Platelet Count and Anemia: A Cross Sectional Study among Adult Patients in a Tertiary Care Hospital

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Abstract:

Background: Reduced levels of haemoglobin in the blood which is known as anemia is a common health issue and other blood cells (Specially platelet) has relation with it which are important to manage this condition. **Objective**: To assess the relationship of platelet count and anemia among adult patients in a tertiary care hospital. **Methods**: This cross-sectional record review study with adult patients was conducted for the duration of six months at hematology laboratory of Diabetic Association Medical College Hospital, a total 810 reports were reviewed from where 561 Hb% and platelet count related data were collected for analysis after taking permission from concern authority. **Results**: This study find that mean(±SD) platelet count among normal patient is 266476.92(±91288.69) whereas it is 263510.73(±101691.05), 346000.00±186901.55 and 480750.00(±8180.26) among mild, moderate and severe anaemia patients respectively. This difference is statistically significant ($p<0.001$). A linear regression revealed that if haemoglobin level decrease the platelet count increase significantly ($p<0.001$). This result is found from a patients group whose mean(±SD) age is 45.74(±18.21) years and females (57.2%) are predominant than male (42.8%). **Conclusion**: There is a significant inverse relation between haemoglobin and platelet count which need attention for further study for proper management of the patients.

Key word: Anemia, Platelet, Relationship, Adult, Tertiary Care Hospital

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Introduction

Anemia is a global public health issue affecting approximately 1.92 billion people and iron deficiency being the most common cause along with other common causes.[1, 2] In anemia, number of red blood cells (RBC) or the haemoglobin concentration within the RBC is lower than normal limit and any form of anemia may coexist with other hematological abnormalities, including thrombocytosis (elevated platelet count) or thrombocytopenia (reduced platelet count).[3] These alterations in platelet count can serve as important clinical indicators in the diagnosis and management of anemia.[4]

Platelets play a crucial role in hemostasis, and their dysregulation can complicate anemia management. Various studies have reported conflicting data regarding the relationship between anemia and platelet counts, particularly in adult patients.[5] For example, patients with iron deficiency anemia have been observed to have elevated platelet counts, while others with anemia of chronic disease or other etiologies may present with thrombocytopenia.[6,7] Though it is confusing some study found thrombocytosis among anaemia patients.[8] Understanding these associations is essential for clinicians, particularly in tertiary care settings where complex cases are managed.

This study aims to investigate the platelet count variations among adult patients diagnosed with anemia in a tertiary care hospital in Bangladesh. The study intends to highlight patterns that may aid in the better management of anemia, improving diagnostic accuracy and therapeutic outcomes.

Objective of the study:

To assess the relationship of platelet count and anemia among adult patients in a tertiary care hospital.

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Materials and Methods:

This cross-sectional study was conducted for a duration of six months (January to June 2024) at hematology laboratory of Diabetic Association Medical College Hospital. Source of data was record review of the hospital pathology department from where Complete Blood Count (CBC) test reports were reviewed after taking permission from concern authority. Total 810 report were collected from the laboratory irrespective of age and sex. Among them 561 were kept which were from adult patient (More than 18 years old). CBC report contains Hb%, ESR, WBC with differential count, RBC, PCV, platelet count along with other information. All the data were entered into SPSS software (Version 26) for analysis. According to analysis plan, at first all the reports which shows anemia were separated and categorized as mild, moderate and severe anemia for comparing with normal findings. For this purpose level of Hb% was chosen to find normal and anemic patient:

Table-1: Classification of anaemia according to Hb level along with normal findings

Attributes		Hb%
Normal		≥ 12 g/dl for female and ≥ 13 g/dl for male
Level of anaemia	Mild	10 to 11.99 g/dl for female and 10 to 12.99 g/dl for male
	Moderate	07 to 9.99 g/dl both female and male
	Severe	< 07 g/dl both female and male

(**Table-1** represents the **WHO classification of anemia according to hemoglobin level**.)

After that platelet count of all the test report were collected and findings were categorized as <150000, 150000 to 300000 and > 300000 per cubic millimeter (cmm) of blood groups. Then descriptive and inferential analysis were done accordingly.

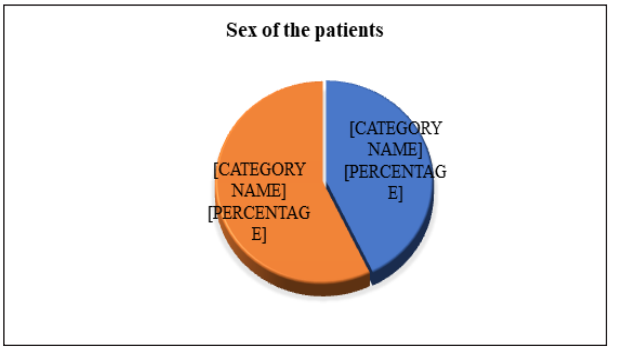
Results:

After analysis of 561 data, results are presented through the following tables and charts

Table-2: Distribution of the patients according to age group (n= 561)

Age (In years)	Frequency	Percentage
≤30	158	28.2
31 to 50	165	29.4
51 to 70	192	34.2
More than 70	46	8.2
Total	561	100.0
Mean ±SD= 45.74 ±18.21 years		

Table-2 shows that most (34.2%) of the patients belong 51-70 years age group and only 8.2% belongs more than 70 years age group



Fifure-1: Distribution of the patients according to sex (n= 561)

Figure-1 shows that among all the respondents 42.8% were male and 57.2% were female

Table-3: Distribution of the patients according to haemoglobin (Hb%) level (n= 561)

Attributes	Severity of anemia	Hb% (gm/dl)	Frequency	Percentage
Male (n= 240)	Normal	≥ 13	96	40.0
	mild	10 to 12.99	128	53.3
	Moderate	07 to 9.99	16	6.7
	Severe	< 07	00	00
Female (n= 321)	Normal	≥12	128	39.9
Mild 10 to 11.99			141	43.9
	Moderate	07 to 9.99	48	15.0
	Severe	< 07	4	1.2

Table- 3 shows that, 40.0% male and 39.9% female were within normal limit. Regarding level of anaemia 53.3% male & 43.9% female were mildly anaemic. Among the rest 6.7% male & 15.0% female were moderately anaemic.

Table-4: Distribution of the patients according to platelet count (n= 561)

Platelet count (Per cmm of blood)	Frequency	Percentage
< 150000	24	4.3
150000 to 300000	336	59.9
> 300000	201	35.8
Total	561	100.0
Mean ±SD= 275853.83 ±114185.93 /cmm of blood		

Table-4 revealed that mean(±SD) platelet count among the patients was 275853.83 ±114185.93 /cmm of blood and around 69.8% patient's platelet count was within 150000 to 300000 range.

Table-5: Analysis of variance (ANOVA) with mean±SD platelet count and level of haemoglobin of the patients with category (n= 561)

Platelet count					
Sex	**Category**	**N**	**Mean**	**SD**	
Male	Normal	96	228375.00	±87985.07	F= 3.02 df= 2 p= <0.05
	Moderate	128	247375.00	±99353.73	
	mild	16	286750.00	±84929.38	
Total 240			242400.00	±94863.60	
Female	Normal	128	297218.75	±89906.59	F= 10.25 df= 3 p= <0.001
	Mild	141	276950.35	±93405.59	
	Moderate	48	365750.00	±207192.01	
	Severe	4	480750.00	±8180.26	
	Total	321	300850.47	±120930.13	

Table-5 shows analysis of variance (ANOVA) with mean±SD platelet count and level of haemoglobin of the patients. It find that, platelet count is more among the anaemic patients than the normal and this difference is statistically significant both male ($p<0.05$) and female ($p<0.001$) patients.

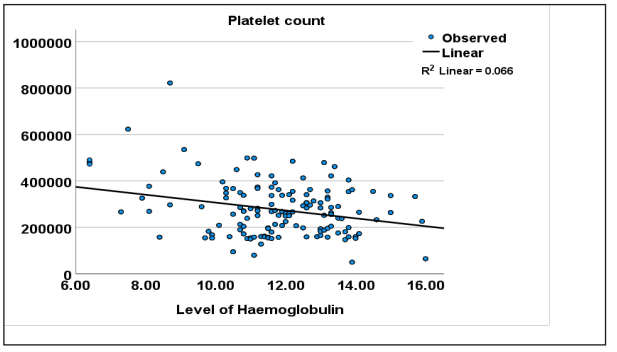


Figure-2: Regression analysis (Linear) between platelet count and level of haemoglobin of the patients (n= 561)

Figure-2 depict that when haemoglobin level is low the platelet count is high and when haemoglobin level is increasing the platelet count is decreasing and the change is statistically significant ($p<0.001$)

Discussion:

By different inferential analysis this study revealed that there is a relationship between haemoglobin level and platelet count. The relationship is inversely associated and statistically significant. When haemoglobin level decrease, the platelet count found high and when haemoglobin level increase, the platelet count is decreased significantly. This finding is similar with some other studies conducted by Bessman et al.,[5] Ruchika *et al*.,[7] Similar findings is also observed by Govind et al.,[8] in India which shows platelet count increase when level of haemoglobin decrease or patient is anaemic.

This study was conducted among the patients aged between 18 to 85 years with more female patients than male, which is quite similar to another study conducted by Govind et al in india. They also study with 18 to 85 years aged patients where females were predominant.[8]

Conclusion:

In conclusion, this study highlights a significant inverse relationship between platelet count and haemoglobin levels among adult patients in a tertiary care hospital. These results emphasize the importance of monitoring both haemoglobin and platelet levels in anemic patients for early identification of potential hematological imbalances. Further research is warranted to explore the clinical implications of this relationship and to investigate its role in patient outcomes.

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