

Prevalence of pre-operative anemia and associated blood transfusion among obstetrics & gynecological patients in Enugu

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Abstract

Background: One of the major preparations before any surgery is to ensure that the patient has adequate blood levels. Anemia, according to the WHO is 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. It is diagnosed as hemoglobin concentration of less than 11g/dl and 12g/dl in pregnant and non-pregnant women respectively. However, Nigerian women with hemoglobin levels between 10g/dl and 11g/dl go through pregnancy and surgeries without any apparent ill effects.

Aim: To determine the prevalence of pre-operative anemia and associated transfusion among gynecological and obstetric surgical patients in a tertiary hospital

Materials & Methods: This a retrospective study of 596 patients who had surgeries in the obstetric and gynecological department of ESUT in 2021 due to various obstetric or gynecological indications. Data was collected with a structured proforma and analyzed using Statistical Package for Social Sciences computer software for Windows version 20.0 presented in tables, charts, means, frequencies and percentages.

Results: The results of the data analysis are presented in the tables below. Table 1 showed the distribution of the patients according to their age, marital status and occupation. Majority of the patients, 209(35%) were above 36 years whereas 141(23.7%) were less than 25 years. Four hundred and three (67.7%) were married whereas 51(8.6) were widowed. Of all 320(53.7) were self-employed whereas 115(19.3%) were unemployed.

Keywords: Prevalence; Pre-Operative; Anemia; Transfusion and Enugu

1. Introduction

One of the major preparations before any surgery is to ensure that the patient has adequate blood levels. Anemia, according to the WHO is 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. It is diagnosed as a hemoglobin concentration of less than 11g/dl and 12g/dl in pregnant and non-pregnant women respectively [1]. However, Nigerian women with hemoglobin levels between 10g/dl and 11g/dl go through pregnancy and surgeries without any apparent ill effects. Thus in practice, only anemia with hemoglobin levels lower than 10g/dl (packed cell volume, PCV of 30%) is deemed worthy of further investigations and treatment in our environment [2]. It is a common feature in patients presenting for major surgeries and considered an independent risk factor associated with adverse outcome [3,4]. Pre-operative anemia was found to be common and equal between genders (39.5%) and associated with a 5-fold increase in the odds of post-

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operative mortality [5]. In the developing countries of sub-Saharan Africa where there is a high rate of poverty and illiteracy anemia is common. This high prevalence of anemia results from multiple factors such as infections, poor nutrition and other co-morbidities [6,7]. A study done among antenatal women in ESUTH, many of whom might deliver by caesarean section showed an anemia prevalence of 65.1% of which 41.9% were mild, 18.6% moderate and 4.6%, severe [8], at the Rivers State University Teaching Hospital, 272(73.5%) had pre-operative anemia while 40(10.8%) required blood transfusion [6]. In the University Hospital Northwest, Ethiopia, it was found to be 36.8% [9].

In most cases, women are more likely to develop anemia than men due to their recurrent blood loss during menstruation [1,10,11] and also due to the fact that women have lower circulating blood volumes and reduced cell mass. This may result in more blood transfusions, more adverse outcomes post-operatively and with higher cost of treatment. Hence, it is advised that patients billed for major surgeries with pre-operative hemoglobin less than 13g/dl (in our environment 10g/dl) irrespective of gender be considered at risk for adverse outcomes and be optimized before surgery [12]. In an American study among gynecological patients, pre-operative anemia was found to be 23.9% and this was independently and significantly associated with increased odds of 30-day mortality and composite morbidity. However, the associated risk did not appear to be corrected by use of peri-operative transfusion [13], but treatment with intravenous iron before surgery was proven to be effective in treating it [14]. Data regarding the prevalence of pre-operative anemia among gynecological and obstetric patients and its consequences in our environment is scarce. Bearing in mind that our women have and tolerate lower hemoglobin levels, it becomes important to undertake this study.

Aim

The aim of this study was to determine the prevalence of pre-operative anemia among gynecological and obstetric surgical patients in ESUTH Enugu

Objectives

To determine

- The prevalence of pre-operative anemia
- Average pre-operative packed cell volume
- Prevalence of blood transfusion

Among gynecological and obstetric surgical patients in Enugu

2. Material and methods

This was a retrospective study of all the gynecological and obstetric patients who had surgeries in ESUTH from December 31 to January 1, 2021. Data was collected after getting approval from the head of department of obstetrics and gynaecology using a structured proforma. The source of data was the patients' case files. For the purposes of this study, pre-operative anemia is defined as pre-operative hemoglobin concentration of less than 10g/dl (PCV<30%) and pre-operative packed cell volume is any packed cell volume done within 1 week before the surgery.

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 cell were read off using a haematocrit reader.

2.1. Study area

The study was carried out in Enugu State University of Science and Technology (ESUT), Teaching Hospital, Enugu, a state owned tertiary hospital in the capital of Enugu state, South-East, Nigeria. Enugu state is one of the five states in the South-East geopolitical zone of Nigeria. It was created in 1991 from the old Anambra state. It lies partly within the semi-tropical rain forest belt of the south and has an area of about 7,161km. It shares borders with Abia State to the South, Ebonyi State to the East, Benue State to the North-East, Kogi State to the North-West and Anambra State to the West. It has a population of approximately 3.3 million which are predominantly Igbo with pockets of other tribes [15].

2.1.1. Inclusion criteria

All obstetric and gynecological patients who had surgery in ESUTH within the time under study.

2.1.2. Exclusion Criteria

Any patient whose pre-operative PCV could not be ascertained.

2.2. Data Analysis

Data collected from the study was analyzed with the Statistical Package for Social Sciences (SPSS) computer software version 20.0 for Windows. Results were presented using tables, frequencies, means and percentages.

3. Results

The results of the data analysis are presented in the tables below. Table 1 showed the distribution of the patients according to their age marital status and occupation. Majority of the patients, 209 (35%) were above 36 years whereas were 23%. Four hundred and three (67.7%) were married whereas 51 (8.6) were widowed. Of all 320 (53.7) were self-employed whereas 115 (19.3%) were unemployed.

Table 1 Distribution by bio-data

| Variable | Frequency | Percentage |
|-----------------------|-----------|------------|
| Age Group | | |
| <25 years | 141 | 23.7 |
| 26-30 years | 109 | 18.3 |
| 31-35 years | 137 | 23 |
| 36 years and above | 209 | 35 |
| Marital Status | | |
| Married | 403 | 67.6 |
| Single | 142 | 23.8 |
| Widow | 51 | 8.6 |
| Occupation | | |
| Public Servant | 161 | 27 |
| Self-employed | 320 | 53.7 |
| Unemployed | 115 | 19.3 |

Table 2 showed the prevalence of preoperative anemia (packed cell volume, PCV less than 30%) among the patients. Whereas 231 (38.8%) were anaemic before surgery, 365 (61.2%) had normal preoperative packed cell volume

Table 2 Prevalence of Pre-Operative Anemia

| Variable | Frequency | Percentage |
|----------|-----------|------------|
| Anaemia | 231 | 38.8 |
| Normal | 365 | 61.2 |

Table 3 Distribution of Pre-Operative Packed cell volume

| Variable | Mean | Standard Deviation | t(p value) | C.I |
|----------|-------|--------------------|-----------------|-----------|
| Anaemia | 24.71 | 3.03 | 35.87 (0.001) * | 6.25-6.97 |
| Normal | 31.32 | 1.42 | | |
| Total | 28.75 | 3.38 | | |

Table 3 showed the mean PCV of both the normal and anemic group. The mean PCV of the anaemic group was 24.71% whereas the normal patients had mean PCV of 31.32%

Table 4 shows the distribution of the patients based on the number of units of blood transfusion received before surgery. Majority 494(82.9%) did not receive any transfusion whereas Only 32(5.4%) received more than 2 units of blood before surgery

Table 4 Prevalence of blood transfusion

| Variable | Frequency | Percentage |
|-------------|-----------|------------|
| 0 | 494 | 82.9 |
| 1 | 14 | 2.3 |
| 2 | 56 | 9.4 |
| More than 2 | 32 | 5.4 |

4. Discussion

The aim of this retrospective study was to determine the prevalence of pre-operative anemia among obstetric and gynaecological patient that had surgeries in the centre within the time under study. For the purposes of this study pre-operative anemia was pegged at PCV levels less than 30%. From the results above, 231 patients had pre-operative anemia giving a prevalence of 38.8%. This is quite a high value giving that our cut-off for anemia in this study was only 30% as against 33% recommended by the WHO [1]. In a similar study in the Rivers State University of Technology Teaching Hospital, the prevalence of pre-operative anemia was found to be 73.5%. This result was found to be way too high when compared with our finding of 38.8%. The difference may be due to various factors that differed in the two studies. The study in Rivers State was a cross-sectional study that involved all patients from all the surgical departments, obstetrics and gynaecology inclusive. This means that the patients comprised both males and females whereas our study was a retrospective study involving only females who had obstetric or gynecological surgeries. Secondly, the study from the Rivers state hospital used a cut-off point of 33% for diagnosis whereas we used 30%. These differences were enough to explain the variations in the prevalence from the 2 studies. In another study in University of Benin Teaching Hospital among paediatric surgical patients aged 0 to 17 years; the prevalence of pre-operative anemia was 12% [16]. The study though a retrospective study, the difference here may be due to the different populations studied in the 2 researches. In a cross-sectional study in Ethiopia [9] the prevalence was found to be 36.8% which was similar to our finding of 38.8%. When compared with a study done in America [13] which found a pre-operative anemia prevalence of 23.9%, the difference could result from the huge difference in the number of participants between the two studies or the cut-off for the diagnosis or the different populations studied. While our study had less than 1000 participants, the American study had 12,836 participants. This study buttresses the point that the prevalence of pre-operative anemia is high among obstetric and gynecological patients having surgeries in our centre.

The average packed cell volume of the patients from our study was 28.75% and the average for those who were anaemic was 24.71%. This means that an average woman who had surgery in our centre had anemia. This finding is worrisome as it may imply poor nutrition and failure of public health education among our women. In a retrospective study in Zaria, northwest Nigeria, the mean PCV of the pre-operative patients 13 years or above was 36.6±4.9% [17]. This was higher than the 28.75% from our study. The difference could be due to the population under study or due to the fact that the Zaria study was on elective cases only. It may also arise from the different population studied.

Despite the high proportion of patients (38.8%) who had anemia in our study, only 17.1% had blood transfusion. This shows that our people tolerate anemia a lot even in surgery as has been shown earlier [2]. A significant number of the raw data showed preponderance of emergency surgeries for which pre-operative transfusion for anemia correction was not feasible. This result differed from the finding among cardiac patients undergoing surgery in a tertiary hospital [18] where the transfusion rate was 53%. This difference may be accounted for by the peculiar medical sequelae associated with cardiac conditions. It is a known fact that patients with cardiac conditions do not tolerate anemia as much as non-cardiac patients

5. Conclusion

Despite low PCV of 30% used in this study to define the lower limit of normal blood levels as against 33% recommended by the WHO a significant proportion of our gynecological and obstetric patients were still anemic before surgery. This calls for a more concerted effort towards improved nutrition and health education to uplift the baseline hemoglobin levels of our women so as to reduce the prevalence of anemia and improve surgical outcome among them

Recommendations

We recommend nutritional supplementation for our women as a routine to improve on their baseline hemoglobin levels

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

There is no conflict of interest in the course of doing this project.

Statement of informed consent

There was no need of informed consent as the study was a retrospective study not requiring any contact with patients.

References

- [1] WHO. Hemoglobin Concentrations for Diagnosis of Anemia and Assessment of Severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, 2011 (WHO/NMH/NHD/MNM/11.1) (<http://www.who.int/vmnis/indicators/hemoglobin.pdf>. accessed 24th April, 2022)
- [2] Duarte GC, Catanoc AP, Zabeu JL, Ribeiro GN, Moschem M, de Oliveira NAG, Langhi DM, Marques Junior JFC, Mendrones-Junior A. Association of Pre-operative Anemia and Increased Risk of Transfusion and Length of Hospital Stay in Adults Undergoing Hip and Knee Arthroplasty: an Observational Study in a Tertiary Center. *Health Sci. Rep.* 2021;4(4):e448. doi:10.1002/hsr2.448.
- [3] Omigbodun. AO. Recent Trends in Management of Anemia in Pregnancy. *Tropic. J. gynaecol* 2004, 21:1-3
- [4] World health organization. Maternal Health and Safe Motherhood Program. (1992). The Prevalence of Anemia in Women: A Tabulation of Available Information, 2nd ed. World Health Organization. <https://apps.who.int/iris/handle/10665/58994>.
- [5] Beattie WS, Karkouti K, Wijesundera DN, Tait G. Risks Associated with Pre-operative Anemia in Non-cardiac Surgery: a Single Centre Cohort Study. *Anaesthesiology*. 2009, 110(3):574-81. doi:10.1097/ALN.0b013e31819878d3. PMID: 19212255.
- [6] Aaron FE, Kalio DGB, Eli S, Wichendu PN. Prevalence of Pre-operative Anemia in Surgical Patients at the RSUTH, Port Harcourt. *International Journal of Innovative Medicine and Health Science*. 2021, 13:21-26.
- [7] Aaron FE, Aaron S, Oparandu UA, Pepple DKO, Inyama AC, Nnoka VN, Tee GP and Emeghara G. Prevalence of Pre-operative Anemia in Surgical Patients at the Rivers State University Teaching Hospital. *Greener Journal of Medical Sciences*. 2022, 12(1):2276-7797
- [8] Onyekpa IJ, Odugu BU, Onah LN. Prevalence Anemia and its Socio-demographic Characteristics among Pregnant Women Attending the Antenatal Booking Clinic in ESUTH. *J Med-Clin Res & Rev*. 2021, 5(9):1-8.
- [9] Beyable AA, Barhe YW, Nigatu YA, Tawuye HY. Prevalence and factors associated with pre-operative anemia among adult patients scheduled for major elective surgeries at University Hospital in Northwest Ethiopia: a cross-sectional study. *Heliyon*. 2022, 8(2):e08921. Doi: 10.1016/j.heliyon.2022.e08921
- [10] Amare A B, Yophtshe WB, Yonas AN, Hailu YT. Prevalence and Factors Associated with Preoperative Anemia Among Adult Patients Scheduled for Major Elective Surgery at University Hospital in Northwest Ethiopia: A Cross-sectional Study. *Heliyon* 2022, 8:e08921

- [11] Guralnik JM, Eisenstaedt RS, Ferrucci L et al. Prevalence of Anemia in Persons 65 Years and Older in the United States: Evidence for a High Rate of Unexplained Anemia. *Blood*.2004, 104:2263-8
- [12] Munoz M, Ramirez SG. Pre-operative Anemia: Prevalence, Consequences and Approaches to Management. *Blood Transfus*.2015, 13(3):370-379
- [13] Richards T, Musallam KM, Nassifj,Ghazeeri G, SeoudM, Gurusamy KS, Jamali FR. Impact of Pre-operative Anemia and Blood Transfusion on Post-operative Outcomes in Gynaecological Surgery. *PloS One*. 2015,6;10(7):e0130861
- [14] Gunayidin B, Isik G, Bagcaz S, Inan G, Bonzkurt N, Ozkurt ZN, Onan MA. Retrospective Evaluation of the Effects of Preo-perativeAnemia Treatment in Gynecological and Obstetric Surgical Patients. *Turk J AnaesthesiolReanim*. 2021, 49(1):25-29
- [15] National Population Commission (NPC) (2006) Nigerian Population Census Report. National Population Commission, Abuja, 2006, 21-27
- [16] PO Adudu, IS Almeh, FO Longway. Pre-operative anemia and blood transfusion requirements in children under general anaesthesia at the University of Benin Teaching Hospital, Nigerian .*Journal Medicine in the Tropics*,2011, 13(1). DOI: 10.4314/jmt.v13i1.69332
- [17] Yakubu SY, Awwalu S, Dogara LG, Waziri AD, Mamman AI. Pre-operative packed cell volume and category of surgery as predictors of intra-operative blood transfusion .*Arch Int Surg*.2017;7:95-8
- [18] Quynh Nguyen, Eric Meng, Joel Berube, Richard Bergstrom, Wing Lam. Pre-operative anemia and transfusion in cardiac surgery: a single centre retrospective study. *J Cardiothoracic Surg*, 2021, 16:109. Doi: 10.1186/s13019-021-01493-z