

# PREVALENCE OF ANAEMIA IN PATIENTS VISITING PREANAESTHESIA CLINIC AND IT'S CO-RELATION WITH PERIOPERATIVE BLOOD TRANSFUSION AN OBSERVATIONAL STUDY

## Author 1-Dr. Aparna Bagle

Professor, Department of Anaesthesiology, Dr. D.Y.Patil medical college Hospital and research centre , Dr.D.Y.Patil Vidyapeeth , Pimpri, Pune, Maharashtra, India

## Author 2\*-Dr.Chandrakala

Resident, Department of Anaesthesiology, Dr. D.Y.Patil medical college Hospital and research centre , Dr.D.Y.Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India

## Corresponding Author\*-

Dr. Chandrakala

Resident, Department of Anaesthesiology, Dr. D.Y.Patil medical college Hospital and research centre , Dr.D.Y.Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India

## Abstract

**Background:** Pre-operative anaemia has been linked to poor outcomes in patients undergoing major surgical procedures. As a result, early detection and treatment of pre-operative anaemia is advised.

**Objectives:** to estimate the prevalence of anaemia in pre-anaesthetic clinic and requirement of perioperative blood transfusion.

**Material and methods:** The present observational study was done in the department of anaesthesiology at tertiary Centre for the duration of 6 months. A total of 200 patients were included in the study. Patients coming for preanesthetic checkup who were posted for elective surgery and of age 18-65 years were included in the study. According to WHO definition male patients with Hb less then 13gm% and female patients with Hb less then 12gm% will be considered anaemic.

**Results:** The prevalence of preoperative anaemia in the present study was 64.5%. Anaemia was seen most commonly in the age group 21-40 years (34.9%) and most commonly seen in males (56.6%). Anaemia was seen in 23.3% of the patients with co-morbidities. Preoperative blood transfusion was done in 20.2% of the patients with anaemia.

**Conclusion:** In the preoperative patient, anaemia creates a unique set of challenges. A thorough history and physical examination, as well as a methodical approach to diagnostic testing, are required for an accurate assessment of anaemia.

**Keywords:** Anaemia, Blood transfusion, preanesthetic clinic, prevalence.

## Introduction

Pre-anesthesia checkup (PAC) has been defined as the clinical assessment that occurs prior to the administration of anaesthesia for surgical and nonsurgical procedures.<sup>1</sup> The primary goal of this endeavour is to assess known and unknown co-morbidities that affect patients' perioperative management directly or indirectly.

Anemia is a condition in which an individual's haemoglobin (Hb) concentration and/or red blood cell (RBC) numbers are lower than normal and insufficient to meet physiological needs.<sup>2</sup> One-third of the world's population is affected by this.

The importance of haemoglobin in transporting oxygen to tissues explains the most common clinical symptoms of anaemia, which include fatigue, shortness of breath, bounding pulses or palpitations, and conjunctival and palmar pallor.<sup>3</sup> When haematological data is unavailable, clinical signs and medical history are used to diagnose anaemia.<sup>4</sup> Anaemia is defined by the World Health Organization as an insufficient circulating red cell mass, with a haemoglobin (Hb) concentration of 13 gm/l for men and 12 gm/l for women.<sup>5</sup>

Anaemia is a common and serious problem in surgical patients; approximately 40% of patients presenting for major surgery are anaemic. Patients with pre-operative anaemia have significantly higher morbidity and mortality rates and are more likely to require red cell transfusion. Pre-optimization of anaemia in surgical patients results in higher pre-operative haemoglobin concentrations and less transfusion need.<sup>6</sup>

Pre-operative anaemia has been linked to poor outcomes in patients undergoing major surgical procedures. As a result, early detection and treatment of pre-operative anaemia is advised. However, in order to effectively implement a pre-operative anaemia management protocol, the prevalence and main causes of anaemia must be estimated.<sup>7</sup>

A low haemoglobin level (13 gm/l for both sexes) is an independent predictor of peri-operative red cell transfusion. Peri-operative blood loss during major elective surgery can result in acute severe anaemia, especially in patients with low pre-operative haemoglobin. Red cell transfusions are commonly used to avoid harm because they produce a rapid increase in haemoglobin levels. However, red cell transfusions are risky, and the proportion of patients who receive peri-operative transfusions when undergoing specific major surgical procedures varies significantly between centres.<sup>8</sup> Hence, this study was conducted to know the prevalence of anaemia in pre-anaesthetic clinic and requirement of perioperative blood transfusion.

## **Material and methods**

The present observational study was done in the department of anaesthesiology at tertiary centre, Maharashtra for the duration of 6 months.

Based on the previous study done by Hong FS et al<sup>9</sup> where incidence of anemia in preoperative patients was 15%, considering the prevalence of 15%, sample size was calculated using open epi statistical software (version 3). With 95% confidence interval, sample was calculated to be 196. Considering the dropouts, total of 200 patients were included in the study.

Patients coming for preanesthetic checkup who were posted for elective surgery and of age 18-65 years were included in the study and patients undergoing surgery for emergency conditions and women undergoing cesarean section were excluded.

After obtaining approval from institutional ethics committee and informed consent from the patients, patients for study were randomly selected in a pre-anaesthesia clinic using random number table. Patient detailed history, any co-existing diseases, sign and symptoms of anaemia like breathlessness on exertion, early tiredness was noted. Clinical pallor and hemoglobin concentration was noted along with all other investigations. Type of surgery for which patient was posted, also noted. According to WHO definition male patients with Hb less than 13gm% and female patients with Hb less than 12gm% will be considered anaemic.

All of these patients were tracked using these records, and any preoperative, intraoperative, or postoperative blood transfusions were recorded. Anaemia was classified using World Health Organization (WHO) definitions.<sup>10</sup>

POPULATION	NO ANAEMIA	MILD ANAEMIA	MODERATE ANAEMIA	SEVER ANAEMIA
Children 6-59 months of age	$\geq 11$	10-10.9	7-9.9	$< 7$
Children 5-11 years of age	$\geq 11.5$	11-11.4	8-10.9	$< 8$
Children 12-14 years of age	$\geq 12$	11-11.9	8-10.9	$< 8$
Non-pregnant women (15 years of age and above)	$\geq 12$	11-11.9	8-10.9	$< 8$
Pregnant women	$\geq 11$	10-10.9	7-9.9	$< 7$
Men (15 years and above)	$\geq 13$	11-12.9	8-10.9	$< 8$

### Statistical analysis

Data was entered in excel sheet and analyzed using the Statistical Package for the Social Sciences 20(SPSS Inc. Chicago). Results were presented in tabular and graphical forms Mean, median, standard deviation and ranges were calculated for quantitative data. Qualitative data were expressed in terms of frequency and percentages. Appropriate test of significance like Chi-square test, T-test were applied to compare categorical data with P value  $< 0.05$  to be considered significant.

### Results

Mild anaemia was seen in 34% of the patients, 27.5% of the patients had moderate and only 3% of the patients had severe anaemia. So, the prevalence of preoperative anaemia in the present study was 64.5% . **(Table 1)**

**Table 1: Prevalence of preoperative anaemia**

Anaemia	Frequency (%)
No anaemia	71 (35.5%)
Mild anaemia	68 (34%)
Moderate anaemia	55 (27.5%)
Severe anaemia	6 (3%)

Majority of the patients in the present study belonged to 21-40 years (36%) and most of the patients were males (51.5%). Around 12% of the patients who underwent surgery had hypertension and 6.5% had diabetes mellitus. Preoperative blood transfusion was done in 13% of the patients and 16.5% of the patients were transfused blood intraoperatively and 14.5% of the patients had postoperative blood transfusion **(Table 2)**.

**Table 2: Characteristics of the patients.**

<b>Characteristics</b>	<b>Frequency (%)</b>
<b>Age (in years)</b>	
<20	8 (4%)
21-40	72 (36%)
41-60	67 (33.5%)
>60	53 (26.5%)
<b>Gender</b>	
Female	97 (48.5%)
Male	103 (51.5%)
<b>Co-morbidities</b>	
Diabetes mellitus	13 (6.5%)
Hypertension	24 (12%)
HTN+DM	1 (0.5%)
HTN+IHD	3 (1.5%)
Hypothyroid	1 (0.5%)
Nil	158 (79%)
<b>Preoperative blood transfusion</b>	
Transfused	26 (13%)
Not transfused	174 (87%)
<b>Intraoperative blood transfusion</b>	
Transfused	33 (16.5%)
Not transfused	167 (83.5%)
<b>Postoperative blood transfusion</b>	
Transfused	29 (14.5%)
Not transfused	171 (85.5%)

Anaemia was seen most commonly in the age group 21-40 years (34.9%) and most commonly seen in males (56.6%). Anaemia was seen in 23.3% of the patients with co-morbidities. Preoperative blood transfusion was done in 20.2% of the patients with anaemia. Around 2.5% of the patients with anaemia received an intraoperative transfusion and 20.9% of the patients with anaemia received a postoperative transfusion. Association of anaemia with gender, preoperative, intraoperative and postoperative was statistically significant when applied chi-square test ( $p < 0.05$ ). (**Table 3**)

**Table 3: Association of factors with anemia.**

Factors	Anemia		Chi-square	p- value
	Present	Absent		
<b>Age (in years)</b>				
<20	5 (3.9%)	3 (4.2%)	2.7	0.43
21-40	45 (34.9%)	27 (38%)		
41-60	40 (31%)	27 (38%)		
>60	39 (30.2%)	14 (19.7%)		
<b>Gender</b>				
Female	56 (43.4%)	41 (57.7%)	3.7	0.05
Male	73 (56.6%)	30 (42.3%)		
<b>Co-morbidities</b>				
Absent	99 (76.7%)	59 (83.1%)	1.1	0.29
Present	30 (23.3%)	12 (16.9%)		
<b>Preoperative blood transfusion</b>				
Transfused	26 (20.2%)	0	16.4	0.000
Not transfused	103 (79.8%)	71 (100%)		
<b>Intraoperative blood transfusion</b>				
Transfused	29 (22.5%)	4 (5.6%)	9.4	0.002
Not transfused	100 (77.5%)	67 (94.4%)		
<b>Post operative blood transfusion</b>				
Transfused	27 (20.9%)	2 (2.8%)	12.1	0.000
Not transfused	102 (79.1%)	69 (97.2%)		

Mean of preoperative haemoglobin was  $11.5 \pm 2.03$  and postoperative haemoglobin was  $11.2 \pm 1.4$  and difference in means was statistically significant when applied paired 't' test ( $p=0.000$ ). (Table 4)

**Table 4: Comparison between preoperative and postoperative haemoglobin.**

Haemoglobin	Mean±SD	't'	P value
Preoperative	11.5±2.03	3.9	0.000
Postoperative	11.2±1.4		

## Discussion

The present study aims to detect the prevalence of preoperative anaemia and its correlation with blood transfusion. The prevalence of preoperative anaemia was 64.5% which was more compared to the study done by Kwon HY et al<sup>11</sup> where prevalence of preoperative anaemia was 46.7% and another study done by Kim CJ et al<sup>12</sup> shows the prevalence as 28.1%.

A study done by Kim CJ et al<sup>12</sup> showed males (67%) had high prevalence of anaemia compared to females (33%) which is similar to the present study where 56.6% of the male's showed anaemia.

Our study shows that anaemic group (23.3%) had prevalence of comorbidities compared to non-anaemic group (16.9%) which is similar to the study done by Kim CJ et al<sup>12</sup> showed that the diabetes mellitus was more prevalent in the anaemic group (45.5%) than in the non-anaemic group.

The study done by Kwon HY et al<sup>11</sup> showed compared with patients with non-anaemic group, patients in anaemic group were older which is contrast to the present study where both anaemic and non-anaemic group were younger.

In our study, 20.2% of the anaemic patients had preoperative blood transfusion where as the study done by Kwon HY et al<sup>11</sup> showed 44% of the patients in the anaemic group received a preoperative blood transfusion.

Kim CJ et al<sup>12</sup> showed that the transfusion rates for RBC were more than twice as high in the anaemic group as in the non-anaemic group. (p-value <0.0001) which is similar to the present study where anaemic group had high transfusion rates both intraoperatively and post operatively.

A study done by Spahn et al<sup>13</sup> showed that the mean haemoglobin levels decreased from 13.6 ±0.4 (preoperative) to 10.6 ±0.8 g/dl (postoperative) which is similar to our study where mean Hb levels decreased postoperatively.

To address the implications of preoperative anaemia, clinicians at multiple levels (primary health practitioners, admitting clinicians, surgical and anaesthesia services) must be involved for early detection and management.

## Conclusion

In the preoperative patient, anaemia creates a unique set of challenges. A thorough history and physical examination, as well as a methodical approach to diagnostic testing, are required for an accurate assessment of anaemia. The presence of anaemia, as well as the use of perioperative blood transfusions, may have an impact on surgical outcome. While current evidence suggests that in most preoperative patients with anaemia, a lower transfusion threshold may be appropriate, the decision to transfuse must be tailored to the patient and the clinical setting.

**Limitations-**

1. Emergency cases and caesarean sections are not included in the group.
2. We have included age group of 18-65 years.

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