving general health among patients and the community at large. As such, sustainable efforts should be directed at its control in order to reduce its attendant health and socio-economic implications.*

Keywords: Burden, anaemia, hospital patients

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Introduction

The word, 'anaemia' is derived from ancient Greek words, '*an*' meaning 'not' and '*haima*' meaning 'blood'. Literally, anaemia means bloodlessness or low blood level. Technically, anaemia describes a condition in which an individual's haemoglobin level (or red cell mass) is below the lower limit (mean ± two standard deviation) of normal for individuals of same age, sex and geographical location[1,2]. The resulting functional consequence of anaemia is decreased oxygen carrying capacity of the blood and tissue hypoxia. Anaemia is not a diagnosis, but rather a feature of an underlying disease.

Worldwide, iron deficiency is the commonest cause of nutritional anaemia[3]. About 50% of all anaemia globally has been attributed to iron deficiency[4]. Nutritional anaemia is particularly prevalent among children and pregnant women in developing nations such as Nigeria[5]. Also peculiar to our environment is the impact of haemoglobinopathies (sickle cell disease), which affects about 2 to 3% of the Nigerian population[6]. About 25 - 30% of the Nigerian population carries the sickle cell trait[6, 7]. Malaria endemicity is also a significant cause of haemolysis, particularly among children under 5 years of age and pregnant women[8-10]. G6PD deficiency affects about 4 to 26% of Nigerians and 20 - 26% of the Nigerian male population[11-13]. High burden of non-communicable diseases such as hypertension and diabetis mellitus in the society is associated with anaemia of renal disease[14]. Chronic infections such as tuberculosis and HIV/AIDS contribute in no small measure to the burden of anaemia in our society. The effect of malignancies on general health and haemoglobin levels, especially in the elderly population is also noteworthy. Generally, malignancies are associated with anaemia of chronic inflammation. GIT malignancies are associated with chronic blood loss and iron deficiency. Some malignancies infiltrate the bone marrow and cause myelophthisic anaemia.

Furthermore, clinically significant blood loss occur secondary to trauma and obstetric complications in our environment. Significant anaemia is associated with increased post-operative morbidities and mortality[15]. Repetitive blood sampling also contributes to anaemia among in-patients. A recent study revealed that about 43% of female patients and 46% of male patients who were not anaemic before admission had their haemoglobin concentrations drop into anaemic range at discharge from the hospital due to iatrogenic causes, so called nosocomial anaemia[16].

Anaemia is associated with a wide range of tropical disease conditions and it significantly contributes to overall ill-health among patients. It is considered a useful indicator and monitor of disease burden in the community and hospitals[17,18]. It is therefore important to determine the burden of anaemia among hospital patients. In this locality, the burden of anaemia among patients is unknown and required investigation. This study therefore seeks to determine the prevalence of anaemia, as well as its severity among patients seen at the University of Benin Teaching Hospital (UBTH).

Methodology

This is a descriptive, hospital based, retrospective study conducted at UBTH. UBTH is a tertiary centre located in Egor Local Government Area, Benin City along Lagos-Benin expressway. UBTH offers both general and specialist health-care services to the community through its different units including Accident/Emergency Unit (A/E), General Practice Clinic (GPC), consultant outpatient department (COPD), Antenatal clinic (ANC) and hospital wards. A/E unit

attends to acutely ill patients, trauma cases and other emergency situations while GPC provides general outpatient care to non-emergency conditions and routine check-ups. COPD is the arm through which various specialties provide outpatient care and follow-up to its patients. Patients seen in the different units are admitted into the different hospital wards by the physicians as deemed fit. UBTH also receives referrals from surrounding states including Delta, Ondo and Kogi states.

In the hospital, laboratory requests for patients' packed cell volume (PCV) are made by attending physicians in the different units based on routine health checks, clinical suspicion of anaemia or as a follow-up to its treatment on both in-patient and outpatient basis. Patients' PCV results as recorded in each laboratory units at different service units in the hospital were retrieved. PCV results over a six month period from October 2013 to March 2014 were assessed, collated and subsequently analyzed. Similarly, the total number of patients seen in the different hospital units over the period of study was obtained from the UBTH records department. The population under study included patients seen in the A/E, GPC, COPD, ANC and hospital wards.

For the purpose of this study, anaemia was defined by PCV value less than 33% (equivalent to haemoglobin concentration of 11g/dl) in all patient groups, which is the lowest cut-off according to WHO definition[17, 19]. All PCV results were subsequently categorized as non-anaemia, mild anaemia, moderate anaemia and severe anaemia. Non anaemia was defined as PCV values ed 33%, mild anaemia corresponds with 30 – 32%, moderate anaemia corresponds to 21 - 29% and severe anaemia corresponds with PCV values less than 21%[17]. PCV was determined by micro-haematocrit method as previously described[20].

Table 1: Prevalence of anaemia among hospital in-patients and out-patients

Hospital Units	Normal runs(n)	Anaemc runs(n)	Total runs(n)	Incidence of anaemia per 100 runs(n)	Number of patients seen(n)	Prevalence of anaemia (%)
A/E	2232	2565	4797	53.50	5201	49.3
Hospital wards	2757	5114	7871	65.00	6856	74.6
COPD	239	670	909	73.70	85,867	0.8
GPC	1054	275	1329	2.07	23,563	1.2
ANC	3140	1466	4606	31.83	13,653	10.7

Overall Prevalence of Anaemia = 27.3%

The prevalence of anaemia was determined from ratio of number of anaemic PCV runs in the different laboratory units to the number of patients seen within the study period. Results were expressed as percentages and ratios. The frequency counts of anaemia and non-

anaemia among hospital in-patients (A/E unit, Hospital wards) and out-patients (COPD, GPC, ANC sections) were drawn into contingency tables and tested using chi-square (x^2) calculation. The level of significance was set at a probability of 5% (p value < 0.05). Statistical calculations were performed using graphic pad Instat™.

Table 2: Severity of anaemia among hospital in-patients and out-patients

Hospital Units	Grades of Anaemia	Anaemic Runs (n)	Percentage (%)
A/E	Mild	1344	52.4
	Moderate	718	27.9
	Severe	503	19.6
Hospital Wards	Mild	2607	50.9
	Moderate	1682	32.9
	Severe	825	16.1
COPD	Mild	250	37.3
	Moderate	285	42.5
	Severe	135	20.2
GPC	Mild	149	54.2
	Moderate	87	37.6
	Severe	39	14.2
ANC	Mild	1388	94.7
	Moderate	67	4.8
	Severe	11	0.8
Overall severity	Mild	5738	56.9
	Moderate	2839	28.1
	Severe	1513	14.9

Table 3: Anaemia among hospital in-patients and out-patients

	Anaemia	Non-Anaemia	Total
In-Patients	7679(39%)	4989(26%)	12668(65%)
Out-Patients	2411(12%)	4433(23%)	6844(35%)
Total	10090(52%)	9422(48%)	19512(100%)

χ^2 = 1146.1, two tailed p-value < 0.0001, OR = 2.83, 95% CI = 2.662 – 3.008.

Results

The prevalence of anaemia among patients and clients receiving care in the accident/ emergency unit, hospital wards, consultant out-patient department, general practice clinic and Antenatal clinics were found to be 49.3, 74.6, 0.8, 1.2 and 10.7% respectively (Table 1). The overall prevalence of anaemia was 27.3%. In other words, approximately 3 out of every 10 patients receiving treatment in the hospital met the criteria for anaemia as defined by this study. Most cases of anaemia observed were mild in severity. Most severe forms of anaemia (20.2%) occurred among patients seen in the Accident and Emergency Unit while about 0.8% of patients seen in the Antenatal clinics had severe anaemia (Table 2). Overall, 14.9% of all anaemic patients had severe form of anaemia.

The prevalence of anaemia among hospital in-patients is found to be significantly higher compared to outpatients (p-value < 0.0001). The odds that hospital in-patient will be anaemic is 2.83 (Table 3).

Discussion

The prevalence of anaemia is found to be significantly higher among in-patient compared to out-patients. More patients seen at the emergency rooms and Hospital wards were found to be more anaemic than patients seen at the COPD and GPC. This is expected as most critically ill patients present via the accident and emergency unit. Such patients are subsequently admitted into the hospital wards for further care. In a study in Port Harcourt, 26.8% of children presenting in the emergency unit had varying degrees of anaemia[21]. We found a high prevalence (74.6%) of anaemia among hospital in-patients.

A similar study among hospitalized elderly patients in Singapore reported anaemia prevalence of 57.1%[22]. A limitation of this study is its retrospective nature. A prospective, point-prevalence study might be useful in obtaining more accurate information. Nonetheless, this study reveals significant information on the burden of anaemia among patients and clients receiving care in a Nigerian tertiary health facility. Another limitation of this study is the determination of anaemia using PCV which might not totally be a reliable measurement of haemoglobin concentration or red cell volume. However, a positive linear correlation exists between haematocrit and haemoglobin concentration[23]. As a rule of thumb, PCV is equivalent to 3 times the haemoglobin concentration levels though conditions such as patient's hydration status may impact on PCV level, making it less reliable.

Inadequate documentation of results by laboratory staff and patients defaults possibly due to lack of finances may also cause an underestimation especially among patients seen in COPD. Similarly, some cases of anaemia especially mild asymptomatic cases might be missed by the attending physician.
Anaemia is considered a public health problem when its prevalence is greater than 5% of the population. Anaemia prevalence of 5 – 19.9% is considered mild, 20 – 39.9% is considered moderate, while prevalence in excess of 39.9% is considered a severe [2,5]. From our study, the overall prevalence of anaemia is found to be 27.32% of all patients receiving care in the hospital, with its greatest burden among hospital in-patients. Most other developing nations share such a high prevalence of anaemia[24]. In a study involving 161 institutionalized children in South-West Nigeria, anaemia prevalence was reported to be 65.8% in 2013[25].

In this study, we observed that 10.7% of pregnant women were anaemic, majority were mild forms of anaemia. A survey of 227

pregnant women in a Primary Health Center in Rivers state revealed anaemia prevalence of 62.9%[8]. The significantly lower prevalence of anaemia in pregnancy observed in this study may be related to the different levels of healthcare facilities and the socio-demographics of the patients seen. Another study from Northern Nigeria observed prevalence of anaemia in pregnancy to be 24.5%[9]. In Enugu, Dim CC et al reported anaemia in pregnancy among 40.4% of the women at booking visit, 90.7% were mildly anaemic and remaining 9.3% were moderately anaemic[26].

Conclusion

Anaemia is highly prevalent among hospital patients seen at the University of Benin Teaching Hospital. There is need for attending physicians to request for at least PCV check for their patients. Computerization of laboratory data will improve access to accurate information and blood bank services should be improved to meet modern day challenges of managing anaemia.

Further studies to elucidate causes of anaemia are recommended, this will aid physicians to better direct their investigations and improve outcome of managing patients in our environment.

References

1. Wiwanitkit V. Introduction to tropical anemia. *In*: Tropical Anaemia. ; 1: 1 – 17. New York. Nova Science Publishers. 2007.
2. Sullivan KM, Mei Z, Grummer-Straw L and Parvanta I. Haemoglobin adjustments to define anaemia. Tropical Medicine and International Health. 2008; 13(10): 1267 – 1271.
3. Khallafallah AA and Mohamed M. Nutritional Anemia. *In:* Silverberg DS (ed). Anemia. 6: 75 – 92. Rijeka Croatia. *In:* Tech Publishers. 2012.
4. WHO/UNICEF/UNU. Iron deficiency anaemia: assessment, prevention, and control. Geneva, World Health Organization, 2001 (WHO/NHD/ 01.3). (http://www.who.int/nut/ documents/ida_assessment_prevention _control.pdf, accessed 27 July 2004).
5. WHO/UNICEF/UNU 2001. Iron deficiency anaemia: assessment, prevention and control. A guide for programme managers. Geneva, World Health Organization, 2001 (WHO/ NHD/01.3).
6. Fleming AF, Storey J, Molineaux L, Iroko EA and Attai ED. Abnormal haemoglobins in the Sudan savanna of Nigeria. I. Prevalence of haemoglobins and relationships between sickle cell trait, malaria and survival. Ann Trop Med Parasitol 1979; 73: 161– 172.
7. Uzoegwu PN and Onwurah AE. Prevalence of Haemoglobinopathy and Malaria Diseases in the Population of Old Aguata Division, Anambra State, Nigeria. Biokemstri. 2003; 15(2): 57 – 66.
8. Ndukwu GU and Dienye PO. Prevalence and socio-demographic factors associated with anaemia in pregnancy in a primary health centre in Rivers State, Nigeria. Afr J PrmHealth Care Fam Med. 2012; 4(1), Art. #328, 7 pages.http://dx.doi.org/ 10.4102/ phcfm.v4i1.328.
9. Gwarzo MY and Ugwa EA. The pattern of anaemia in northern Nigerian pregnant women. J. Med. Med. Sci. 2013; 4(8): 319 – 323.

10. Fowowe AA. Malaria: A Major Cause of Anemia Among Under 5 Children on Hospital Bed in State Specialist Hospital, Ondo, Ondo State, Nigeria. Available at: www.agpmpn.org/.../9716134Malaria.pdf (last accessed on 01-06-2014).
11. Ademowo OG and Falusi AG. Molecular epidemiology and activity of erythrocyte G6PD variants in a homogenous Nigerian population. East Afr. Med. J. 2002; 79: 42 – 44.
12. Luzzatto L and Gordon-Smith EC. Inherited haemolyticanaemia. *In*: Postgraduate Haematology. Hoffbrand AV, Lewis SM, Tuddenham EGD (eds). 120 – 143. Arnold, London. Wiley-Blackwell publishers. 2001
13. Egesie OJ, Joseph DE, Isiguzoro I and Egesie UG. G6PD Activity and Deficiency in a population of Nigerian Males Resident in Jos. Nigerian Journal of physiological Sciences 2008; 23(1-2): 9 – 11.
14. Adejumo BI, Dimkpa U, Ewenighi CO, Erhabor TA, Uchunor GA, Odia SI, Ukatu E , Oji OJ and Besong EE. The Incidence of Anemia and the Impact of Poor Glycemic Control in Type-2 Diabetic Patients with Renal Insufficiency. Journal of Biology, Agriculture and Healthcare. 2013; 3(13): 130 – 136.
15. World Health Organisation. Surgical care at the district hospital. WHO, Geneva, 2003. Available at:http://www.who.int/bct/Mainareasofwork/DCT/documents/9241545755.pdf. Last accessed on 27th July, 2004.
16. Kurniali PC, Curry S, Brennan K, Velletri K, Schwartz KA and Elise MM. Incidence of Hospital Acquired Anemia. Blood. 2013; 122(21): 1700.
17. World Health Organisation. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. 2011, WHO/NMH/NHD/MNM/11.1
18. Bates I, McKew S and Sarkinfada F. Anaemia: A useful indicator of neglected disease burden and control. PLoS Med. 2007; 4(8): e231. doi:10.1371/journal.pmed.0040231.
19. DeMaeyer EM. Preventing and Controlling iron deficiency anaemia through primary health care. World Health Organization, Geneva, 1989.
20. Briggs C and Bain BJ. Basic Haematological techniques. Bain BJ, Bates I, Laffan MA, Lewis SM(eds). Dacie and Lewis Practical Haematology. 11 ed. Elsevier Churchill Livingstone 2012; 3: 23 – 56.
21. George IO, Otaigbe BE. Anaemia in Critically Ill Children - A Case Study from Nigeria. International Journal of tropical disease & health. 2012; 2(1): 55 – 61.
22. Rong M, Tay J and Ong YY. Prevalence and Risk Factors of Anaemia in Older Hospitalised Patients. Proceedings of Singapore Healthcare. 2011; 20(2): 71 – 79.
23. Bhokaisawan N and Chinayon S. The correlation between haematocrit and haemoglobin. Chula Med J. 1982; 26: 15 – 21.
24. World Health Organization. Worldwide prevalence of anaemia 1993 – 2005. WHO, Geneva 2008. ISBN 978-92-4-159665-7.
25. Brown BJ and Oladokun RE. Health status of children in institutionalized homes in South West Nigeria. The Nigerian postgraduate medical Journal 2013; 20 (3): 168 – 173.
26. Dim CC and Onah HE. The prevalence of anaemia among pregnant women at booking in Enugu, South-Eastern Nigeria. Med Gen Med. 2007; 9(3): 11.