Prevalence and Demographic Determinants of Anaemia and Its Correlation with Blood Group among Medical and Paramedical Students

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ABSTRACT

Background: Anaemia is a global health problem. Medical and para-medical students come from different regions, socio-economic status, cultural backgrounds and various geographical regions of country. This study was undertaken to find out prevalence and demographic determinants of anaemia, its correlation with blood group in medical and para medical students.

Material and methods: This cross sectional study was conducted in 344 medical and para-medical students of Rohilkhand Medical College and hospital, Bareilly. A structured schedule was used to collect the information regarding anemia and blood group typing. Data was analysed using SPSS software. Chi-square test was applied.

Results: The overall prevalence of anaemia was 29.07%. Prevalence was higher among female students (41.92%), among those aged between 25-26 years (75.00%) and among Muslims (40.54%). Prevalence of anaemia was higher among students having blood group A (33.33%) followed by group O (29.65%).

Conclusion: Blood group exhibits a strong correlation with anemia. Early identification of anaemia and its modification among these medical and para medical students is required.

Key words: Anaemia, haemoglobin, blood group, medical and paramedical students

INTRODUCTION

Anaemia is the most widespread nutritional problem of public health importance in India. [1, 2] It causes a negative impact on human health as well as social and economic development. Iron deficiency is the most important contributor to anaemia [3].

The Knowledge of blood group distribution is essential for clinical studies and provides reliable geographical information. ABO and Rh grouping is used in blood transfusion practice, population genetic studies, studying population migration patterns and resolving certain medico legal issues, such as disputed paternity cases.

ABO and Rh grouping is important in relation to disease and environment [4].

Blood groups are associated with diseases like duodenal ulcer, diabetes mellitus, urinary tract infection, Rh incompatibility and ABO incompatibility of newborn and anaemia [5]. If such correlation further exists between anaemia and blood group, then

it will help us to predict the type of population which is more related to anaemia and to recommend such population groups for taking preventive measures so that anaemia can be eradicated in them. [6] Therefore the present study was undertaken to find out the existence of any correlation between blood group and anaemia which may guide to recommend the appropriate measures in preventing the occurrence of anaemia in such population.

MATERIALS & METHODS

A cross sectional study was conducted among medical and para-medical students of the academic year 2015-16 in Rohilkhand Medical College and Hospital, Bareilly. Ethical committee approval was taken before the start of the study and informed consent was obtained from the students. Sample size consisted of all the students taking admission in medical and para-medical courses in Rohilkhand Medical College and Hospital, Bareilly, U.P., India in the academic year 2015-2016. For haematological investigations, with aseptic precaution 2 ml of venous blood from each study respondent was taken in a pre-numbered vial containing EDTA (anticoagulant). All the sample vials were sent to the central laboratory, where the haemoglobin estimation was done by the cyanmethaemoglobin method recommended by international committee for standardization in haematology (ICSH) [7] using photoelectric colorimeter and determination of blood group by slide testing method using standard procedure.

Calculations: Hb. Concentration in test (gm%) =

$$\frac{\text{Absorbance of test} \times \text{Hb conc. of standard (mg/dl)} \times 251}{\text{Absorbance of standard}}$$

Where 251 is the dilution factor [7]

Criteria For The Diagnosis Of Anaemia:[8] Anaemia was considered to exist in those whose haemoglobin levels were lower than 13 among males and 12 among female students (values given are in gm/100 ml of venous blood of persons residing at sea level).

Determination of the Blood Group [9] was done using ABO system and Rh system following standard procedures.

ABO system interpretation- Agglutination of the Red Blood Cells with the antibodies was a positive test indicating cells of A, B antigen positive and absence of agglutination indicate that cells were A,B antigen negative. If only agglutination of the RBCs with antisera A, than it was blood group A. If only agglutination of the RBCs with antisera B than it was blood group B. If agglutination of the RBCs with both antisera A & B, than it was blood group AB. In no agglutination of the RBCs with antisera A & B than it was blood group O.

Rh system interpretation-agglutination of the Red Blood Cells with the antibodies shows a positive test indicating cells of Rh positive and absence of agglutination indicate that cells are Rh negative.

Statistical analysis: Statistical Package for Social Science (SPSS) version 21.0 was used to analyse data Descriptive statistics were used to show the socio-demographic characteristics (age, sex and religion) of the anaemic student. Cross tabulations were used to see the association between different attributes. Chi-square Test was used.

To find significant difference in Anaemic and Non-anaemic students in different age groups, we used the chi square test of goodness of fit by using quanti PSY.org software.

RESULTS

Out of 344 students, 198 (57.44%) were females while 146 (42.44%) were males. Majority (41.57%) were aged between 19-20 years followed by 17-18 years (37.79 %). (Table 1)

Overall 100 (29.07%) students were found anaemic, prevalence of anaemia was higher in age group 25-26 years (75%) followed by 17-18 years age group (36.15%). It was higher among females (41.42%) and among Muslims (40.54%) (Table 1)

Higher prevalence rate (38.95%) was observed among students of blood group B followed by group O (29.65%). (Table 2)

Prevalence of anaemia was found to be higher in Blood group A (33.33%) followed by blood group B (31.34%) , O (27.45%) and AB (17.95%), the difference being statistically insignificant. (Table 3)

DISCUSSION

Prevalence of Anaemia among students

In the present study anaemia was found in 29.07 % of students, out of which prevalence of anaemia was found higher among females (41.92%) as compared to males (11.64%). Similarly Pandey et al [10] found prevalence of anaemia to be 30.20% among medical students, the prevalence of anaemia being higher among female medical students (47.37%) than males (18.96%). Bano et al [11] also found similar prevalence (32%) among medical students with prevalence of anaemia among females being 44% while in males was 20%. Kalyanshetti et al [12] also reported a similar prevalence (25.5%).

Table 1: Sociodemographic determinants of Anaemia status among students

Socio demography	Anaemic (n=100) (%)	Non Anaemic (244) (%)	Total (n=344) (%)	X² (P-value)
Age group (years)				
17-18	47 (47)	83 (34.01)	130 (37.79)	5.086 (0.0241)
19-20	33 (33.00)	110 (45.08)	143 (41.57)	4.263 (0.0390)
21-22	13 (13.00)	32 (13.12)	45 (13.08)	0.001 (0.9771)
23-24	00 (00.00)	09 (03.69)	09 (02.62)	2.478 (0.1154)
25-26	06 (06.00)	02 (00.82)	08 (02.32)	6.254 (0.0124)
>26	01(01.00)	08 (03.28)	09 (02.62)	0.690 (0.4063)
Gender				
Male	17 (17.00)	129 (52.87)	146 (42.44)	35.903 **(0.000)**
Female	83(83.00)	115 (47.13)	198 (57.56)	
Religion				
Hindu	83 (83.00)	213(87.30)	296 (86.05)	1.090 (0.2965)
Muslim	15(15.00)	22 (09.02)	37 (10.76)	2.646 (0.1038)
Christian	02 (02.00)	08 (03.28)	10 (02.90)	-
Sikh	00 (00.00)	01(00.40)	01 (00.29)	-

Chisquare test of goodness of fit was calculated by using quanti PSY.org software

Table 2: Distribution of Blood group among the students

Blood group	Total Male (n=146) (%)	Total Female (n=198) (%)	Total students (n=344) (%)
A	23 (15.75)	46 (23.24)	69 (20.06)
B	58 (39.73)	76 (38.38)	134 (38.95)
AB	18 (12.33)	21 (10.60)	39 (11.34)
O	47 (32.19)	55 (27.78)	102 (29.65)
Total	146 (100.00)	198 (100.00)	344 (100.00)

Table 3: Distribution of students according to status of anaemia in relation to blood group

Blood group	Anaemia present (%)	Anaemia absent (%)	Total (%)	X² (P-value)
A	23 (33.33)	46 (66.67)	69 (20.06)	0.761 (0.3830)
B	42 (31.34)	92 (68.66)	134 (38.95)	0.550 (0.4582)
AB	07 (17.95)	32 (82.05)	39 (11.34)	2.638 (0.1043)
O	28 (27.45)	74 (72.55)	102 (29.65)	0.184 (0.6677)

We used the chi square test of goodness of fit by using quanti PSY.org software.

Debbarma R et al [13] found prevalence of anaemia among medical students (26.62%) more prevalent among females (50.00%) than males (6.67%). Kaur et al [14] reported that prevalence of anaemia among undergraduate students was 35%, more prevalent among girls (44.8%) than the boys (17.6%). Higher prevalence of anemia (57.23%) was reported by Pal et al [15], more among females (66.87%) than males (46.62%). Mehta.[16] also reported a higher prevalence (70.83%) of anaemia among students, more prevalent among females (74.47%) than males (35.71%). Ahmed et al [17] reported a lower prevalence (14.8%) of anaemia among dental students of Bareilly, being higher (13.8%) in females and (1.6%) in males. Saxena et al [18] found lower prevalence (8.0%) of anaemia among medical students, with none of boys being anaemic. Sah et al [19] and Agarwal AK et al [20] also found a higher prevalence of anaemia among females as compared to males. Maximum anaemics were found in 17-18 years age group (36.15%) in this study. Our findings are comparable to Prabhusaran N. et al [21] who found prevalence of anaemia among 16-19 years to be 77.44%. Verma P. et al [22] found prevalence of anaemia to be 19.53% in age group of 20-29 years which is higher than that reported (1%) in our study among those aged more than 26 years.

Distribution of blood group

Frequency of the distribution of blood group A, B, AB, and O was found to be 23%, 42%, 07% and 28% respectively in this study. Our findings are comparable to previous studies [13, 21-24].

Relation of Anaemia with blood group

In the present study overall anaemia was found to be 29.07%. Anaemia was more prevalent among students of blood group A (33.33%) followed by blood group B (31.34%), blood group O (27.45%) and least in blood group AB (17.95%). Kaur M. et al [14] found anaemia more prevalent among students with blood group B (41.2%), AB (40.6%) A (33.3%), in blood group O (25.8%). Kumar BA et al [6] found anaemia more prevalent in blood group B (42%) followed by A (28%) than blood group O (18%) and blood group AB (12%). Our findings are also comparable to Verma et al. [22]

Table 4: Distribution of Blood Group In Different Studies:

Distribution of blood group (%)	Among general population[22]	Present study	Kaur M[14]	Kumar AB et al [6]	Prabhusaran et al [21]	Patel P et al [24]	Verma P et al [22]
Blood group B	31-33	42%	39.7	38.1	25.26	39.40	39.24
Blood group O	34-40	28	29.7	32	46.88	30.79	42.2
Blood group A	22-27	23	20	22	22.14	21.94	13.3
Blood group AB	05-08	07	10.7	08	05.72	7.86	5.25

Table 5: Prevalence of anaemia in relation to blood group in different studies

Prevalence of anaemia	Present study	Kaur M et al [14]	Kumar AB et al [6]	Verma P et al [22]
In Blood group A	33.33	33.3	28	13.3
In Blood group B	31.34	41.2	42	18.88
In Blood group O	27.45	25.8	18	22.18
In Blood group AB	1-7.95	40.6	12	5.25

CONCLUSION

Prevalence of anemia is high among medical and para medical students in this study. Blood group A followed by blood group B is more associated with the development of anemia amongst these students. Early identification of anaemia and its modification among these medical and para medical students is required..

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