



A STUDY OF CORRELATION BETWEEN BLOOD GROUPS AND ANAEMIA - AN ANALYTICAL CROSS-SECTIONAL STUDY ON OLDER SUBJECTS.

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ABSTRACT

Objective: This study is focused to know the co-relation between blood groups and Hemoglobin in elderly population (≥ 65 years), so that proper and regular screening and preventive measures can be undertaken so as to prevent anaemia in individuals who are prone to it. **Methodology:** This is a cross-sectional analytical study conducted on 161 individuals comprising of both male and female of age ≥ 65 years of age to find out the correlation between ABO blood group, Rh factor and hemoglobin concentration. The study was carried out in the Department of Physiology, Government Medical College Srinagar, Jammu and Kashmir, India from May 2023 to June 2023, after taking the approval of the institutional ethics committee. After taking the consent from the patient and under all aseptic precautions blood samples were taken, ABO and Rhesus blood grouping were done using the slide method and Hemoglobin concentration was estimated by Acid Haematin method. **Result:** In our study of 161 subjects comprising 77 males and 84 females with age ≥ 65 years blood group B was the most frequent blood group with frequency of about 36.64%, followed by blood group O comprising of 29.81%, blood group A comprising of 24.22% and blood group AB comprising of 9.31% respectively. Prevalence of anaemia in older subjects is 65.21%, and anaemia is more common in blood group B (72.88%) followed by blood group O (68.75%) followed by A (61.53%) and AB (33.33%) blood group respectively. Out of total study population 81.98% belonged to Rh positive and 18.01% belonged to Rh negative blood group. Out of total male subjects 58.44% had low haemoglobin concentration whereas in case of females 71.42% were having low Hb. This clearly shows that old age females are more susceptible to anaemia than old age males. **Conclusion:** Prevalence of anaemia in older subjects is 65.21%. Blood group B is the most common blood group followed by blood groups O, A and AB respectively. In old age individuals anaemia is more frequent in blood group B followed by blood groups O, A and least in blood group AB. Females are more prone to develop anaemia than men in old age. Based on their blood groups, we can advise regular screening and intake of diet rich in iron and vitamins or also recommend supplements from early ages to the individual who are more susceptible to anaemia, so that we can reduce the complication and burden of anaemia in their older ages and on the society as whole.

KEYWORDS : Blood Group, Hemoglobin, Rhesus, Anaemia.

INTRODUCTION

Anaemia is defined as a reduced absolute number of circulating RBCs or a condition in which the number of RBCs (and subsequently their oxygen-carrying capacity) is insufficient to meet physiologic needs^[1]. With 1.62 billion individuals afflicted worldwide, anaemia is a critical public health concern^[2]. Anaemia is more likely to occur not only in children, or women, but is also a matter of concern for old age people. The most common cause of anaemia in old age is due to chronic disease and due to nutritional deficiency and unexplained anaemia. Nutritional deficiencies include lack of iron, vitamin B₁₂ or folate. The most frequent nutritional anaemia is due to iron deficiency. The worldwide public health issue of anaemia has serious repercussions for both the societal and economic prosperity of both emerging and wealthy nations, as well as for individual wellbeing.

Anaemia is defined by the World Health Organization (WHO) as Hb less than 130 g/L in men older than 15 years, 110 g/L in pregnant women, and less than 120 g/L in non-pregnant women older than 15 years.^[3] Some geriatric authorities have proposed an equal Hb threshold of 12 g/dL for defining anaemia in both genders^[4]. Anaemia has been associated with a higher incidence of cardiovascular disease^[5], cognitive impairment^[6] decreased physical performance and quality of life and increased risk of falls and fractures.^{[7][8]}

Iron supplements that are frequently used to treat iron deficiency anaemia cause gastrointestinal irritation like aggravation of ulcers, nausea, vomiting, diarrhoea and constipation. So dietary supplementation should be preferred over oral supplementation and it is better to start oral

supplementation only when dietary supplementation has failed.

Blood is a unique type of connective tissue with an unalterable identity. Blood is made up of red blood cells, white blood cells and platelets in liquid called plasma. Antibodies and antigens found in the blood help to identify the blood group. Plasma contains proteins called antibodies. They are a component of our body's built-in defences. They identify foreign entities, like bacteria, and notify our immune system, which then eliminates them. Protein molecules called antigens can be detected on the outer layer of red blood cells.

There are 4 main blood groups defined by the ABO system. Blood group A has A antigens on the red blood cells with anti-B antibodies in the plasma. Blood group B has B antigens with anti-A antibodies in the plasma. Blood group O has no antigens, but both anti-A and anti-B antibodies in the plasma. Blood group AB has both A and B antigens, but no antibodies. If RhD antigen is present, your blood group is RhD positive. If it's absent, your blood group is RhD negative.

So, it would be better to combat anaemia by early and regular screening, giving the treatment to the population who are more prone to anaemia. By determining the specific population prone to anaemia, it would be easier to suggest specific dietary advice to prevent the occurrence of anaemia in such a population. The present study was conducted to find the correlation between blood group and anaemia, so that we can identify the most prone group and prevent the incidence and complications of anaemia by advising regular screening and intake of diet rich in iron and vitamins or prescribe

supplements to the individual who are more susceptible to anaemia, and thus reduce their morbidity, death, and hospitalisation.

AIMS AND OBJECTIVES:

To study and find out if there is any correlation between blood group distribution and occurrence of anaemia among old age people.

MATERIALS AND METHOD:

This is a cross-sectional analytical study conducted on 161 individuals comprising of both male and female of age ≥65 years of age .The study was carried out in the Department of Physiology, Government Medical College Srinagar, Jammu and Kashmir, India from May 2023 to June 2023, after taking the approval of the institutional ethics committee. After taking the consent from the patient and under all aseptic precautions blood samples was taken and transferred into prepared Ethylene-diamine Tetra-acetic Acid (EDTA) anticoagulant vial. The ABO and Rhesus blood grouping were done using the slide method. A drop of blood from each individual was placed on a clean dry glass slide in three places. A drop of each of the antisera, anti A, and anti B and anti D was added and mixed with each blood sample with the aid of plastic stick. Blood groups were determined on the basis of agglutination reaction. Hemoglobin concentration was estimated by Acid Haematin method. This method is based on the principle that haemoglobin present in a sample of blood is converted into acid haematin by addition of N/10 HCl to the blood and its haemoglobin content is determined by matching the brown colour of the solution against a non-fading coloured glass.

Old age individuals comprising both sexes in the age group of ≥65 years were included in the study subjects. Subjects with acute or chronic infection, chronic blood loss, individuals taking iron or vitamin supplements and Individuals taking immunosuppressive drugs were excluded from the study group.

Findings:

The study subject consisted of a total no of 161 individual's comprising of both male and female of age group ≥65 years.

Table 1: Shows sex wise distribution of ABO and Rh blood groups among old age (≥65 years) subject.

Blood Group	MALE		FEMALE		Total Rh Positive Group	Total Rh Negative Group	Total	Percent
	Rh Positive Group	Rh Negative Group	Rh Positive Group	Rh Negative Group				
A	18	4	13	4	31	8	39	24.2%
B	21	4	31	3	52	7	59	36.64%
AB	5	2	6	2	11	4	15	9.31%
O	19	4	19	6	38	10	48	29.81%
TOTAL	63	14	69	15	132	29	161	
Percent	81.81%	18.18%	82.14%	17.85%	81.98%	18.01%		

Table 1 shows the distribution of the blood groups A, B, and O and Rh. The Highest percentage of subjects are of Blood group B (36.64%), followed by O (29.81%), A (24.22%) and AB (9.31%) respectively. The distribution of RhD positive and Rh negative varies among the ABO blood groups. There are significant differences in the distribution of Rh positive and negative among the groups. This table shows that 81.81% male subjects are Rh positive while as only 18.18 % male subjects

are Rh negative. The percentage of female subjects having Rh positive is 82.14 % and Rh negative is 17.85 %.Overall we can see that 81.98 % of subjects belong to Rh positive group and only 18.01 % belong to Rh negative group.

Table 2: Shows blood group wise distribution of haemoglobin concentration.

Blood Group	Total subject in each group	%	Hb Concentration			
			< 12 gm /dl	%	>12 gm/ dl	%
A	39	24.22	24	61.53	15	38.46
B	59	36.64	43	72.88	16	27.11
AB	15	9.31	5	33.33	10	66.66
O	48	29.81	33	68.75	15	31.25
Total	161		105	65.21	56	34.78

The distribution of hemoglobin concentration obtained in this study is shown in Table 2. This table shows that 65.21 % of the study population suffered from anaemia while 34.78% had sufficient amount of haemoglobin .This table shows that the frequency of anaemia in **blood group B** is more (72.88%) followed by **blood group O** (68.75 %) which was followed by **blood group A** (61.53%) and **blood group AB** (33.33 %) respectively.

Table 3: Shows Rh blood group wise distribution of haemoglobin concentration.

Rh Group	Total subject in each group	%	Hb Concentration			
			< 12 gm /dl	%	>12 gm / dl	%
Positive	132	81.98	91	68.93	41	31.06
Negative	29	18.01	14	48.27	15	51.72
Total	161	100	105	65.21	56	34.78

Out of total study subjects 81.98 % constituted Rh positive while as 18.01 % constituted Rh negative.

Table 4: Shows Gender wise distribution of haemoglobin concentration.

GENDER	Total subject in each group	%	Hb Concentration			
			< 12 gm /dl	%	>12 gm/ dl	%
Male	77	47.82	45	58.44	32	41.55
Female	84	52.18	60	71.42	24	28.57
Total	161		105	65.21%	56	34.78 %

Table 4 shows that out of the total study subjects 161 persons , 77 subjects (47.82 %) were males while as 84 subjects (52.18 %) were females .Out of the total male subjects 45 subjects (58.44 %) were anaemic ,whereas in case of female 60 subjects (71.42 %) were anaemic . It shows that older females are more susceptible to develop anaemia.

DISCUSSION:

Anaemia is a wide spread global problem and at its worst in developing countries. The prevalence of anaemia among the elderly is rising as the population ages. Any level of anaemia in elderly people has a major impact on quality of life as well as morbidity and death. Anaemia in the elderly is underdiagnosed despite its clinical significance, and there are no evidence-based therapy recommendations. Anaemia of the elderly represents a challenge and a burden for the individual, the community and health care providers. Anaemia has been associated with a higher incidence of cardiovascular disease, cognitive impairment, decreased physical performance and quality of life, and increased risk of falls and fractures as mentioned by Reinhard Stauder and Swee Lay Thein , 2014⁹¹.

In our study of 161 subjects comprising both sexes it is obvious

that blood group B was the most frequent blood group with frequency of about 36.64%, followed by blood group O comprising of 29.81%, blood group A comprising of 24.22% and blood group AB comprising of 9.31% respectively. The distribution of Rh positive and Rh negative varies among the ABO blood groups. Out of total study population **81.98%** belonged to Rh positive and **18.01 %** belonged to Rh negative blood group.

Amiay Kumar, Rajiva Kumar Singh, in a study in 2020 consisting of 200 students aged 16-25 years had similar finding concluding that individuals with blood group B are more prone to anaemia followed by blood group O, A and least is with blood group AB.^[10] Amit Agrawal et al, 2014 in his study comprising of 10,000 healthy blood donors concluded that O was the most common blood group (37.12%) closely followed by B at 32.26%, followed by A at 22.88% while AB was the least prevalent group at 7.74%. 94.61% of the donor population was Rh positive and the rest were Rh negative.^[11]

Our study shows that the prevalence of anaemia in older subjects is **65.21 %**, and anaemia is more common in blood group **B (72.88 %)** followed by **blood group O (68.75 %)** followed by **A (61.53%)** and **AB (33.33 %)** blood group respectively. Out of total male subjects **58.44 %** had low haemoglobin concentration. Out of total female subjects, **71.42 %** were having low Hb .This clearly shows that old age females are more susceptible to anaemia than old age males.

CONCLUSION:

Prevalence of anaemia in older subjects is **65.21 %**. **Blood group B** is the most common blood group followed by blood groups **O, A and AB** respectively. In old age individuals anaemia is more frequent in blood group **B** followed by blood groups **O, A** and least in blood group **AB**. **Females** are more prone to develop anaemia than men in old age .Based on their blood groups, we can advise regular screening and intake of diet rich in iron and vitamins or also recommend supplements from early ages to the individual who are more susceptible to anaemia, so that we can reduce the complication and burden of anaemia in their older ages and on the society as whole.

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