Journal of Medical Research and Health Sciences
Received 19 July 2022 | Revised 28 July 2022 | Accepted 27 Aug 2022 | Published Online 23 Sept 2022

DOI: https://doi.org/10.52845/JMRHS/2022-5-9-5

JMRHS 5 (9), 2250–2255 (2022)

ISSN (O) 2589-9031 | (P) 2589-9023

Research Article **Open Access**

Prevalence of Post-Operative Anaemia and its Complications among Obstetric and Gynaecological Patients in Enugu

Onyekpa Ij,[1,2] Odugu Bu,[1] Nweze So[1]

Corresponding Author: Onyekpa Ij

[1]Department of Obstetrics and Gynaecology, Enugu State University of Science & Technology Teaching Hospital/ College of Medicine, Enugu
[2]SEMINO Specialist Hospital Abakpa-Nike, Enugu

Abstract

Background: Anaemia is a common condition among patients especially in the developing world. The prevalence of post-operative anaemia varies widely from centre to centre across all surgical specialties. It is often a reflection of pre-operative anaemia and poor pre-operative work-up. Some modifiable risk factors associated with anaemia include ignorance, illiteracy and poverty, and these factors are more in the developing countries of the world. Post-operative anaemia is associated with various complications which may include wound sepsis, poor wound healing, pneumonia, venous thrombosis, stroke, delirium, acute myocardiac infarction and cardiac failure. The consequences of these complications could range from increased cost of treatment to increased length of hospital stay and to mortality.

Aim: To determine the prevalence and complications of post-operative anaemia among obstetric and gynaecological patients in a tertiary hospital

Materials & method: It was a prospective, cohort study of 320 women who had surgery in the department of obstetrics and gynaecology for either obstetric or gynaecological indications. Data was collected using a structured proforma and analyzed using Statistical Package for Social Sciences(SPSS) version 20.0 for Windows and the results presented in tables, charts, means, frequencies and percentages

Results: The results showed that 320 participants were recruited into the study and they all completed the surgery. Majority of them were aged 36 years and above (37%), married (67.2%) and self-employed (53.1%). The prevalence of post-operative anaemia was 53.8%. The mean post-operative PCV was 28.84± 3.67 and p-value of 8.06(.001). Out of the 320 participants, 194(60.06%) had elective surgeries and 59(46.5%) of them had post-operative anaemia. On the other hand 126(39.4%) had emergency surgeries of which 68(53.5%) had post-operative anaemia (p-value of 0.001). Furthermore, 40(12.5%) of the 320 participants had surgical wound infections; 32(80%) of them had anaemia while 8(20%) had normal, acceptable pcv levels.

Conclusion

Key words: Prevalence, Post-Operative, Anaemia, Complications, Obstetric, Enugu

Introduction

Anaemia, a common condition in which the number of red cells (and consequently their oxygen carrying capacity) is insufficient to meet the body's physiological needs and it is a global public health challenge [1,2]. According to the WHO it is diagnosed when the haemoglobin concentration is below 11g/dl. However, experience has shown that patients from the developing countries like Nigeria do well with haemoglobin concentration of between 10g/dl and 11g/dl without apparent ill effects [3]. Often times, post-operative anaemia is a reflection of pre-operative anaemia and work-up prior to surgery [4,5]. The prevalence of post-operative anaemia vary from centre to centre and from country to country depending on the population, type of surgery, extent and duration of surgery, surgical specialties studied and the experience of the surgeon; and can range from 80% to 90% after major surgeries[6]. A search of the literature revealed scarce data on post-operative anaemia among obstetric and gynaecological patients in Nigeria. In a study of all surgical patients at Rivers State University Teaching Hospital Port-Harcourt, the prevalence of post-operative anaemia was found to be 70% [7]. In Uganda, a study of post-caesarean section patients gave a post-operative severe anaemia prevalence of 6.79% [8]. In a secondary analysis of a prospective observational CESARO-study using 800 adult patients undergoing elective surgeries from various operative disciplines across seven hospitals ranging from university hospitals, district general hospitals to specialist clinics of minimally access surgery in Germany, the prevalence of post-operative anaemia was 49.2% [9]. Some modifiable risk factors associated with anaemia include ignorance, illiteracy and poverty, and these factors are more in the developing countries of the world [4,10]. Post-operative anaemia is associated with various complications which may include wound sepsis, poor wound healing, pneumonia, venous thrombosis, stroke, delirium, acute myocardiac infarction and cardiac failure [8,11-15]. All these can lead to increased cost of treatment and length of hospital stay

This study became necessary to bridge the gap in the knowledge about post-operative anaemia and its consequences among obstetric and gynaecological patients in our centre and by extension in the developing countries of sub-Saharan Africa.

Aim: The aim of the study was to determine the prevalence of post-operative anaemia and its complications among obstetric and gynaecological patients Enugu

Objectives: To determine the:

- Prevalence of post-operative anaemia
- Relationship between class of surgery and post-operative anaemia and class of surgery
- Mean post-operative PCV
- Post-operative wound infection

among obstetric and gynaecological patients in Enugu

Materials & Methods: This was a prospective, cohort study of women who had surgery at the ESUTH either for obstetric or gynaecological indications. Patients who met the inclusion criteria were recruited after adequate counseling and an oral informed consent obtained. It was ensured that a pre-operative PCV of the patient was obtained and documented. The intra-operative blood loss is visually estimated using an average of the surgeon's and anesthetist's values. Blood is given intra-operatively if the pulse rate rises by more than 40% of the baseline or if the estimated blood loss is greater than 1 litre. Post-operative PCV is done between the 2^{nd} and 5^{th} day post surgery. The wound dressing is finally removed between the 5^{th} and the 7^{th} day post surgery for inspection before discharge. For the purpose of this study, post-operative anaemia is defined as PCV between the 2^{nd} and 5^{th} day post surgery of less than 30%. The relevant data was collected with a structured proforma

Study Area/Centre: The study was done in ESUTH Enugu, a tertiary hospital in the capital of Enugu State, south-East, Nigeria. The centre serves as a training centre for undergraduates and resident doctors. It also receives referrals from all the surrounding states of Abia, Ebonyi, Imo and Anambra.

The packed cell volumes were determined by collecting about two millilitres of venous blood from the ante cubital vein using Ethylene Diamine-Tetra Acetic Acid (EDTA) impregnated sample bottles for each of the subjects. The blood was then collected with capillary tubes and centrifuged at 10000 cycles per minute for 5 minutes. Subsequently the values of the packed cells were read off using a haematocrit reader.

Inclusion criteria: All conscious, obstetric and gynaecological patients who were at least 18 years old with pre-operative PCV of at least 30% who had surgery in ESUTH within the time under study for either obstetric or gynaecological indications.

Exclusion Criteria: Any patient whose pre-operative PCV could not be ascertained or whose Pre-operative PCV was less than 30% or who declined consent.

Sample size estimation: The sample size was calculated using Kiesh Leslie formula:

$$\mathbf{N = Z^2pq/d^2}$$

N is the desired sample size

Z is the standard normal deviate usually set at 1.96, which corresponds to the confidence interval

P is the proportion of pregnant women with anaemia from a previous similar study[7] which in this case is 0.7

q is complementary proportion equivalent to 1-0.7%, equal to 0.3%

d is the degree of accuracy desired which is 5.0% (0.05%).

From the formula above an estimated sample size of 320 rounded off to the nearest whole number was calculated

Data Analysis: Data collected from the study was analyzed using Statistical Package for Social Sciences for Windows version 20.0 and presented in tables, charts, means, frequencies and percentages.

Results:

The results showed that 320 participants were recruited into the study and they all completed the surgery. Majority of them were aged 36 years and above (37%), married (67.2%) and self-employed (53.1%). The prevalence of post-operative anaemia was 53.8%. The mean post-operative PCV was 28.84± 3.67 and p-value of 8.06(.001). Out of the 320 participants, 194(60.06%) had elective surgeries out of which 59(46.5%) had post-operative anaemia. On the other hand 126(39.4%) had emergency surgeries out of which 68(53.5%) had post-operative anaemia (p-value of 0.001). Furthermore, 40(12.5%) of the 320 participants had surgical wound infections; 32(80%) of them had anaemia while 8(20%) had normal, acceptable pcv levels.

.Table 1: Patients bio-data

Variable	**Frequency**	**Percentage**
Age Group		
<25 years	73	22.8
26-30 years	55	17.2
31-35 years	74	23
36 years and above	118	37
Marital Status		
Married	215	67.2
Single	76	23.8
Widow	29	9.1
Occupation		
Public Servant	91	28.4
Self-employed	170	53.1
Unemployed	59	18.4

Table 2: Prevalence of Post-Operative Anaemia

Variable	**Frequency**	**Percentage**

Anaemia	172	53.8
Normal	148	46.3

Table 3: Mean post-operative PCV

Variable	Mean	Standard Deviation	t(p value)	C.I
Anaemia	26.97	4.66	8.06 (0.001)*	2.37-2.84
Normal	30.06	2.08		
Total	28.84	3.67		

Table 4: Distribution of anaemia based on the class of surgery

	N (%)	N (%)	N (%)		
Variable	Anaemia	Normal	Total	X^2 (p value)	Odds
Elective	59(46.5)	135(69.9)	194(60.6)	16.73(0.001)	0.37
Emergency	68(53.5)	58(30.1)	126(39.4)		
Total	127(100)	193(100)	320(100)		

Table 5: Distribution of post-operative wound infection based on post-op anaemic status

	N (%)	N (%)	N (%)	
Variables	Anaemia	Normal	Total	X^2(p value)
Wound infection	32(25.2)	8(4.1)	40(12.5)	11.98(0.002)
No wound infection	95(74.8)	185(95.9)	280(87.5)	
Total	127(100)	193(100)	320(100)	

Discussion:

The aim of this was to determine the prevalence of post-operative anaemia among obstetric and gynaecological patients in ESUTH. From the study, the prevalence of post-operative anaemia was found to be 53.8%. This result was despite the use of 30% as the lower limit of normal packed cell volume against the WHO lower limit of 33% (haemoglobin level of 11g/dl) [3]. This implies that if the WHO standards were to be maintained in our centre, a larger chunk of our patients would be diagnosed with post-operative anaemia. As noted earlier, the prevalence of post-operative anaemia varies from country to country and from centre to centre within the same centre with a range of 80 to 90% recorded [6]. This value is based on the WHO criterion and seems to agree with our value of 53.8% which if extrapolated would give a much higher values.

In a study carried out in Rivers State, south-south Nigeria the prevalence of post-operative anaemia was 70% [7]. This result differed from our study and this could be due to the difference in the criteria for diagnosis employed and possibly due to the fact that the participants for the Rivers state study were drawn from all surgical specialties as against our study carried out among obstetric and gynaecological patients only. The two study centres are also located in different geopolitical zones with different population demographics. Among post caesarean section patients in Uganda [8] the prevalence of post-operative severe anaemia was 6.79%. This may not be easily compared with our study as their emphasis was on severe anaemia. In a secondary analysis of a prospective cohort study, a multi-centric observational study among 800 adult patients undergoing elective surgery, post-operative anaemia was found to be 49.2% [8]. This was similar to our result despite the obvious differences between the two studies in all ramifications.

In a study in 2 centres in Ogbomosho, Osun state [16], the mean PCV on the second post-operative day was 30.31±4.795 as against our mean value of

28.84± 3.67. The values from these two studies all fall within the moderate anaemia zone based on the WHO standard despite the variations in the methodologies employed in the two studies. Of the 127 patients who had anaemia 59(46.6%) had elective surgeries the rest, 68(53.5) had emergency surgeries. This is probably due to the fact that there was no room for pre-operative optimization of patient prior to most emergency procedures as against elective. This can be explained by an earlier finding that a pre-operative anaemic state predisposes to post operative anaemia[17].

The study showed that 40(12.5%) out of the 320 participants developed wound infections. Of these 40 participants, 32(80%) had post-operative anaemia whereas 8(20%) had normal blood levels based on the criterion used in the study. In a prospective cohort study in Lagos [18], in 2011, 176(19.4%) patients who had caesarean section developed wound infection and one the implicated factors was excessive blood loss which invariably would translate to post-operative anaemia (aOR=5.05;95% CI=2.18-11.66;P=0.0002). This was a little higher 12.5% prevalence value and p value of 0.002 seen in our study. The study in Lagos was in a different geopolitical zone and involved a much more number of participants than our study. In another study in Pakistan among women who had Pfannenstiel incision [19] 24(18.5%) of the post-operative anaemic patients had surgical wound infections. The cut-off for anaemia here was 33%(11g/dl) pcv according to WHO. The result here differed from our finding of 12.5% which can be explained on the basis of a different criterion for diagnosis and the fact that the study was in a different continent and among different populations. Were our study to have pegged the cut-off for pcv at 33% the prevalence of wound infection would have been higher. In essence, one can infer from the above scenario that post-operative and by extension, peri-operative anaemia is a major risk factor for postoperative surgical site infection.

Conclusion: There is a high prevalence of post-operative anaemia among women who had either a gynaecological or obstetric surgeries in ESUTH and that this condition is a significant risk factor for post-operative wound infection.

Recommendations: Patients should be optimized prior to surgeries or if an emergency, surgery efforts should be targeted towards early detection and correction of anaemia to improve overall post-operative outcome

Acknowledgment: We acknowledge the head of the department of Obstetrics & Gynaecology, the ethics committee of the hospital for the permission to carry out the study in there facility

Disclosure of conflict of interest: There was no conflict of interest in the course of this study

Statement of informed consent: A written informed consent was obtained from the participants prior to recruitment into the study

References:

1. Milman N. Anaemia, still a major health problem in many parts of the world. Ann Hematol 2011;90:369-77
2. WHO. Haemoglobin Concentrations for Diagnosis of Anaemia and Assessment of Severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization,2011 (WHO/NMH/NHD/MNM/ 11.1) (http://www.who.iny/vmnis/indicators/ haemoglobin.pdf. accessed 24th April,2022)
3. Omigbodum AO. Recent Trends in Management of Anaemia in Pregnancy. Tropic J Gynaecol 2004;21:1-3
4. Ugwu EOV, Obioha K, Okezie O. A Five-year Survey of Caesarean Delivery at a Nigerian Tertiary Hospital. Annals of Medical and Health Sciences Research. 2011; 1(1): 77-83.
5. Musailam KM, Tamim HM, Richards T, Spahn DR, Rosendal FR, Habbal A et al. Pre-operative Anaemia and Post-operative Dutcomes in Non-cardiac Surgery: A Retrospective Cohort Study. Lancet 2011; 378(9800):1396 – 407.
6. Gomez-Ramirez S, Jerico C, Munoz M. Peri-operative Anaemia: Prevalence, Consequences and Parthophysiology. Transfus Apher Sci. 2019;58(4):369-74
7. Kalio DG, Eli S,Okagu KE,and Allagoa DO. Prevalence of Post-operative Anaemia in Surgical Patients at the Rivers State University Teaching Hospital. World Journal of

Advanced Research and Reviews, 2021;10 (10):218-23
8. Sivahikyako SA, Owaraganise A, Tibaijuka L et al. Prevalence and Factors Associated with Severe Anaemia Post-caesarean Section at a Tertiary Hospital in South-western Uganda. BMC Pregnancy Childbirth. 2021;21:674.
9. Kunz JV, Spie3s CD, Bichmann A, Sieg M, Mueller A. Post-operative Anaemia Might be a Risk Factor for Post-operative Delirium and Prolonged Hospital Stay: A Secondary Analysis of a Prospective Cohort Study. PLOS ONE 15(2):e0229325. https://doi.org/10.1371/journal.pone.0229325
10. Anorlu RI, Oluwole AA, Abudu OO. Socio-demographic Factors in Anaemia in Pregnancy at Booking in Lagos Nigeria. Journal of Obstetrics and Gynaecology. 2006; 773-776.
11. Kaira S, Thilagar B, Khambaty M, et al. Post-operative Anaemia After Major Surgery: A Brief Review. Curr Emerg Hosp Med Rep 2021;9:89-95
12. Dunne JR, Malone D, Tracy JK, Gannon C, Napolithani LM. Peri-operative Anaemia: An Independent Risk Factor for Infection, Mortality and Resource Utilization in Surgery. J Surg Res 2002;102:237-44
13. Hagino T, Ochiai S, Sato E, et al. The Relationship between Anaemia at Admission and Outcome in Patients Older Than 60 Years with Hip Fracture. J Orthop Traumatol 2009;10:119-22
14. Foss NB, Kristensen MT, Kehlet H. Anaemia Impedes Functional Mobility After Hip Fracture Surgery. Age Ageing 2008;37:173-8
15. Kulier A, Levin J, Moser R, et al. Impact of Pre-operative Anaemia on Outcome in Patients Undergoing Coronary Bypass Graft Surgery. Circulation 2007;116:471-9
16. Aworinde OO,Olufemi Aworinde KJ,Ogunlaja oa,Olutogun TA, Akinola SE, Adeyemi AS. Optimal timing of post-operative haematocrit check in obstetric and gynaecological surgeries. Res J of Health Sci.2018;6(1)DOI: https://dx.doi.org/10.4314/rjhs.v6i1.5
17. Gladys Amponsah & Alice Charwudzi. Pre-operative anaemia and post-operative outcomes in normadic surgery patients in Central Region of Ghana. Anaesthesiol Resp Pract.2017;2017:7410960. doi:10.1155/2017/7410960
18. Kabiru AR, Fatima MA, Adeniyi AA, Taiwo GA, Idayat AD.Risk factors for post-caesarean wound infection in a tertiary hospital in Lagos, Nigeria. Niger Med. J. 2020,61(5):262-268
19. Mehvish Javeria, URFA TJ, ASIF HANIF. Frequency of anaemia in patients with wound dehiscence undergoing caesarean section through Pfannenstiel incision. Pakistan Journal of Medical and Health Sciences. 2017,11(2) :515-518

How to Cite : IJ, O. ., BU, O. ., & SO, N. . (2022). Prevalence of Post-Operative Anaemia and its Complications among Obstetric and Gynaecological Patients in Enugu. Journal of Medical Research and Health Sciences, 5(9), 2250–2255. https://doi.org/10.52845/JMRHS/2022-5-9-5