INTERNATIONAL JOURNAL OF CURRENT ADVANCED RESEARCH
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 12; Issue 07(C); July 2023; Page No. 2359-2362
DOI: http://dx.doi.org/10.24327/ijcar.2023.2362.1512

Research Article

PREVALENCE OF ANAEMIA AND ITS RELATIONSHIP WITH ABO AND Rh BLOOD GROUPS AMONG DENTAL STUDENTS – A CROSS SECTIONAL STUDY

Shiny George[1] and Biju Baby Joseph[2]

[1]Department of Physiology, Azeezia Institute of Medical Sciences and Research, Kollam, Kerala
[2]Department of Oral medicine and Radiology, Azeezia College of Dental Sciences and Research, Kollam, Kerala

A R T I C L E I N F O

Article History:
Received 13th April, 2023
Received in revised form 11th May, 2023
Accepted 8th June, 2023
Published online 28th July, 2023

Key words:

Anaemia, Blood group, Dental students

A B S T R A C T

Background: Anaemia is a major health problem affecting developing as well as developed countries. Eventhough the association between some of the diseases with blood group is well known, the studies on relationship of anaemia with blood groups is scarse.
Objective: To find out the prevalence of anaemia among dental students of a private institution and to assess its relation with blood groups if any.
Materials & methods: The study is conducted in 99 dental students of a private college in Kerala. Hemoglobin is estimated using Sahli's method, RBC count by hemocytometry and blood groups by glass slide method.
Results: The prevalence of anaemia among dental students is found to be 31.3%. B blood group was showing maximum frequency of 41.4% followed by A blood group with a frequency of 29.3 % followed by O blood group with a frequency of 25.3 % and blood group AB the least (4%). Frequency of Rh negative blood group is 5.1%. Study showed that anaemia is more in students with blood group B followed by blood group O but it was not statistically significant.
Conclusion: The prevalence of anaemia among dental students is found to be 31.3 %. There is no significant association between anaemia and ABO and Rh blood groups among dental students.

INTRODUCTION

Anaemia, defined as a low blood haemoglobin concentration below the normal range for that particular age, sex and race, has been shown to be a public health problem which affects low, middle and high-income countries and has significant adverse health consequences, as well as adverse impacts on social and economic development[1]. It affects approximately 1.62 billion people or approximately a quarter of the world's population in both developed and developing countries [2,3] . The 2011 estimates suggest anaemia affects around 800 million children and women[1] and the second global nutrition target for 2025 calls for a 50% reduction of anaemia in women of reproductive age [4].

Eventhough hundreds of blood group antigens have been reported, ABO system is considered the most important because agglutinogen A and B are strongly antigenic and agglutinins A and B are naturally occurring. In the ABO system, depending upon the antigen present, the group is named. If antigen A is present the blood group is A, if antigen B present then group B, if both are present then group AB, both are absent then blood group O. Plasma from blood group A contains Anti-B antibodies which act against type B antigens, whereas plasma from type B blood contains Anti-A antibodies, which act against type A antigens. Type AB has neither type of antibody and type O blood has both A and B antibodies[5]. The second most important blood group system is Rh system because it is immunogenic and produces an immune response in Rh negative individuals during blood transfusion or pregnancy[6]. If RhD antigen is present on the surface of the red cells, the person is positive and if this antigen is not present, the individual is Rh negative.

As anaemia is considered as a global health problem, several studies are reported from various parts of the world and India is no exception. Many studies are conducted among medical students to know its prevalence from both north as well as south India including Kerala[7-11]but very few among dental students [12,13] .

Similarly studies have reported on the distribution of ABO and Rh blood groups in different populations [14,15]. Many diseases are found to have some association with certain blood groups.. Blood group A is associated with increased risk of stomach cancer and breast cancer[16,17]. Other recent studies have reported the association between blood groups O and A individuals with increased incidence of duodenal ulcers and gastric carcinoma[18,19]. Similarly there is association between pancreatic cancer and Hodgkin's lymphomas with B group

Corresponding author:* **Shiny George
Department of Physiology, Azeezia Institute of Medical Sciences and Research, Kollam, Kerala

[20,21]. In a study by BA Kumar in anemic patients in west Bengal, individuals having blood group B, A and AB were prone to anaemia compared to blood group O [22].

This study is conducted to find out the prevalence of anaemia among dental students and also to find out its relationship with blood groups.

MATERIALS AND METHODS

This study was conducted at physiology department of Azeezia institute of medical sciences and research, Kollam, Kerala from January to march 2019.

Inclusion criteria **-** All the dental students from 1st year who are willing to participate.

Exclusion criteria **-** Those who are suffering from any chronic illness, those who had undergone any surgical procedures recently or donated blood recently.

99 students participated in the study. After getting the informed consent from the participants, their personal details like name, age, sex are noted and height and weight are measured. The weight in Kg was measured using a weighing machine and the height in meters was also recorded. Hemoglobin estimation was done using Sahlis method in the physiology department and blood group was determined by glass slide method based on agglutination of red blood cells with specific antisera. RBC count was determined by hemocytometry using improved Neubauer chamber. Grading of anemia was done as per the WHO grading system. For females a hemoglobin level of 12-14gms/dl was taken as normal. Mild anemia is defined as hemoglobin of 10 - 11.9 g/dl, moderate between 7-9.9 g/dl and severe anemia less than 7 gm/dl[23]. In males, hemoglobin less than 13 mg/dl was taken as anemia[2]. Statistical analysis of the data was done using EZR (version 1.36) software. Chi square test, independent sample t test and ANOVA were used for analysis and a 'p value' of less than 0.05 was taken as significant.

RESULTS

There were 99 dental students as participants for this study out of which 83 were females & 16 were males. Mean age of the participants was 20.74+/-1.332. Thirty one students (31.3%) were found to be anaemic (figure 1). Among the anemics, 6 students were males and 25 were females. In anaemic females, majority (20) were having only mild anaemia & rest of them were having moderate anaemia. Similarly in males 5 out of 6 were having mild anaemia (figure 2). Mean body mass index was 22.40+/- 2.675 in nonanaemic males and 21.40+/- 3.362 in anaemic males. Mean body mass index of nonanaemic females was 21.24+/- 3.068 and those with mild anaemia was 22.45+/- 3.395 and moderate anaemia was 20.20+/-1.483. There was no significant association with body mass index and anaemia in this study (p=0.211).

Mean RBC count was 4.80+/- 0.447 millions in anaemic males and 5.60+/- 0.516 millions in nonanaemic or normal males and found to be significant statistically (p=0.000). Similarly there was significant association between the RBC count among anaemic and nonanaemic females group by ANOVA (p=0.000). Mean RBC count was 4.15+/- 0.366 million in females with mild anaemia, 4+/- 0.00 million in those with moderate anaemia.

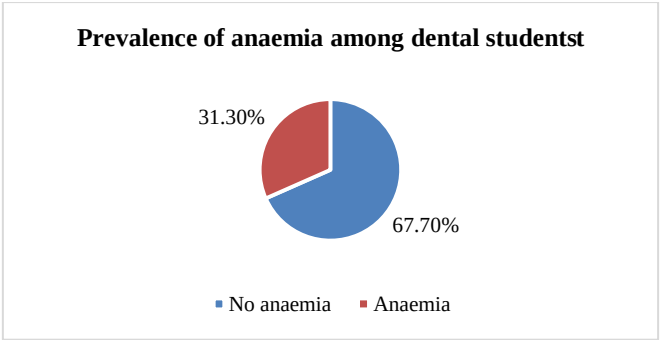

Figure 1 Prevalence of anaemia among dental students

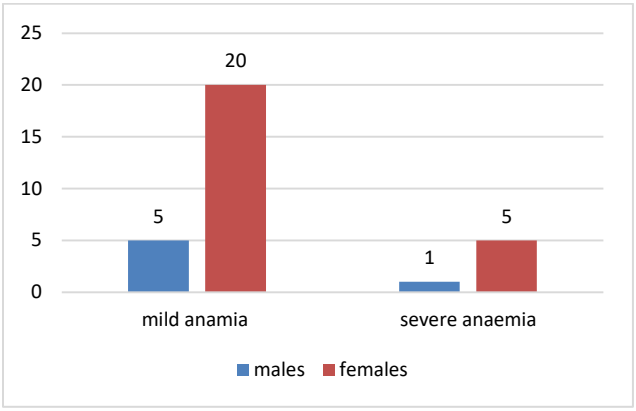

Figure 2 Anaemia in male and female dental students

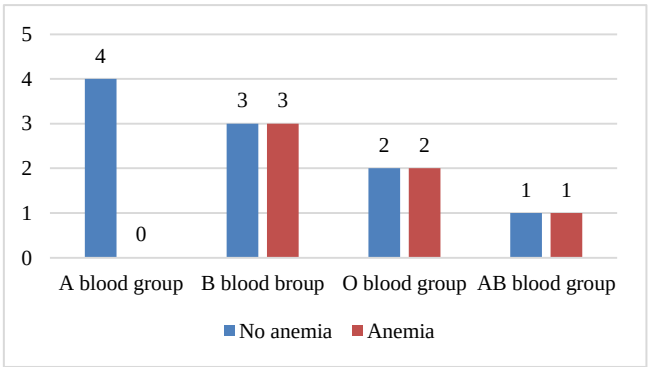

Figure 3 Distribution of blood groups in males with and without anaemia

Distribution of blood groups among this group is also studied. 29 students (29.3%) belonged to the A blood group, 41 students (41.4 %) B group, 25 of them (25.3 %) O group and 4 of them (4%) AB group. Among the 6 males having anaemia, 3 belonged to B, 2 belonged to O and 1 belonged to AB groups (table 1, figure 3).

Table 1 Distribution of blood groups among anaemics and nonanaemics

	A blood group		B blood broup		O blood group		AB blood group		Total
Gender	males	females	males	females	males	females	males	females	
No anaemia	4	17	3	27	2	13	1	1	68
Anaemia	0	8	3	8	2	8	1	1	31
Total	4	25	6	35	4	21	2	2	99

Chi square test showed that there is no significant association between different blood groups and anaemia (p= 0.447). Among the 25 females detected to have anaemia 8 belonged to

A group, 8 to B blood group, 8 to O blood group and 1to AB blood group (table 1). Majority of them were having mild anaemia and only three females with blood group A and two with blood group O were having moderate anaemia (figure 4). Rh typing showed that 5(5.1%) were Rh negative and 94 (94.9%) were Rh positive. Among the Rh negative individuals, 4 were females out of which 2 of them were found to have mild anaemia. There was no statistical significance between anaemia and Rh typing (p=0.318). In the Rh negative category, 2(2%) were A group, 1(1%) B group, 2(2%) O group and 1(1%) A group.

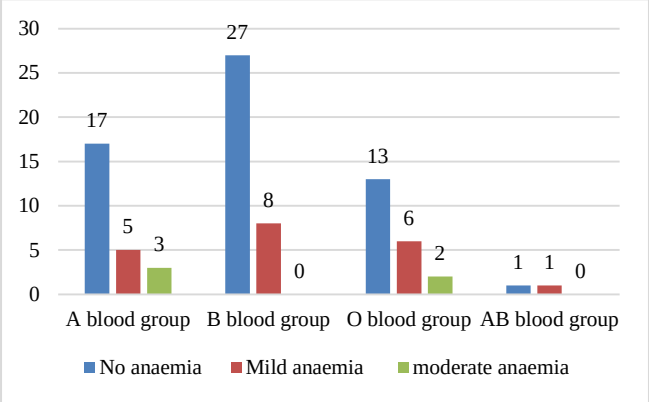

Figure 4 Distribution of blood groups in females with and without anaemia

DISCUSSION

The present study is carried out in dental students from a private institution in Kerala with the intention of finding out the prevalence of anaemia among them and to find out if there is any relation with blood group. The prevalence of anaemia obtained in our study is 31.3 %. 25 out of 83 females (30.1%) were found to be anaemi. This can be compared to the study conducted by Manjula *et al* among female medical students of Kottayam medical college and study by Anusha etal among medical students of a private medical college which showed a lesser prevalence of anaemia which was 19.13% and 16.8% respectively [10,11]. Whereas a study of Subramanyan K *et al* among health science students of a south Indian university revealed higher prevalence rate of 43%[9]. Studies conducted among dental students from a college in south India by Rajsekhar B *et al* reported a high prevalence of anaemia of 45% whereas a study conducted in Bareily by Ahmed QR *et al* reported a low prevalence of 14.8%[12,13]. Kannan k *et al* in their study reported that 58% of female medical students were anaemic[8]. The considerably lower prevalence in the present study when compared to studies from other states of India may be because the major part of population of Kerala belong to middle economic class and also the study was conducted in a private college in which majority of the students taking admission will be having better economic background and can afford to have better nutritional status. Increased prevalence of anaemia when compared to the other studies from Kerala may be due to the fact that some students willnot consume adequate food either because of their eating habits or because they are overconscious about their looks and donot want to gain weight.

In the present study, the distribution of A blood group was found to be 29.3%, B blood group 41.4%, O group 25.3 % and AB group 4%. This can be compared to the study conducted among medical students of Nepal Medical College, Kathmandu in which 34% are blood group A, 32.5% group O, 29% group B and 4% group AB[14]. Another study conducted in India by Verma P *et al*, revealed that 36.55% was O group, 35.78% was B group, 18.97% A group and 6.11% was AB blood group[15]. In our study prevalence of Rh negative blood group was 5.1%. Studies have documented the distribution of Rh negative blood group as 5.5% in South India, 4.8% in Nigeria, 7.3% in Lahore, 7.7% in Rawalpindi [24]. In the study of Verma P etal the prevalence of Rh negative group was only 2.57% [15]. All these studies indicates that there are variations in the distributions of blood groups among different populations.

As it is known that some diseases are common in individuals with certain blood groups, it is easy to screen that particular population for these diseases and early diagnosis helps in early intervention. Keeping this in mind, we tried to find out any relation between anemic population with any blood group so that it will help us to screen individuals with a particular blood group for anemia especially the women of reproductive age group that will help in preventing many complications. In our study, we could not find any statistically significant association between anemia and blood groups even though we found that B group followed by O group persons were more prone to anemia. This is similar to the study by Reshmarani *et al* in Bidar in which no association between the two were noted[25]. Whereas in a study by BA Kumar in anaemic patients in West Bengal there was significant association between anemia and blood groups which revealed that individuals with blood groups B, A and AB were more prone to anemia compared to blood group O[22].

Limitations of the study

In the present study, cause of anemia is not found out. Detailed history, examination and other lab investigations are required to find out the cause of anemia.

CONCLUSION

The prevalence of anemia among dental students was found to be 31.3% and it is mainly of mild grade with prevalence in females being 30.1%. Further studies are required to find out the cause of anaemia so that it can be managed effectively. Apart from referring them to medicine department for further follow up, we advised them to have healthy diet and not to skip meals considering that nutritional anemia is the commonest one. This study could not find any relation between anaemia and ABO blood group and Rh typing. Further studies are required in this regard with large sample size to find out if there is any association between anaemia and blood group.

References

1. WHO. The global prevalence of anaemia in 2011. Geneva: World Health Organization; 2015.
2. World Health Organization. Worldwide Prevalence of Anemia 1993 to 2005. Geneva, Switzerland: WHO; 2008.
3. Peyrin-Biroulet L, Williet N, Cacoub P. Guidelines on the diagnosis and treatmentof iron deficiency across indications: a systematic review. Am J Clin Nutr.2015; 102:1585–1594.
4. Global nutrition targets 2025: anaemia policy brief. Geneva: World Health Organization; 2014

5. Seeley RR, Stephens TD, Tate P. Anatomy and Physiology. 4th edition. The McGraw Hill Companies, Inc. USA p. 1098, 1998
6. Dennis YM, Hylem NM, Fidler C, Sargent IL, Murphy MF, Chamberlain PF. Prenatal diagnosis of fetal RhD status by molecular analysis of maternal plasma. New Engl. J. Med. 1998; 337:1734 – 1738
7. Agarwal A K , Katiyar G D, Mahmood S E, Khan S, Sharma M .A cross sectional study of association of anaemia with BMI in medical and paramedical students, Int J Community Med Public Health. 2017; 4(12):4697-4701
8. Kannan.K, Kameshvell. C, Rajini.S, Nandhakumar V, Niminesh B.S, Prevalence of Anemia among Female Medical Students, Pondicherry, National Journal of Research in Community Medicine. Vol.6. Sup. Issue 1. 2017:48-50
9. Subramaniyan K., George M, Seshadri D, Jena A, N. Chandraprabha, Prevalence of anemia among health science students of a university in South India , Int J Res Med Sci. 2016 Oct;4(10):4598-4601
10. Manjula V D, P Parameshwari, Lillykutty Pothen, Sobha A. Prevalence of Anemia Among Female Undergraduate Students of Government Medical College Kottayam, Kerala , Int J Med Health Sci. April 2014,Vol-3;Issue-2:133-38
11. Anusha Merline J, Delinda Linu Swornila, Pramod Thomas, Prasanna Kumari L prevalence of anemia among female medical students, *International Journal of Scientific Research* 2017 vol-6 (5) : 174-76
12. Rajsekhar B, Rajesh M, Sabithadevi R, Shrikanth M. Prevalence of anemia and its causative factors among dental undergraduate students in a dental college in south India. *Journal of medical sciences and clinical research* 2016; 4(10) :13578-581
13. Ahmed Q R, Seth K R, Mahmood E S. Prevalence of hypertension, obesity and anemia among first year dental students in Bareily. *Journal of evolution of medical and dental sciences* 2014 ; 3(44):10881+
14. Pramanik T, Pramanik S. Distribution of ABO and Rh blood groups in Nepalese medical students: a report. Eastern Mediterranean Health J. 2000; 6(1):156 –158
15. Pratima Verma, Shraddha Singh, Akhilesh Krishna, Wahid Ali , Sunita Tiwari Prevalence of Heamoglobin Variants, ABO and Rhesus Blood Groups in Northern Uttar Pradesh, India. Biomedical Research 2013; 24 (3): 377-382
16. Aird I, Bentall HH, Roberts JA. A relationship between cancer of stomach and the ABO blood groups. Br Med J1953; 1: 799-801.
17. Rabab Aly, Ansaf Yousef and Omer ElbablyAssociation of ABO Blood Group and Risk of Breast Cancer J Blood Disorders Transf 2014, 5:9
18. Rasmi Y, Sadreddini M, Peirovi T, Jamali M, Khosravifar F, *et al*. Frequency of ABO blood group in peptic ulcer disease in Iranian subjects. Pak J Biol Sci 2009; 12: 991-993.
19. Iodice S, Maisonneuve P, Botteri E, Sandri MT, Lowenfels AB ABO blood group and cancer. Eur J Cancer 2010; 46: 3345-3350.
20. Nozoe T, Ezaki T, Baba H, Kakeji Y, Maehara Y Correlation of ABO blood group with clinicopathologic characteristics of patients with esophageal squamous cell carcinoma. Dis Esophagus 2004; 17: 146-149.
21. Vadivelu MK, Damodaran S, Solomon J, Rajaseharan A Distribution ofABO blood groups in acute leukaemias and lymphomas. Ann Hematol 2004; 83: 584-587.
22. Kumar BA, Kaushik M. Blood group and anemia: exploring a new relationship. Journal of public health and epidemiology 2013; 5 (1): 43-45
23. World Health Organization. Iron deficiency anemia, Assessment, Prevention and Control: A guide for programme Managers 2001. Retrieved from www.who.int>nutrition>publications
24. Sah JP, Pant DR, Shrestha V, Tiwari BR, Jaiswal S. Distribution of ABO, rhesus blood groups and hemoglobin concentration among the school students of Deurali VDC, Kaski, Nepal; International journal of pharmacy and biological sciences 2013 3(4) 10-16
25. Reshmarani, Shilpa N, Chimkode S. Study of correlation between blood groups and anemia in young adults. *International Journal of Physiology* 2019 ; 7(4): 199-202

How to cite this article:

Shiny George and Biju Baby Joseph (2023) 'Prevalence of Anaemia and Its Relationship with Abo and Rh Blood Groups Among Dental Students – A Cross Sectional Study', *International Journal of Current Advanced Research*, 12(07), pp. 2359-2362. DOI: http://dx.doi.org/10.24327/ijcar.2023. 2362.1512

****