

PREVALENCE OF ANAEMIA AMONG PATIENTS ATTENDED PRE-ANAESTHETIC ASSESSMENT POSTED FOR OBSTETRICS & GYNAECOLOGICAL OPERATIONS AND ITS SURGICAL OUTCOME



Medical Science

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ABSTRACT

INTRODUCTION: Anaemia is estimated to contribute to more than 115 000 maternal deaths and 591 000 perinatal deaths globally per year. In high resource settings, even mild anaemia adversely effects surgical outcome and is independently associated with increased postoperative mortality, complications, and length of hospital stay. Therefore non-treatment of perioperative anaemia is considered 'substandard practice'. This study is designed to analyse such routinely recorded data and observe prevalence of anaemia in patients posted for obstetric and gynaecological operations.

MATERIALS AND METHODS: This Observational Retrospective study was conducted in MRD, ESI-PGIMSR & MC. All elective post-surgical patients who underwent surgery in between the period of January 2017 to December 2019. Total 2073 patients were present in this study.

RESULT: The severe anaemia group had 8.58 [3.65, 19.49] higher odds of experiencing any surgical complication ($p < 0.001$) compared to non-anaemic patients. Analysis of each complication showed a 33.13 [9.57, 110.39] higher odds of unexpected ICU admission ($p = 0.001$); a 7.29 [1.98, 21.45] higher odds of surgical site infection ($p < 0.001$); and 7.48 [1.79, 25.78] higher odds of requiring hospital readmission ($p < 0.001$).

CONCLUSION: Severe anaemia predisposes to postoperative complications but mild anaemia does not.

KEYWORDS

Prevalence, Anaemia, Postoperative complication.

INTRODUCTION

Anaemia is a major public health problem affecting 1.62 billion people globally.¹ Although the prevalence of anaemia is estimated at 9% in countries with high development, in countries with low development the prevalence is 43%.¹ Anaemia is estimated to contribute to more than 115 000 maternal deaths and 591 000 perinatal deaths globally per year.² The consequences of morbidity associated with chronic anaemia extend to loss of productivity from impaired work capacity, cognitive impairment, and increased susceptibility to infection,³ which also exerts a substantial economic burden.⁴

In high resource settings, even mild anaemia adversely effects surgical outcome and is independently associated with increased postoperative mortality, complications, and length of hospital stay.⁵ Therefore non-treatment of perioperative anaemia is considered 'substandard practice'.^{6,7}

Whether we can apply these findings to low income countries is an important question since the aetiology of anaemia between low and high income settings differs due to differences in the prevalence of malnutrition, life-expectancy, and age-related illness.⁸⁻¹⁰ Anaemia is disproportionately prevalent in low-socioeconomic settings where patients often cannot afford iron supplementation.⁹⁻¹²

The only data on the effect of anaemia on perioperative outcomes in low income settings comes from one combined retrospective and prospective study in India.¹³

Patient often report to hospital with a specific complaint requiring surgical intervention. Many of them suffer from other coexisting medical illness (other than surgical conditions). As a routine procedure all significant history/clinical findings and investigation status are recorded in Pre-Anaesthetic Check-up. This study is designed to analyse such routinely recorded data and observe prevalence of anaemia in patients posted for obstetric and gynaecological operations and its surgical outcome.

AIMS AND OBJECTIVES:

- To detect prevalence of anaemia in patients posted for obstetric and gynaecological operations.
- To detect correlation between anaemia and surgical outcome.
- To detect correlation (if any) between anaemia with other comorbidities

MATERIAL AND METHODS

Research Design:

Type of Trial: Observational

Type of Study: Retrospective Data Analysis

Conflict of interest: Nil

Sample Size: All post surgical patients who underwent obstetric and gynaecological surgery in between the period of January 2017 to December 2019

Study period: 3 years

Place of Study: MRD, ESI-PGIMSR & MC, Joka

Inclusion Criteria: All surgical patients who underwent obstetric and gynaecological surgery under anaesthesia with w.e.f. January 2017.

Exclusion Criteria: Emergency Surgery

Permission from Institutional Ethics Committee

Statistical Analysis:

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had greater power than unpaired tests. One-way analysis of variance (one-way ANOVA) was a technique used to compare means of three or more samples for numerical data (using the F distribution). A chi-squared test (χ^2 test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate.

The Mann-Whitney U test is a nonparametric test of the null hypothesis that it is equally likely that a randomly selected value from one sample is less than or greater than a randomly selected value from a second sample. This test can be used to determine whether two independent samples were selected from populations having the same distribution; a similar nonparametric test used on dependent samples is the Wilcoxon signed-rank test.

Z-test (Standard Normal Deviate) was used to test the significant difference of proportions. Correlation was calculated by Pearson correlation analysis. The Pearson product-moment correlation coefficient was a measure of the linear dependence between two variables X and Y. Multivariate analysis was performed by logistic regression method for calculation of risk factors. The Kaplan-Meier estimator (Kaplan-Meier survival analysis) was a non-parametric statistic used to estimate the survival function from time data.

Explicit expressions that can be used to carry out various *t*-tests are given below. In each case, the formula for a test statistic that either exactly follows or closely approximates a *t*-distribution under the null hypothesis is given. Also, the appropriate degrees of freedom are given in each case. Each of these statistics can be used to carry out either a one-tailed test or a two-tailed test.

Once a *t* value is determined, a *p*-value can be found using a table of values from Student's *t*-distribution. If the calculated *p*-value is below the threshold chosen for statistical significance (usually the 0.10, the 0.05, or 0.01 level), then the null hypothesis is rejected in favour of the alternative hypothesis.

$p\text{-value} \leq 0.05$ was considered for statistically significant.

RESULT AND DISCUSSION

Our result that severe anaemia increases the risk of surgical site infection is similar to other studies in low income countries^{14,15}. However, our finding that moderate and severe anaemia also increases the risk of other postoperative complications is novel and differs from the only other low income study on anaemia and postoperative complications¹³. Lagoo found anaemia had little effect on postoperative complications and the incidence of complications did not increase with anaemia severity¹³. The difference may be explained by our larger sample size; categorisation of anaemia severity; and broader range of surgeries in our study.

Our results suggest that mild anaemia does not predispose to complications, in contrast to studies from high income settings⁵. This may be related to differing anaemia aetiologies. In high income countries, anaemia increases with increasing age and is often related to the underlying surgical disease. However, in low income countries anaemia is concentrated in pre-school age children and women¹⁰; and has multifactorial causes involving complex interactions between nutrition, infectious diseases and other factors⁸. Globally, 80% of haemoglobinopathies occur in low income countries and are poorly treated¹⁶, further contributing to the burden of anaemic disease. That the anaemic population in low income countries is generally younger and fitter may mean they are better able to tolerate the demands of surgery, despite anaemia, compared with their older frailer counterparts in high income countries. Therefore, our results suggest that while preoperative treatment of anaemia is important, current trends in the literature towards aggressive treatment with for example, intravenous iron therapy for even mild anaemia, should be interpreted cautiously and may not be medically justified in low income settings^{17,18}.

Our finding that mild anaemia is not associated with and increase in postoperative complications may be explained by additional factors which should be considered when interpreting our results and applying them to other low income contexts. The two countries in one study, the Republic of Congo and Madagascar, both have a very low prevalence of human immunodeficiency virus (HIV) infection, 2.8% and 0.5% respectively^{19,20}. We do routinely test patients for HIV, but the prevalence of HIV is very low in our population, therefore we cannot comment on the incidence of HIV in our cohort, but in countries with a higher prevalence of HIV, complications rates may be increased. Appropriate and timely antibiotic prophylaxis is known to reduce the incidence of surgical site infections and is used routinely in our hospital according to protocol, but this may not be the case in other low income countries. Most of our patients were young and with few comorbidities

Our study has some limitations. It is retrospective in nature and we lack data on duration of surgical procedure and mean blood loss associated with the surgeries. Our participants were relatively young and undergoing both elective and emergency surgeries. Nonetheless we believe our study has a number of strengths. The sample size is large

and it adds to only one prior small study on the effect of anaemia on complications in global surgery. Complications were reviewed and collected in a standardized fashion.

CONCLUSION:

Anaemia continues to be an endemic problem of large magnitude, and the increasing trends in several developing countries point to the failures of existing approaches to alleviate this burden. In conclusion, our results indicate that severe anaemia predisposes to postoperative complications like SSI, ICU admission, Return to OR and Hospital readmission. We found that complications were less in mild anaemia which was statistically significant.

Table 1 Baseline Characteristics Of Patients Stratified By Anaemia Severity

Observations		Mild	Moderate	Severe
	Age (years) ^a	26.7 ± 20.3	18.6 ± 19.9	36.1 ± 21.0
Hb	women	11.3 ± 0.5	9.9 ± 0.9	6.2 ± 2.3
Surgical specialty	OBSTETRICS	850	560	89
	GYNACOELOGY	344	209	21
Complications	ICU admission	6 (1.3%)	7 (2.4%)	6 (21.4%)
	Return to OR	20 (4.3%)	10 (3.5%)	2 (7.1%)
	Surgical site infection	19 (4.1%)	7 (2.4%)	4 (14.3%)
	Hospital readmission	10 (2.1%)	9 (3.1%)	4 (14.3%)

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