AWARENESS OF TENDENCY OF DISEASE AMONG DIFFERENT BLOOD GROUPS

Comment [DDM1]: Title of study is not correct.

Running title: Tendency of disease among different blood groups

ABSTRACT

INTRODUCTION:

Blood groups are classified into two types ABO system and Rh system and ABO system have the antigen on the RBC and the antibody of the blood and whereas Rh blood system only contain the only antigen called D antigen that is present on the surface of RBC and the criteria to find the Rh+ or Rh- is by presence or absence of D antigen and this is the prime understanding of the blood groups where the antigen and antibody and cellular units together comprise the host response to the antigen or disease and enhance it and our study is about to create the awareness among the people for different blood groups disease-causing tendency

Comment [DDM2]: Sentence is not clear

MATERIALS AND METHODS:

The questionnaire was made comprising of 15 questions using google forms and it is circulated among 100 peoples and the data was collected and evaluated the correct and wrong answers using the table

RESULT AND CONCLUSION:

The results showed that more than 75% of the study population are unaware of the blood groups associated with systemic illness and further survey is needed to analyze more population.

KEYWORD:

Blood groups , systemic disorders, ABO system, Rh grouping, innovative technique

INTRODUCTION:

Blood group systems are usually two types: 1) ABO system and 2)Rh system. ABO system was introduced by Karl Landsteiner in 1901(1). The phenotype of a person is determined by antigens on RBC and ABO has four phenotypes. There is a coat found on RBC. The coat is usually of oligosaccharide. A person having antigen A has A blood group. A person having B antigen has a B blood group. A person with both of these A and B antigens has an AB blood group while the person with neither A nor B has an O blood group. The role of antibodies is very important(2) for A group has two subgroups namely A_1 and A.Rh meaning Rhesus differentiated by negative and positive signs. D is considered to be the most important antigen of it. Other antigens are C and E. It has two genes D and d. Persons with the presence of this gene have a positive Rh+ factor while those who lack this have Rh- factor. A person having Rh-negative does not have anti-Rh antibodies so Rh positive is not suitable for Rh-negative recipient. Incompatibility also occurs during transfusion.

Moreover, maternal-fetal Rh incompatibility also occurs when Rh-negative woman are married to Rh-positive man and their child is Rh-positive. The child is anemic in this case which leads to stillbirth and other complications as well. Certain diseases are more profound to certain blood groups and various diseases are more potent in certain blood groups, for instance, certain blood groups like O have an increased risk of rheumatoid arthritis, and A, B, AB blood group are more prone to ischemic heart disease(3,4).Patients with deep vein thrombosis along with certain types A, B, and AB blood have an increased risk of coronary heart disease, due to increased levels of inflammatory markers and certain proteins in the blood that lead to blood clotting. Certain diseases occur in certain blood groups and the Rh system plays an important role in pathogenesis.

Comment [DDM3]: Check for authenticity

Comment [DDM4]: Check for authenticity

During pregnancy, Rh incompatibility occurs when Rh-positive mother gives nourishment to Rh-negative baby at the time of second pregnancy the baby becomes fatal due to this Rh system so there is a need for knowledge and awareness about the Rh systems and treatment(5) accordingly and it is important to know the blood groups ABO typing and Rh system. Our team has extensive knowledge and research experience that has translate into high quality publications (6).(7–20) ,(5,21–24) In our study, the prime motto is to establish and create the awareness of blood group capable and tendency to develop a disease through the mean of the survey

Comment [DDM5]: Check for authenticity

MATERIALS AND METHODS:

The questionnaire was a self-structured questionnaire administered through google forms and circulated among 100 participants. Each output variable was collected as data and the collected data were represented in a table.

RESULT AND DISCUSSION:

Comment [DDM6]: Should be separate

In our study, we made the questionnaire related to the disease that is capable of occurring in the blood group we acquired the result and tabulated it as given in table 1

TABLE 1: Results of the study

S.N0	DISEASE	BLOOD GROUP	CORRECT RESPONSES	INCORRECT RESPONSES
1.	Diabetes mellitus	B	40%	60%
2.	Cognitive impairment	AB	22%	78%
3.	Stroke and heart attack	AB	25%	75%

4.	Gastric cancer	A	34%	66%
5.	*H.pylori infection*	O	19%	81%
6.	Caries	O	53%	47%
7.	Rheumatic arthritis	A	24%	76%
8.	Systemic lupus erythematosus	O	23%	77%
9.	Sjogren's syndrome	O	19%	81%
10.	Systemic sclerosis	O	22%	78%
11.	Ankylosing spondylitis	O	19%	81%
12.	Pulmonary thromboembolism	A	6%	94%
13.	Deep vein thrombosis	A B and AB	28%	72%
14.	Ischaemic heart disease	A B and AB	29%	71%
15.	Rh incompatibility	AB	31%	69%

Table 1 depicts the results and responses of our study. It showed that more than 75% are unaware of the blood groups and tendency of the occurring disease. In our study, 40% of the people are aware that the B blood group are prone to diabetes mellitus whereas 60% of the people are unaware(25) and the previous studies were conducted in which AB+ and B+ve blood groups are more vulnerable to diabetes mellitus(26) and for the cognitive impairment 22% have answered correctly AB is responsible for cognitive impairment(19) and 78% of people don't aware about that and in the previous studies 82% of the AB blood group are more likely to develop cognitive impairment(27).

We found that the awareness about stroke and heart attack tendency on blood groups 25% answered correctly as AB blood group has more tendency to cardiac diseases than other blood groups(28) and 75% of people aren't aware of it and in previous studies(7), 80% of AB blood groups develop heart attack and stroke(29) and when asked about blood group tendency on gastric cancer 34% of them have answered A(30) and 66% of them are unaware about it and in previous studies, 95% of the people are more prone to gastric cancer(2)

The participants of our study responded that the blood tendency on *H.pylori* infection 19% of the people have answered O(6) and 81% of people are unaware about it and in previous studies, 95% of them have answered non O blood groups capable of causing *H.pylori* infection(31) and when asked about caries 53% of people answered O blood group have more tendency in causing disease(32) and 47% of the people are unaware about it and in previous studies(33), 40% of people are affected due to O blood group in dental caries which is higher than the other blood groups(34)

The awareness of rheumatic arthritis showed that only 24% of people have answered A blood group is capable of getting the disease(17) and 76% of the people are unaware of it and in previous studies, 80% of patients with rheumatoid arthritis are found(35) and when asked about systemic lupus erythematosus tendency of disease-causing on blood group(33) 23% of the people have answered O blood group(36) and 77% of the people are unaware and in previous studies, 95.7% of the people answered O blood group(37–39).

When questioned about Sjogren's syndrome 19% of people have answered O blood group(16) and 81% of them are unaware and in previous studies, 60% of people have answered O blood group is more prevalent(40) and when asked about systemic sclerosis 22% of them

have answered O blood group(41) and 78% of people are unaware and in previous studies, O+ blood group is more prone to systemic sclerosis(42).

The participants' responses were recorded about Ankylosing Spondylitis 19% of the people have answered O blood group is more prone(43) and 81% of the people doesn't aware of it(44) and in a previous study, 70% of O blood group is more prone to ankylosing spondylitis(45) and when asked about pulmonary thromboembolism 6% of the people answered(23) A blood group(13) and 94% of the people are unaware and in previous studies, 46.1% of people have answered A blood group(46).

We obtained that 28% of the people have answered non O blood group was mostly associated with deep vein thrombosis than other blood groups(44) and 72% of the people are unaware and in previous studies, 80% of the people answered non O blood groups show deep vein thrombosis(47) and inquiry on blood group associated with Ischaemic heart disease showed that 29% of people have answered non-O blood groups correctly(48) and 71% of them are unaware and in previous studies, 85% of non-O blood groups have a higher risk of ischaemic heart disease(49) and when asked about Rh incompatibility 31% of them answered AB and 69% of them are unaware(15) and in previous studies 80% of the people of non-O blood groups mainly AB have a higher incidence of Rh incompatibility(50).

CONCLUSION:

From the results, we concluded that more than 75% of the study population are unaware of the blood groups associated with systemic illness. It shows a need of awareness and teaching programmes to improve the knowledge on blood group association on systemic disorders.

Comment [DDM7]: Cannot conclude as sample size small

REFERENCES:

1. Khan MA, Qadir MI. Blood grouping and tendency of flu compatibility. J Hum Virol Retrovirology. 2018;6(3):100–1.
2. Wang Z, Liu L, Ji J, Zhang J, Yan M, Zhang J, et al. ABO blood group system and gastric cancer: a case-control study and meta-analysis. Int J Mol Sci. 2012 Oct 17;13(10):13308–21.

3. Preethikaa S, Brundha MP. Awareness of diabetes mellitus among general population. Research Journal of Pharmacy and Technology. 2018;11(5):1825–9.

4. Timothy CN, Samyuktha PS, Brundha MP. Dental pulp Stem Cells in Regenerative Medicine--A Literature Review. Research Journal of Pharmacy and Technology. 2019;12(8):4052–6.

5. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial [Internet]. Vol. 24, Clinical Oral Investigations. 2020. p. 3275–80. Available from: http://dx.doi.org/10.1007/s00784-020-03204-9

6. Anita R, Paramasivam A, Priyadharsini JV, Chitra S. The m6A readers YTHDF1 and YTHDF3 aberrations associated with metastasis and predict poor prognosis in breast cancer patients. Am J Cancer Res. 2020 Aug 1;10(8):2546–54.

7. Jayaseelan VP, Paramasivam A. Emerging role of NET inhibitors in cardiovascular diseases. Hypertens Res. 2020 Dec;43(12):1459–61.

8. Sivakumar S, Smiline Girija AS, Vijayashree Priyadharsini J. Evaluation of the inhibitory effect of caffeic acid and gallic acid on tetR and tetM efflux pumps mediating tetracycline resistance in Streptococcus sp., using computational approach. Journal of King Saud University - Science. 2020 Jan 1;32(1):904–9.

9. Smiline Girija AS. Delineating the Immuno-Dominant Antigenic Vaccine Peptides Against gacS-Sensor Kinase in Acinetobacter baumannii: An in silico Investigational Approach. Front Microbiol. 2020 Sep 8;11:2078.

10. Iswarya Jaisankar A, Smiline Girija AS, Gunasekaran S, Vijayashree Priyadharsini J. Molecular characterisation of csgA gene among ESBL strains of A. baumannii and targeting with essential oil compounds from Azadirachta indica. Journal of King Saud University - Science. 2020 Dec 1;32(8):3380–7.

11. Girija ASS. Fox3+ CD25+ CD4+ T-regulatory cells may transform the nCoV's final destiny to CNS! J Med Virol [Internet]. 2020 Sep 3; Available from: http://dx.doi.org/10.1002/jmv.26482

12. Jayaseelan VP, Ramesh A, Arumugam P. Breast cancer and DDT: putative interactions, associated gene alterations, and molecular pathways. Environ Sci Pollut Res Int. 2021 Jun;28(21):27162–73.

13. Arumugam P, George R, Jayaseelan VP. Aberrations of m6A regulators are associated with tumorigenesis and metastasis in head and neck squamous cell carcinoma. Arch Oral Biol. 2021 Feb;122:105030.

14. Kumar SP, Girija ASS, Priyadharsini JV. Targeting NM23-H1-mediated inhibition of tumour metastasis in viral hepatitis with bioactive compounds from Ganoderma lucidum: A

computational study. pharmaceutical-sciences [Internet]. 2020;82(2). Available from: https://www.ijpsonline.com/articles/targeting-nm23h1mediated-inhibition-of-tumour-metastasis-in-viral-hepatitis-with-bioactive-compounds-from-ganoderma-lucidum-a-comp-3883.html

15. Girija SA, Priyadharsini JV, Paramasivam A. Prevalence of carbapenem-hydrolyzing OXA-type β-lactamases among Acinetobacter baumannii in patients with severe urinary tract infection. Acta Microbiol Immunol Hung. 2019 Dec 9;67(1):49–55.

16. Priyadharsini JV, Paramasivam A. RNA editors: key regulators of viral response in cancer patients. Epigenomics. 2021 Feb;13(3):165–7.

17. Mathivadani V, Smiline AS, Priyadharsini JV. Targeting Epstein-Barr virus nuclear antigen 1 (EBNA-1) with Murraya koengii bio-compounds: An in-silico approach. Acta Virol. 2020;64(1):93–9.

18. Girija As S, Priyadharsini J V, A P. Prevalence of Acb and non-Acb complex in elderly population with urinary tract infection (UTI). Acta Clin Belg. 2021 Apr;76(2):106–12.

19. Anchana SR, Girija SAS, Gunasekaran S, Priyadharsini VJ. Detection of csgA gene in carbapenem-resistant Acinetobacter baumannii strains and targeting with Ocimum sanctum biocompounds. Iran J Basic Med Sci. 2021 May;24(5):690–8.

20. Girija ASS, Shoba G, Priyadharsini JV. Accessing the T-Cell and B-Cell Immuno-Dominant Peptides from A.baumannii Biofilm Associated Protein (bap) as Vaccine Candidates: A Computational Approach. Int J Pept Res Ther. 2021 Mar 1;27(1):37–45.

21. Arvind P TR, Jain RK. Skeletally anchored forsus fatigue resistant device for correction of Class II malocclusions-A systematic review and meta-analysis. Orthod Craniofac Res. 2021 Feb;24(1):52–61.

22. Venugopal A, Vaid N, Bowman SJ. Outstanding, yet redundant? After all, you may be another Choluteca Bridge! Semin Orthod. 2021 Mar 1;27(1):53–6.

23. Ramadurai N, Gurunathan D, Samuel AV, Subramanian E, Rodrigues SJL. Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial. Clin Oral Investig. 2019 Sep;23(9):3543–50.

24. Varghese SS, Ramesh A, Veeraiyan DN. Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students. J Dent Educ. 2019 Apr;83(4):445–50.

25. Arvind P, Jain RK. Skeletally anchored forsus fatigue resistant device for correction of Class II malocclusions—A systematic review and meta-analysis [Internet]. Vol. 24, Orthodontics & Craniofacial Research. 2021. p. 52–61. Available from: http://dx.doi.org/10.1111/ocr.12414

26. Mandal B, Shukla R, Basu AK, Sinha A, Maiti A, Bhattacharjee K, et al. Association of

ABO blood groups with type-2 diabetes mellitus and its complications. J Diabetes Metab Disord Control. 2018;5(1):1–7.

27. Lim YY, Mormino EC. IC-P-087: Effect of AB And APOE-E4 On Cognition, Hippocampal Volume and AB in Mild Cognitive Impairment [Internet]. Vol. 12, Alzheimer's & Dementia. 2016. p. P67–8. Available from: http://dx.doi.org/10.1016/j.jalz.2016.06.116

28. Sivakumar S, Smiline Girija AS, Vijayashree Priyadharsini J. Evaluation of the inhibitory effect of caffeic acid and gallic acid on tetR and tetM efflux pumps mediating tetracycline resistance in Streptococcus sp., using computational approach [Internet]. Vol. 32, Journal of King Saud University - Science. 2020. p. 904–9. Available from: http://dx.doi.org/10.1016/j.jksus.2019.05.003

29. Enevold C, Nielsen CH, Molbo D, Lund R, Bendtzen K, Fiehn N-E, et al. Lewis and AB0 blood group-phenotypes in periodontitis, cardiovascular disease, obesity and stroke. Sci Rep. 2019 Apr 18;9(1):6283.

30. Girija ASS, Smiline Girija AS, Shoba G, Vijayashree Priyadharsini J. Accessing the T-Cell and B-Cell Immuno-Dominant Peptides from A.baumannii Biofilm Associated Protein (bap) as Vaccine Candidates: A Computational Approach [Internet]. Vol. 27, International Journal of Peptide Research and Therapeutics. 2021. p. 37–45. Available from: http://dx.doi.org/10.1007/s10989-020-10064-0

31. Risch HA, Yu H, Lu L, Kidd MS. ABO Blood Group, Helicobacter pylori Seropositivity, and Risk of Pancreatic Cancer: A Case–Control Study. J Natl Cancer Inst. 2010 Apr 7;102(7):502–5.

32. Jaisankar AI, Smiline Girija AS, Gunasekaran S, Vijayashree Priyadharsini J. Molecular characterisation of csgA gene among ESBL strains of A. baumannii and targeting with essential oil compounds from Azadirachta indica [Internet]. Vol. 32, Journal of King Saud University - Science. 2020. p. 3380–7. Available from: http://dx.doi.org/10.1016/j.jksus.2020.09.025

33. Varghese SS, Ramesh A, Veeraiyan DN. Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students [Internet]. Vol. 83, Journal of Dental Education. 2019. p. 445–50. Available from: http://dx.doi.org/10.21815/jde.019.054

34. Arneberg P, Kornstad L, Nordbö H, Gjermo P. Less dental caries among secretors than among non-secretors of blood group substance. Scand J Dent Res. 1976 Nov;84(6):362–6.

35. Çildağ S, Kara Y, Şentürk T. ABO blood groups and rheumatic diseases. Eur J Rheumatol Inflamm. 2017 Dec;4(4):250–3.

36. Girija ASS, Smiline Girija AS. Fox3 CD25 CD4 T-regulatory cells may transform the nCoV's final destiny to CNS! [Internet]. Vol. 93, Journal of Medical Virology. 2021. p. 5673–5. Available from: http://dx.doi.org/10.1002/jmv.26482

37. Karimifar M, Moussavi H, Hajihashemi A. Prevalence of ABO and Rh blood groups in systemic lupus erythematosus and their association with disease activity. Journal of Preventive Epidemiology. 2019;4(2):e26–e26.

38. Hannah R, Ramani P, Brundha MP, Sherlin HJ, Ranjith G, Ramasubramanian A, et al. Liquid Paraffin as a Rehydrant for Air Dried Buccal Smear. Research Journal of Pharmacy and Technology. 2019;12(3):1197–200.

39. Harsha L, Brundha MP. Prevalence of Dental Developmental Anomalies among Men and Women and its Psychological Effect in a Given Population. Journal of Pharmaceutical Sciences and Research; Cuddalore. 2017 Jun 20;9(6):869–73.

40. Manthorpe R, Staub Nielsen L, Hagen Petersen S, Prause JU. Lewis Blood Type Frequency in Patients with Primary Sjögren's Syndrome:A Prospective Study Including Analyses for A1A2BO, Secretor, MNSs, P, Duffy, Kell, Lutheran and Rhesus Blood Groups [Internet]. Vol. 14, Scandinavian Journal of Rheumatology. 1985. p. 159–62. Available from: http://dx.doi.org/10.3109/03009748509165497

41. As SG, Vijayashree PJ, Paramasivam A. Prevalence of Acb and non-Acb complex in elderly population with urinary tract infection (UTI) [Internet]. Vol. 76, Acta Clinica Belgica. 2021. p. 106–12. Available from: http://dx.doi.org/10.1080/17843286.2019.1669274

42. Harris ES, Harris HD, Malkovsky M. Blood type distribution in autoimmune diseases: An anonymous, large-scale, self-report pilot study [Internet]. Research Square. 2020. Available from: https://www.researchsquare.com/article/rs-75388/latest.pdf

43. Venugopal A, Vaid N, Jay Bowman S. Outstanding, yet redundant? After all, you may be another Choluteca Bridge! [Internet]. Vol. 27, Seminars in Orthodontics. 2021. p. 53–6. Available from: http://dx.doi.org/10.1053/j.sodo.2021.03.007

44. Girija ASS, Smiline Girija AS. Delineating the Immuno-Dominant Antigenic Vaccine Peptides Against gacS-Sensor Kinase in Acinetobacter baumannii: An in silico Investigational Approach [Internet]. Vol. 11, Frontiers in Microbiology. 2020. Available from: http://dx.doi.org/10.3389/fmicb.2020.02078

45. Shinebaum R. ABO blood group and secretor status in the spondyloarthropathies. FEMS Microbiol Immunol. 1989 Jun;1(6-7):389–95.

46. Hajizadeh R, Kavandi H, Nadiri M, Ghaffari S. Association of ABO blood group with incidence and outcome of acute pulmonary embolism. Turk Kardiyol Dern Ars. 2016 Jul;44(5):397–403.

47. Franchini M, Makris M. Non-O blood group: an important genetic risk factor for venous thromboembolism. Blood Transfus. 2013 Apr;11(2):164–5.

48. Kumar SP, Praveen Kumar S, Smiline Girija AS, Vijayashree Priyadharsini J. Targeting NM23-H1-mediated Inhibition of Tumour Metastasis in Viral Hepatitis with Bioactive

Compounds from Ganoderma lucidum: A Computational Study [Internet]. Vol. 82, Indian Journal of Pharmaceutical Sciences. 2020. Available from: http://dx.doi.org/10.36468/pharmaceutical-sciences.650

49. Hong X-L, Li Y, Fu G-S, Wu H, Wang Y, Gu C-X, et al. Association of ABO blood groups with the severity of coronary artery disease: a cross-sectional study. J Geriatr Cardiol. 2019 Sep;16(9):701–5.

50. Izetbegovic S. Occurrence of ABO And RhD Incompatibility with Rh Negative Mothers. Mater Sociomed. 2013 Dec;25(4):255–8.