Evaluation of Anaemia in Patients Posted for Elective Surgical Intervention in A Tertiary Care Hospital in Rural Area

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Abstract
Background: Anaemia is a global public health problem which affects both developing and developed countries with major consequences for human health and also the social and economic development. Anaemia affects subjects of all age groups with children and pregnant females being most commonly affected. **Material And Method:** A detailed analysis was conducted in our medical college and hospital for a period of one year. A prior consent was obtained by the ethics board of our medical college. A total of 300 patients were included in the study. All the patients were analysed by the sahlis method. An informed consent was obtained from each patient prior enrolment in the study. **Results:** The mean haemoglobin level of 8.45 +/-0.85 raised to 10.27 +/-0.61 g/dl after medical treatment. Amongst them, the subjects receiving injectable, their mean haemoglobin level raised from 7.95 to 10.61 gm/dl. There was a highly significant difference amongst pre and post intervention haemoglobin level. With folic acid tablet administration, the haemoglobin level raised from 8.95 to 9.86 gm/dl. Blood transfusion was also given amongst few subjects. Amongst them the haemoglobin level raised from 7.99 to 10.32 gm/ dl. There was a highly significant difference amongst pre and post intervention haemoglobin level. There was 1 male with severe anaemia. **Conclusion:** This current study has shown a high occurrence of anaemia in patients posted for various surgeries and need for treatment before surgery but lack of awareness amongst patients as well as surgeons. Thus a larger study should be conducted to understand the actual prevalence of Anaemia in tertiary care hospitals in rural areas.
Keywords: Anaemia, Surgery, medical treatment, blood transfusion.

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Introduction

Anaemia is a global public health problem which affects both developing and developed countries with major consequences for human health and also the social and economic development. It might occur at any stages of the life cycle, but is comparatively more prevalent in pregnant women and young children. In 2002, iron deficiency anaemia (IDA) was considered to be among the most important contributing factors to the global burden of disease.[1] Anaemia is an outcome of a wide variety of causes that can be isolated, but more often coexist. Globally, the most evident contributor to the onset of anaemia is iron deficiency so that IDA and anaemia are often used synonymously. It is generally assumed that 50% of the cases of anaemia are due to iron deficiency, but the ratio might vary among population groups and in different areas depending upon the local conditions.[2] It is also observed that the presence of other micronutrient deficiencies, including vitamins A and B12, riboflavin, and copper might also increase the risk of anaemia. The effect of haemoglobin related disorder on anaemia prevalence needs to be considered within some populations. Anaemia is also an indicator of both poor nutrition and poor health. The most dramatic health effects of anaemia, i.e., increased risk of maternal and child mortality occurs due to severe anaemia, have been well documented.[3] [4] [5] In any adult population, anaemia is a major risk factor for cardiovascular health and early death. It also causes fatigue and leads to negative impact on cognitive and physical functions and even on the quality of life.[6] Many existing studies point out that anaemia among women causes increased risk of low birth weight, inadequate iron stores for the neonates, higher risk of maternal morbidity and mortality as well as a decline in mental concentration and also physical activity.[7] [8] The present study was conducted with the aim to evaluate prevalence of anaemia in patients posted for elective surgical intervention in a tertiary care hospital in a rural areas.

Material And Methods

This prospective observational study will be done in NKP Salve Institute of Medical sciences and RC, Nagpur over a period of 1 year. A detailed analysis was conducted in our medical college and hospital. A prior consent was obtained by the ethics board of our medical college. A total of 300 patients were included in the study. Patients with Hb less than 10 g / dl Hb will be included in this study. An informed consent was obtained from each patient prior enrolment in the study. All patients from new born to patients above 65 years of age were included in the study. Thorough pre anaesthetic check up was performed. Complete blood count and peripheral smear was advised. All the patients were classified under mild, moderate, severe and normal range according to the obtained values. As diagnosed and analysed with the WHO classification, a proper treatment was provided. Ranging from iron supplements (oral and injectable), folic acid supplements to B12 supplements a complete treatment for the underlying cause was provided. The subjects with lower haemoglobin values were transfused blood or blood components and taken for surgery. Patients were observed postoperatively for any complications like wound infection, burst abdomen, anastomotic leak, prolongation of hospital stay beyond 1 week etc. Questionnaire including 7 open ended questions were asked to the patient to assess awareness regarding anaemia and its treatment. All the results were documented manually and later interpreted electronically. SPSS software was used for statistical analysis. Student t test and chi square test were used for result interpretation.

Result

The present study enrolled 300 subjects between the age of 0-70 years. Table 1 shows the gender distribution of the subjects. There were 4.34% subjects between 0-5 years of age. There were 3 patients between 5-15 years of age. There were 2.43% patients between 15-25 years of age. There were 22.33% patients between 25-35 years of age. 80 subjects were between 35-45 years of age. There were only 3% patients elder than 65 years of age. There were 43.33% males and 56.67% females.

Table 2 demonstrates the categorization of subjects according to grade of anaemia. There were 24.13% males and 29.76% females with severe anaemia. There were 75.87% males and 70.24% females with moderate anaemia. On applying chi square test no significant difference was observed in the grade of anaemia amongst males and females.

Graph 1 shows the Haemoglobin Pre treatment Classification in Children between 0 to 59 months of age. All the infants had moderate anaemia between 7 to 9.9 gm/dl.

Graph 2 shows the Haemoglobin Pre treatment Classification in Children between 5 to 11 years of age. There was 1 male with severe anaemia. There were 88.89% males and 100% females with moderate anaemia.

Table 3 illustrates the mean haemoglobin levels in different types of treatment given pre and post. The mean haemoglobin level of 8.45 +/-0.85 raised to 10.27 +/-0.61 g/dl after medical treatment. Amongst them, the subjects receiving injectable, their mean haemoglobin level raised from 7.95 to 10.61 gm/dl. There was a highly significant difference amongst pre and post intervention haemoglobin level. With folic acid tablet administration, the haemoglobin level raised from 8.95 to 9.86 gm/dl. Blood transfusion was also given amongst few subjects. Amongst them the haemoglobin level raised from 7.99 to 10.32 gm/ dl. There was a highly significant difference amongst pre and post intervention haemoglobin level.

Table 4 shows the Mean and Standard deviation of hematologic parameters and other continuous variables. The mean MCH was 25.12+/- 3.170. The mean MCHC was 28.48+/- 1.794. The mean MCV was 74.43+/- 7.201. The mean Treatment duration was 3.61+/- 1.654.

Table 1: Age wise distribution

Age group (in years)	Frequency	Percentage
0-5	13	4.34
5-15	3	1
15-25	7	2.34
25-35	67	22.33
35-45	80	26.67
45-55	89	29.66
55-65	32	10.66
>65	9	3
Total	300	100

Table 2: Classification of Anaemia in Adult males and females

Classification of Anaemia*	Males		Females		P value[#]
	Frequency	Percentage	Frequency	Percentage	
Severe	28	24.13	50	29.76	0.3931, NS
Moderate	88	75.87	118	70.24	
Mild	0	0	0	0	

| Normal | 0 | 0 | 0 | 0 | |
| Total | 116 | 100 | 168 | 100 | |

*According to WHO classification of Anaemia, #- Chi square test applied, NS- Not significant
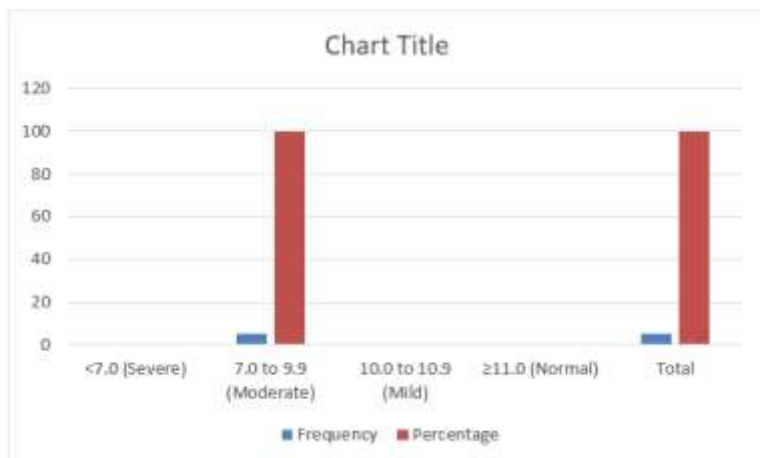
Graph 1: Haemoglobin Pre treatment Classification in Children[#] (0 to 59 months)*
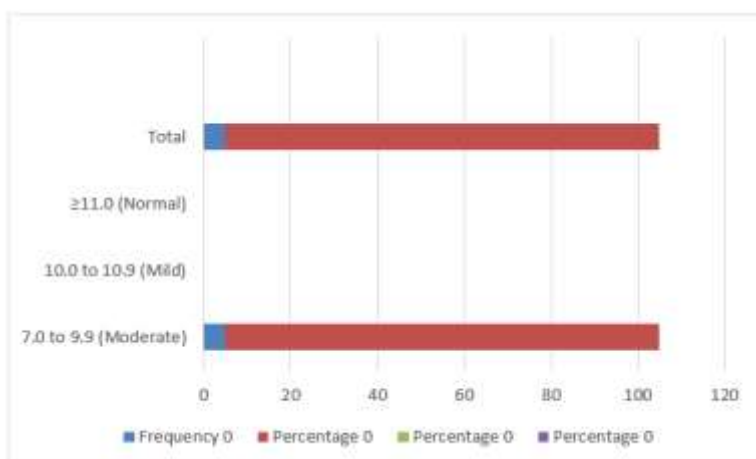
Graph 2: Haemoglobin Pre treatment Classification in Children (5 to 11 years)

Table 3: Mean haemoglobin levels in different types of treatment given pre and post

Type of treatment	Haemoglobin				
	Pre treatment		Post treatment		P value*
	Mean	SD	Mean	SD	
Medical treatment	8.25	0.85	10.27	0.61	<0.001, HS
Oral	8.45	0.77	10.03	0.48	<0.001, HS
Injectable	7.95	0.87	10.61	0.60	<0.001, HS
Folic acid tablets	8.95	0.17	9.86	0.43	<0.001, HS
Vitamin B12	8.85	0.25	9.88	0.21	<0.001, HS
Blood transfusion	7.99	0.70	10.32	0.66	<0.001, HS
Packed red cell only	7.80	0.49	10.33	0.72	<0.001, HS
Whole blood only	8.49	0.30	10.16	0.39	<0.001, HS
Both	7.79	1.00	10.49	0.75	<0.001, HS

*Paired t test is applied, HS- highly significant

Table 4: Mean and Standard deviation of hematologic parameters and other continuous variables

Hematologic parameters	Mean	SD
MCH	25.12	3.170
MCV	74.43	7.201
MCHC	28.48	1.794
Age	43.34	15.069
Duration of treatment	3.61	1.654

Discussion

The frequency of anaemia is an crucial health indicator and when used with other biochemical tests of iron status the haemoglobin level can give information regarding the severity of iron deficiency (9) Numerous guidelines havebeen established to help hospitals in the applicationof patient blood management, like the treatmentand optimisation of pre-operative anaemia [10-11] and cell retrieval [12]. Patient blood level management has been found toimprove outcome and decrease healthcare costs amongstmany studies. In patients with total knee and hip arthroplasty [13]and cardiac surgery , application of blood management of patient's has been found to lead to a decrease in transfusion, stay at hospital, morbidity and repeated admissions to hospital. Anaemia should be viewed as a serious and treatable medical condition, rather than simply an abnormal laboratory value. Depending on procedures and definition of anaemia, upto 75% of patients for elective surgery may be anaemic and upto 90% patients may have anaemia in the postoperative period. [14]Anaemia is associated with increased risks of postoperative mortality and morbidity , infectious complications , prolonged hospitalization and greater likelihood of blood transfusion reaction . Therefore an evaluation of, incidence ,types of anaemia and treatment modality is crucial in the preoperative period. This study even brings out the fact that the problem of Anaemia was related to a wider population than the traditionally considered groups of the pregnant females, lactating females and children only. The methods of determination of haemoglobin and source of blood sample source like capillary and venousblood can alter the levelof estimated haemoglobin concentration. The cyanmethemoglobin and the HemoCue system are generally recommended for use in cases of surveys to estimate the population incidence of anaemia (15).Studies have even proved that Anaemia was an indicator of poor nutrition and poor health, with major consequences on the human health as well as on the social and economic development.[16,17]In the present study, The mean haemoglobin level of 8.45 +/-0.85 raised to 10.27 +/-0.61 g/dl after medical treatment. Amongst them, the subjects receiving injectable, their mean haemoglobin level raised from 7.95 to 10.61 gm/dl. There was a highly significant difference amongst pre and post intervention haemoglobin level. With folic acid tablet administration, the haemoglobin level raised from 8.95 to 9.86 gm/dl. Blood transfusion was also given amongst few subjects. Amongst them the haemoglobin level raised from 7.99 to 10.32 gm/ dl. There was a highly significant difference amongst pre and post intervention haemoglobin level.Current study has an emphasis on the prevalence of anaemia in young males and females in North Indian population were comparatively higher as compared to the national standards. Preoperative anaemia is related with elevated morbidity[18,19] and mortality[20,21] after orthopaedic surgeries and other major surgeries, and repeated exposure to allogeneic blood transfusions.[22-24] Hb levels at admissionalso have an impact on postoperative recovery in elderly subjects with hip fractures[25,26] and on the life quality.[227]Our study even highlights the fact that the prevalence of anaemia was way more in the younger

age groups, in the lower socio-economic groups and in subjects with a sedentary life style. We would suggest that that there is a need for a well-planned, systematic and large-scale studies by using standardized methodologies to evaluate the prevalence of anaemia as well as the cause of anaemia at the basic community level among males and females in all age groups. Surgical patients with anaemia are at anelevated risk for mortality and morbidity and are mostly transfused with RBCs.[28] Red cell transfusion itself also enhances morbidity and mortality.[29] Therefore, it becomes important to diagnose and treat anaemia as part of patient blood management.

Conclusion

This current study has shown a high occurrence of anaemia in patients posted for various surgeries and need for treatment before surgery but lack of awareness amongst patients as well as surgeons. Thus a larger study should be conducted to understand the actual prevalence of Anaemia in tertiary care hospitals in rural areas. It was also seen that Anaemia is a basic predictor of many diseases; thus a larger study should be conducted to understand the actual prevalence of Anaemia at national level.

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