Prevalence of post-operative anaemia in surgical patients at the Rivers State University Teaching Hospital

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Abstract

Background: Post-operative anaemia is often a reflection of pre-operative work-up and pre-operative anaemia. In addition, post-operative anaemia is also determined by co-morbidities of patients prior to surgery. The prevalence of post-operative anaemia varies based on surgical specialties and the experience of the surgeon; prevalence rates as high as 85% have been recorded in orthopaedic surgeries.

Aim: To determine the prevalence of post-operative anaemic in surgical patients at the Rivers State University Teaching Hospital (RSUTH).

Method: This was a six months cross sectional study of the post-operative anaemia of patients who had operation at the Surgery and Obstetrics/Gynaecology departments of The Rivers State University Teaching Hospital. The permission for the study was granted by the head of department of obstetrics and gynaecology in conjunction with the head of the hospital management. The yard stick for anaemia was packed cell volume less than 33% in line with the World Health Organization (WHO). A structured proforma was used to obtain information from patient’s case notes and analyzed using SPSS version 25.

Result: Three hundred and eighty subjects were recruited for the study. Males subjects were 150 (39.5%) while females were 230 (60.5%) respectively. The mean age was 31 years. One hundred and ninety nine (52.4%) were obstetrics and gynaecological surgeries while 181 (47.6%) were non-gynaecological surgeries. The commonest indication for surgery was caesarean section representing 130 (34.2%) of the subjects. Two hundred and sixty six of the subjects (70%) had PCV less than 33%. One hundred and fifty two (40%) women had PCV less than 33% while 114 (30%) of the men had PCV less than 33%.

Conclusion: The study revealed that prevalence of post-operative anaemia amongst surgical patients at RSUTH was 70%. The post-operative anaemia amongst women was worrisome. The need to optimize patients prior to surgery cannot be over-emphasized to prevent morbidities and mortalities post-operative.

Keywords: Prevalence; post-operative; Anaemia; Surgery; RSUTH

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1. Introduction

Post-operative anaemia is often a reflection of pre-operative work-up prior to surgery [1-4]. In addition, post-operative anaemia is also determined by co-morbidities of patients prior to surgery of which sepsis is a common example [2]. The prevalence of post-operative anaemia varies based on surgical specialties and the experience of the surgeon; prevalence rates of post-operative anaemia as high as 85.8% has been documented by Kunz et al in elective orthopaedic surgeries [2,5]. Furthermore, post-operative anaemia has closely been linked to increased post-operative morbidity, mortality and increased risk of peri-operative blood transfusion [1-2]. Anaemia is defined as packed cell volume less than 33% [1-2]. The World Health Organization (WHO) has emphasized that reasonable measures need to be taken to optimize pre-operative patients, using a patient's blood management (PBM) approach [2]. The associated modifiable risk factors of anaemia are ignorance, illiteracy and poverty. These factors are more in the developing countries of the world [1,6].

There a good number of complications that are associated with post-operative anaemia [1,2-7]. In a meta-analysis involving approximately one million patients who had non-cardiac surgery, the prevalence of post-operative anaemia was high as well as other co-morbidities such as high mortality rate [5-8]. In addition, post-operative complications that may result of post-operative anaemia are sepsis, pneumonia, venous thrombosis, stroke, poor wound healing, acute myocardial infarction and cardiac failure [2,9-14].

Literature have revealed that elderly persons were more predisposed to post-operative anaemia [10]. The reason for this is some fractions of these elderly patients have some level of anaemia prior to surgery [9-14]. One of such studies conducted by WHO on elderly hospitalized patients over a 6-month time frame revealed that 50% of those patients were anaemic [10,15].

1.1. Aim

To determine the prevalence of post-operative anaemic surgical patients following surgery at the Rivers State University Teaching Hospital (RSUTH).

2. Material and methods

This was a cross sectional study of post-operative anaemic patients following Surgery and Obstetrics/Gynaecology departments of The Rivers State University Teaching Hospital over a 6 month period. The sample size of 380 was calculated using the formula \( n = Z^2pq/d^2 \). Where \( Z \) is the degree of confident = 1.96, \( P = 0.5 \), \( q = 1-p = 0.5 \), \( d \) is error margin = 0.05. The cut-off for anaemia was 33% in line with the World Health Organization (WHO). The Information was analyzed using SPSS version 25.

2.1. Sample size estimation

The sample size of 380 was calculated using the Kish Leslie formula for cross-sectional studies calculated, based on 50% prevalence of post-operative anaemia from the study by Kunz JV et al [2] and a confidence level of 95%.

\[ n = Z^2pq/d^2 \]

Where,

\( n \) 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 which in this case is 50%
\( q \) is complementary proportion equivalent to one (1), that is 1 - 0.50% equal to 0.50%
\( d \) is the degree of accuracy desired which is 5.0% (0.05%)

\[ n = 1.96^2 \times 0.50 \times 0.50 / 0.05^2 \]

\[ = 384.16 \]

This was rounded up to the nearest whole number, the reason for using 380 as the sample size.
2.2. Study Population
This study was conducted in the Rivers State University Teaching Hospital. It is a 370 bed hospital located at Harley Street Port Harcourt Local Government Area of Rivers State, South-South Nigeria. It is a tertiary health institution that provides all levels of health care services to Rivers, Bayelsa, Delta, Imo, Abia and Akwa-Ibom States. The Obstetrics/Gynaecology and surgical department are two of the clinical departments of the hospital with twelve (13) and twelve (12) Consultant Staff respectively.

2.3. Methods
The relevant information for the study were extracted from case notes of patients in the obstetrics/gynaecology and surgery departments who were eligible for the study had their information filled into a structured proforma. The content of the proforma were bio-data, socio-demographic characteristics and information on current and previous gestations.

Packed cell volume (PCV) was determined by collecting two millilitres (2mls) of venous blood. This was collected from the ante cubital vein using plastic disposable bottles for each of the subjects. The sample bottles contain ethylene diamine-tetra acetic acid (EDTA).

2.4. Packed Cell Volume estimation
The packed cell volume were obtained using a hematology auto analyser.

2.4.1. Inclusion criteria
All post-operative surgical patients including post-operative obstetric patients who had singleton pregnancy.

2.4.2. Exclusion criteria
Patients with sickle cell disease and haemophilia Post-operative obstetric patients with vaginal bleeding prior to surgery.

2.5. Data Analysis
The data were coded and analysed by using the Statistical Package For Social Sciences (SPSS) software version 25. P value <0.05 was considered significant.

3. Results
Three hundred and eighty subjects were recruited for the study. Males subjects were 150 (39.5%) while females were 230 (60.5%) respectively. The mean age was 31 years. One hundred and ninety nine (52.4%) were obstetrics and gynaecological surgeries while 181 (47.6 %) were non-gynaecological surgeries. The commonest indication for surgery was caesarean section representing 130 (34.2%) of the subjects. Two hundred and sixty six of the subjects (70%) had PCV less than 33%. One hundred and fifty two (40%) women had PCV less than 33% while 114 (30%) of the men had PCV less than 33%. For the educational status 18 (4.7%) had primary level of education, 244 (59.0%) had secondary education, 127 (32.7%) had tertiary education and 11(2.9%) had no formal education.

Table 1 Sex distribution of subjects in the study.

| Sex     | Frequency | Percentage (%) |
|---------|-----------|----------------|
| Male    | 150       | 39.5           |
| Female  | 230       | 60.5           |
|         | 380       | 100            |
Table 2 Distribution of Surgeries.

| Surgeries                                | Frequency | Percentage (%) |
|------------------------------------------|-----------|----------------|
| Obstetrics/gynaecological surgeries      | 199       | 52.4           |
| Non-obstetrics/gynaecological surgeries  | 181       | 47.6           |

Table 3 Distribution of post-operative anaemic and non-anaemic subjects.

| Subjects       | Frequency | Percentage (%) |
|----------------|-----------|----------------|
| Anaemic        | 266       | 70             |
| Non-anaemic    | 114       | 30             |
|                | 380       | 100            |

Table 4 Sex distribution of subjects with anaemia.

| Gender  | Frequency | Percentage (%) |
|---------|-----------|----------------|
| Male    | 114       | 30             |
| Female  | 152       | 40             |
|         | 266       | 70             |

Table 5 Comparison between the level of education and anaemia amongst pre-operative patients.

| Level of education | Frequency (%) | Anaemia |
|--------------------|---------------|---------|
| No formal education| 11 (2.9%)     | 11 (2.9%)|
| Primary            | 18 (4.7%)     | 15 (4.0%)|
| Secondary          | 224 (59.0%)   | 214 (56.3%)|
| Tertiary           | 127 (33.4%)   | 26 (6.8%) |
| Total              | 380 (100%)    | 266 (70%)  |

Figure 1 Distribution of educational status of the subjects
4. Discussion

The study revealed the prevalence of post-operative anaemia at the Rivers State University Teaching Hospital was 70%. This figure is higher than those in studies in Nigeria and other developed countries of the world [2-6]. However, this figure was lower than the prevalence of post-operative anaemia who had elective orthopaedic surgery as documented by Kunz JV et al. The sex distribution of anaemia were 60.5% of females compared with 39.5% for males as shown in table 1. Majority of the subjects with post-operative anaemia were from the obstetrics and gynaecology 60.5% with those who had caesarean section representing 34.2% of the subjects.

The study revealed that the post-operative prevalence of anaemia for non-obstetric and gynaecological surgeries was 30.0%. This value is in agreement with studies done in different parts of Nigeria and globally.[4-6] The non-obstetrics and gynaecological surgeries were general surgery, orthopaedic, urological, ophthalmology, ear/nose/throat surgeries and other specialties of surgery.

From the study those with tertiary level of education had the lowest prevalence of post-operative anaemia representing 6.8% of those with anaemia compared with those who had no formal education and had 100% preoperative anaemia as shown in table 5. The reason for this correlation is that those with formal education are more likely to have better nutrition with intake of haematinics in general [3-4,7-15]. In addition, subjects with tertiary level of education with co-morbidities such as HIV and tuberculosis or any other infections with depleted iron stores are more likely to seek treatment, thus improving their iron stores [5-8].

Kunz  JV et al in a study revealed the prevalence of post-operative anaemic patients who had elective orthopaedic surgery was 85.8% [2]. The post-operative patients included general surgery, obstetric, gynaecological, cardio-thoracic and vascular surgery [1-,3,10-12]. This study showed the prevalence of pre-operative anaemia amongst non-gynaecological subjects as 23.8%. [2] In the same study the the prevalence of pre-operative anaemia contributed immensely to post-operative morbidities including post-operative anaemia [1,4-5]. This was lower in some studies done in rural parts of the country [6-11]. The reason why the post-operative anaemia was higher than prevalence of pre-operative anaemia in some rural communities was because prior to surgery these patients packed cell volumes were optimized and majority of these patients had at least secondary level of education [2-4,14-17].

The mean age in this study was 31 years with prevalence of post-operative anaemia as 70.0%. In our study prevalence of post-operative anaemia amongst obstetrics/gynaecological subjects was 52.4% and for non-gynaecological subjects was 47.6%.

5. Conclusion

The study revealed the prevalence of post-operative anaemia as 70% at the Rivers State University Teaching Hospital (RSUTH). It worrisome that the prevalence of post-operative anaemia was above average for obstetrics and gynaecological patients after surgery. Even though the prevalence of post-operative non-obstetrics/gynaecological was below average there is still need to improve on their packed cell volume after surgery.

Compliance with ethical standards

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Disclosure of conflict of interest

There was no conflict of interest.
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