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Distribution and Frequency of ABO and Rh blood groups among first year under graduate science students of Thiru Kolanjiappar Governnment Arts college, Vriddhachalam,Tamil nadu

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Abstract: *The ABO and Rhesus blood groups were very important in the field of medicine related to blood transfusions, paternity testing, population genetics, forensic science and in medico legal issues. The present study was carried out to know about the Frequency and Distribution of ABO and Rhesus blood groups among UG first year science Department students(Maths, Computer science, Physics, Chemistry, Botany and Zoology), Thiru kolanjiappar government arts college vriddhachalam. This was a cross sectional observational study carried out during the academic year 2019-2020,in which grouping was done by slide agglutination using capillary blood obtained by finger prick method. Standard antisera A,B and D were used. Results were formulated in numbers and percentage wise. A total of 423 students were participated ,in which blood group A accounts for 19.14%(81),B blood group 36.17%(153),AB blood group 6.38%(27), O blood group 38.29%(162),Rh positives were 95.98%(406) and Rh negative 4.01%(17).It was concluded that the most common and frequently occured blood group was O and the least was AB in the order O>B>A>AB also Rh positive blood group was more common than Rh negative. The knowledge in blood grouping was very important in the field of medicine.*

Key words*: Blood group, Rhesus ,A,B,AB,O*

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I. INTRODUCTION

ABO blood grouping system was discovered by Karl Landsteiner, an Austrian scientist in the year 1901.He identified A,B and O blood group types, initially 'O' blood group was described as 'C' due to lack of antigen A and B and later it was renamed as 'O' (Garraty G *et al.*,2000).In 1902,Alfred Von Decastello and Adriano Sturli discovered the fourth blood group, AB (Hemalatha NR 2017). karl Landsteiner was awarded Nobel prize for his work. Later in 1941 ,Landsteiner and Wiener discovered Rhesus(Rh) blood goup system (Gadwalkar S R *et al.*,2013). Landsteiner's discovery paved the way for the wide spectrum of discoveries in the field of blood transfusion,immune haematology,unmatched pregnancies,genitic research,legal medicines,forensic pathalogy and anthropology.The discovery of other blood groups were based on the result of Karl's discovery(Kurshid B *et al.*,1992;Jolly J G,2000).The ABO blood groups are determined due to the presence or absence of certain molecules called antigens and antibodies.The antigens are located on the surface of the red blood cells and antibodies in the plasma(Daniel HL, Clark AG ,2007).

The ABO blood group system was governed by a single gene located on the chromosome no. 9 with three alleles IA,IB,IO(Zahid H *et al.*,2016).IA and IB are co-dominant but both are dominant over recessive allele IO(Murphy W J *et al.*,2003).The blood groupings are determined by the presence of antigens on red blood cells, antigen A(group A),antigen B(group B),both antigens (group AB) or absence of both antigens (group O),which classifies all the four blood groups A,B,ABandO (Phenotypes) and six genotypes,AA(group A),AO(group A),BB(group B),BO(group B),AB(group AB) OO(group O).(Khalid M *et al.*,2013). Rhesus blood group system (Rh) is the second most important blood group system due to haemolytic diseases in new born babies. The gene responsible for Rh factor is locted on the short arms of chromosome no.1(Murphy W J *et al.*, 2003)with two alleles D and d.The antigens resposible for Rh is also located on the red blood cells and therefore persons who have antigen D on their red blood cells are known to be Rh positive and without antigen D are known to be Rh negative(Knowles S, Poole G ,2002).Incomptability in Rh factors between mother and the foetus leads to Erythroblastosis foetalis (Saladin K ,2003).Several studies have been conducted to understand the frequency and distribution of ABO and Rh blood group among Indian population(Gauniyal M ,2006; Subhashini A B ,2007;Periyavan A *et al.*,2010; Rai V and Kumar P ,2011; Pathania I ,2011; Haloi A ,2011; Pandey B N *et al.*,2012; Prakash DSRS *et al.*,2013; Pandey B N *et al.*,2013; Soram J S *et al.*,2014; Handoo S

and Bala S S ,2014; Rao C and Shetty J, 2014; Shrivastava S *et al.*,2015; Sukumaran M K *et al.*,2016; Sah A K and Sahadalal B ,2016).The incidence of ABO and Rh blood group varies from race to race,region to region in different groups all over the world.Blood group distribution knowledge is very important in reducing mortality rate and to access safe and sufficient blood supply.Therefore the present study was conducted to know about the frequency and distribution of ABO and Rh blood groups among the Under graduate first year science students of Thiru Kolanjiappar government arts college,Vriddhachalam.

II. MATERIALS AND METHODS

The present cross sectional study was conducted during the academic year 2019-2020,among UG first year science students(Maths,Computer science,Physics,Chemistry,Botany and Zoology) between the age group of 17-21.The students were voluntarily participated and test was done in the Zoology lab of Thiru kolanjiappar government arts college Vriddhachalam.In this study a total of 423 students were participated in which 163 were boys and 260 were girls.The blood grouping and Rh groupings were determined by a glass slide agglutination method.The blood samples were collected by finger prick method under aseptic condition.Three drops of blood from middle finger is then placed in slides from each individual.One drop of each antiseraA ,antisera B and antisera D were added to those three blood drops separately.Finally it was mixed well with separate applicator sticks to detect A,B,AB O blood groups and its Rh factors.The mixtures were observed for agglutination and it was based on antigen-antibody interactions

III. RESULTS

In this study out of total 423 students,163(38.5%) were males and 260(61.4%) were females. ABO and Rh blood group of these students were estimated. The results were illustrated in the table 1,2 & 3 also in Fig 1,2,3&4.In this study the most frequently observed blood group was O 38.29%(162) followed by B 36.17%(153), A 19.14%(81))and AB 6.38%(27).In Rh blood groupings 95.98%(406) were Rh positive and 4.01%(17) were negative. Among the most frequent O blood group , males were 54 and females were 108,while in the least AB blood group, 13 males and 14 females were observed.In the Rh positive blood groups O has the highest frequency of 37.11%(157)followed by B 36.94%(150) and in Rh negative blood groups O and AB has the same frequency of 29.41% with 5 each and the least was B negative 17.64%(3).

Table 1:Frequency of ABO and Rh blood grouping

ABO BLOOD GROUP	Rh POSITIVE	Rh NEGATIVE	TOTAL	PERCENTAGE
A	77	4	81	19.14%
B	150	3	153	36.17%
AB	22	5	27	6.38%
O	157	5	162	38.29%

Table 2:Frequency of Rh blood grouping

Rh BLOOD GROUPS	MALE(n)=163	FEMALE(n)=260	TOTAL(n)=423	PERCENTAGE
Rh POSITIVE	156	250	406	95.98%
Rh NEGATIVE	7	10	17	4.01%

Table 3:Gender wise distribution of ABO and Rh blood group system

ABO BLOOD GROUP	MALE(n=163)			FEMALE(n=260)			TOTAL(n=423)		
	Rh POSITIVE	Rh NEGATIVE	TOTAL	Rh POSITIVE	Rh NEGATIVE	TOTAL	Rh POSITIVE	Rh NEGATIVE	TOTAL
A	30	1	31	47	3	50	77	4	81
B	64	1	65	86	2	88	150	3	153
AB	10	3	13	12	2	14	22	5	27

O	52	2	54	105	3	108	157	5	162
TOTAL	156	7	163	250	10	260	406	17	423

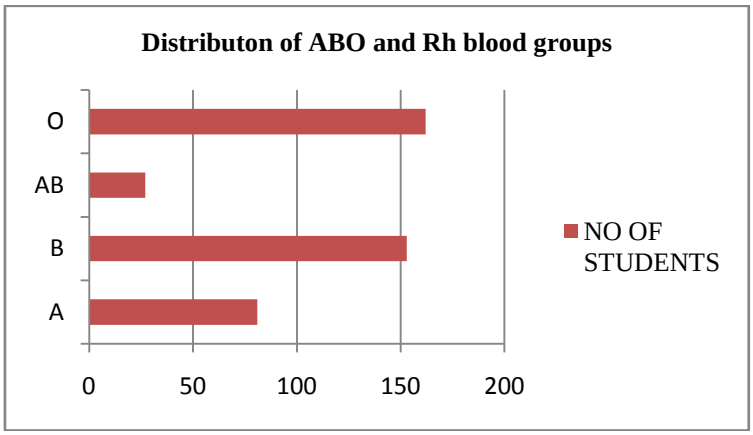

Fig 1:Distribution of ABO and Rh blood groups among students

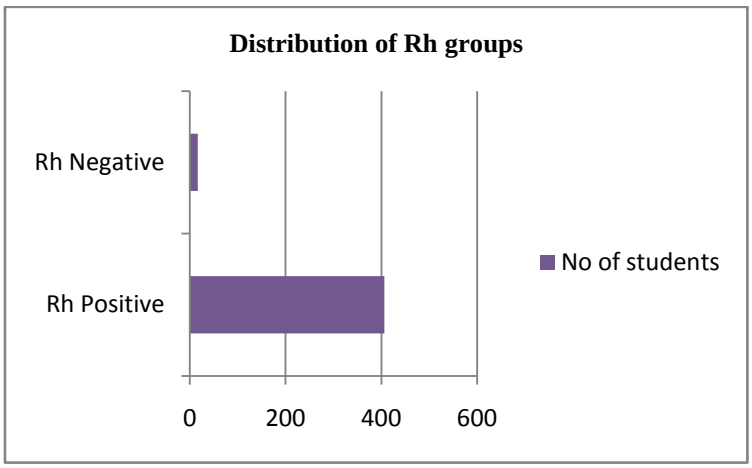

Fig 2:Distribution blood groups among Rh negative students

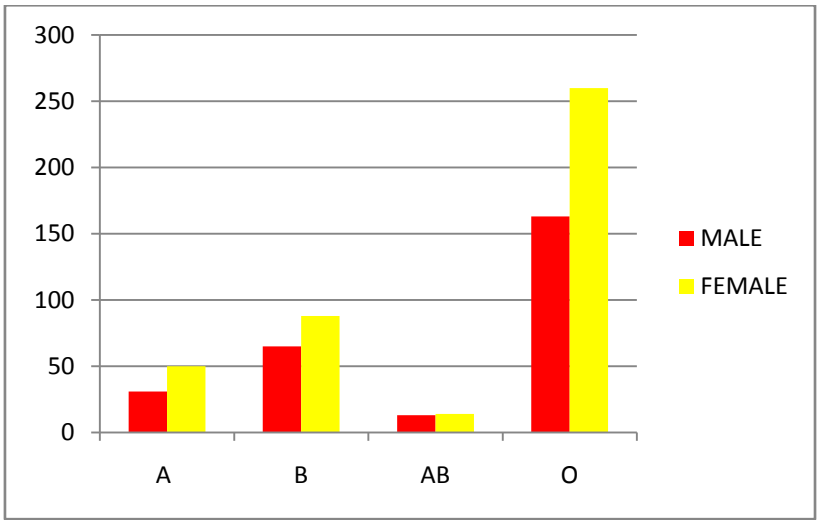

Fig 3:Gender wise distribution Of ABO blood groups among students

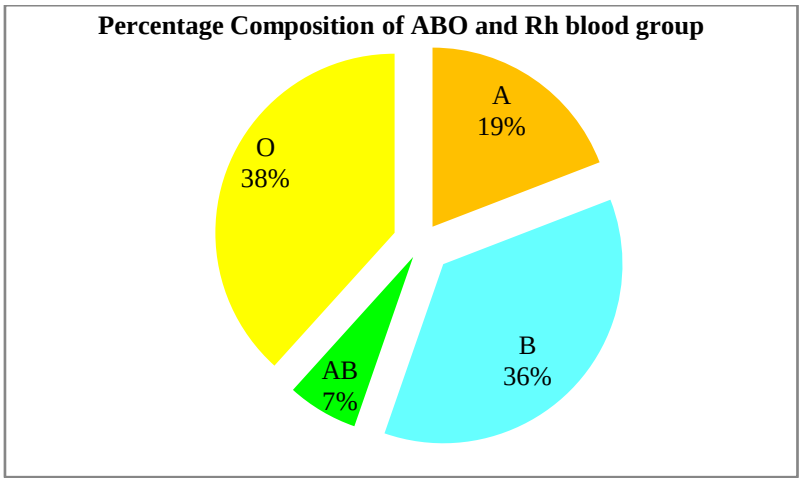

Fig 4:Pie chart showing percentage composition of blood groups

Table 4:Frequency of ABO and Rh Blood group phenotypes in various studies

Name of the study	Region	Study Population	Sample size	ABO BLOOD GROUP				Rh BLOOD GROUP	
				A	B	AB	O	Rh+	Rh-
Krishna M C et al	Tumkur	Blood, donars, Recipients,Patients	4823	21.54	31.85	8.7	37.9	94.65	5.35
Periyavan S et al	Banglore	Blood donars	36964	23.85	29.95	6.35	39.8	94.2	5.79
Rao C and Shetty J	Dakshina Kannada	Donars and Patients	43103	25.8	27.3	4.8	42	94.64	5.35
Gadwalkar SR et al	Bellary	Blood donars and in-patients	16097	21.7	35.48	8.49	34.3	90.95	5.1
Hemalatha NR and Bhagya V	Davanagare	Medical students	152	19	32.2	7.2	41.5	94	6
Hemalatha NR	Mandya	Medical students	82	26.8	39.02	2.4	31.7	95.1	4.9
Vinutha B et al	Harihara	Degree college students	351	21.9	34.2	10.3	33.7	96.9	3.1
Present study	Vriddhachalam	Degree college students	423	19.14	36.17	6.38	38.29	95.98	4.01

IV. DISCUSSION

The present study was carried out to determine the frequency and distribution of ABO and Rh blood groups among UG first year,Science students.The Phenotype and Genotype frequencies of ABO and Rh blood group varies widely across different study population (Raja KA *et al.*,2016).ABO and Rh blood group distributional studies are very important in the field of blood transfusion, transplantation of organs, human evolution and forensic studies.Some blood groups are susceptible to certain diseases like Ulcers UTI,diabetes mellitus etc(Chandrika Rao *et al.,* 2014) therefore blood groups are known to be in genetic association with some diseases. Various studies have stated that individuals with A blood group were proned to heart diseases like venous thrombosis,Ischemic heart disease and atherosclerosis but O blood group individuals were protective to such diseases. Some scientists identified that ovarian cancers are more common in B blood groups. Also gastric ulcers are least noticed in O groups than other blood groups(Swamy CM *et al.*,2012). The genetic history of an individual can be known by studying the blood group(Sokolov,1993)

In my study O blood group were more common ,followed by B blood group with the frequency 38.29% and 36.17% respectively,Which was similar to the studies of(Krishnan MC *et al*,2014;Periyavan S *et al.*,2010;Roa C and ShettyJ 2014;Hemalatha NR and Bhagya V 2015). Similar to my study , (Das PK Nair *et al.,* Vellore 2001; Girish *et al.*,2011;Nag *et al.*,2012;Durgapur,Eastern part of India, ,Mallikarjuna S *et al.*,2012) found that the commonly observed blood group ws O followed by B,A,AB. Vinutha B *et al.*,(2018) observed that B blood group was most common followed by O blood group.Swamy CM *et al.*.(2012) conducted a study among the great eastern medical students of Andhra pradesh and confirmed that O blood group was most dominant and commonest.Studies in North India also proved that O blood group was predominant followed by B,A and AB.(Das *et al.*,2001;Reddy and Sudha 2009;Periyavan *et al.*,2010). Rh positive was found to be more dominant than Rh negative,most literature indicates that 99% Asians were Rh positive(Ganong W F 1993).In my study also Rh positive blood group was more frequent 95.98% and Rh negative group was 4.01%,which was similar to that of studies done by (Pramanik, T., Praminic, S., 2000) among Nepalese Medical students.

V. CONCLUSION

This study indicates the prevalance of blood groups in small samples,which can also be correlated with large samples.The data obtained in my study can be a tool for several medical studies and therefore implementing various health novalties.The information regarding blood groups among college students will be helpful at the time of blood transfusion, organ transplantation and any other medical needs.

Conflict of interest

There is no conflict to disclose

REFERENCES

[1]. Behra R, Joshi YR. 2013.Distribution of ABO blood group and RH(D) factor in western Rajasthan. National J.Medical Res 3:735.*Anthropologist* **8 .**53-4

[2]. Bethesda, D.L., 2005. Blood Groups and Red Cell Antigens. In: The Rh blood group. USA: National Center for Biotechnology Information., p.1-6.

[3]. Chandrika Rao, Jayaprakash Shetty 2014. Frequency of ABO and rhesus (D) blood groups in Dakshina Kannada district of Karnataka - A study from rural tertiary care teaching hospital in South India. NUJHS.4:57-60.

[4]. Daniel HL, Clark AG 2007. Principle of population genetics. 4th ed.Sinaur. Associates. Sunderland, Massachusetts P 633.

[5]. Das PK, Nair SC, Harris VK, Rose D, Mammen JJ, Bose YN, Sudarsanam A 2001. Distribution of ABO and Rh-D blood groups among blood donors in a tertiary care centre in South India. Trop Doct. 31:47-8.

[6]. Gadwalkar SR, Kumar NS 2013. Distribution of blood groups in and around Bellary, Karnataka. Ind. Jour. Clin Prac.24(3):247–50.

[7]. Ganong WF. Review of Medical physiology. 16th edition. 1993.Norwalk CT, Appleton and Lange. 486-7.

[8]. Garraty G, Dzik W, Issitt PD, Lubin DM, Reid ME, Zelinski T 2000. Terminology for blood group antigens and genes- historical origins and guideline in the new millennium. Transfusion. 40:477–89.

[9]. Gauniyal M 2006. The study of blood group A1A2BO and Rh among the Brahmins of Mussoorie, Uttaranchal

[10]. Girish CJ, Chandrashekhar TN, Ramesh Babu K, Kantikar SM 2011. ABO and Rhesus blood group distribution among Malnad region blood donors. Research and reviews in Biomedicine and Biotechnology 2:25- 30

[11]. Haloi A 2011. Genetic Characterization of the Biates of Saipung Village of Jaintia Hills District, Meghalaya *Anthropologist* **13** 239-240

[12]. Handoo S and Bala S S (2014) Distribution of ABO and Rhesus Blood Groups in Kashmir Valley *Internat J Sc. Resch* **3**(9)233-35

[13]. Hemalatha NR, Bhagya V 2015. Frequency and distribution of blood groups among medical students in davanagere. J Pub Health Med Res 3(1):1-4

[14]. Hemalatha NR 2017. ABO and Rh blood group distribution among medical students in Mandya. International Jour. Contemp. Med. Res.; 4 (8):1655–8.

[15]. Jolly JG 2000. Medico legal significance of human blood groups. J Indian Med Assoc. 98:340–341.

[16]. Khalid M, Aslam N, Aslam M, Ahmad R 2013. Distribution of ABO and Rh (D) blood groups among blood donors in district Mardan,Pakistan. Journal of Saidu Medical College 3(2):318-322.

[17]. Khurshid B, Naz M, Hassan M, Mabood SF 1992. Frequency of ABO and Rh (D) blood groups in district Swabi, NWFP, Pakistan. J Sci Tech University Peshawar. 16:5-6.

[18]. Knowles S, Poole G 2002. Human blood group systems. In: Murphy MF, Pamphilon DH, editors. Practical Transfusion Medicine. 1st ed.London, UK: Blackwell Science pp. 24-31

[19]. Krishna MC, Sharadha MS, Hulinaykar RM, Harish SG 2014. Frequency and distribution of ABO and Rhesus (D) blood groups in and around Tumkur, Karnataka, Study from Teritiary Care Teaching Hospital. Internat Jour. Healthcare Sci.2(1):135–9.

[20]. .Mallikarjuna S 2012. Prevalence of ABO and Rhesus blood group among blood donors. Ind J Pub Health Research and Development 3:106-9.

[21]. Murphy WJ, Fronicke L, O'Brien SJ, Stanyon R 2003. The Origin of Human Chromosome 1 and Its Homologs in Mammals".Genome Research 13(8):1880-1888.

[22]. Nag I, Das SS 2012. ABO and Rhesus blood groups in potential blood donors at Durgapur Steel City of the district of Burdwan, West Bengal. Asian J. Transfus. Sci 6:54-5.

[23]. Pandey B N, Jahangeer M D, Kumar D, Vatsal S and Verma D K 2013. Genetic structure and micro genetic differentiation among populations of Terai belt of Bihar, India *European Journal of Experimental Biology* **3 :** 80-87

[24]. Pandey B N, Kumari R, Mishra A, Jahangeer K D and Ojha A K 2012. Genetic variation and micro-genetic differentiation among tribal populations of Jharkhand, India *Scholarly Journal of Agricultural Science* **2** 147-156

[25]. Pathania I 2011. The Serological Variation Among Tribal and Non-Tribal population of Himachal Pradesh Biological Forum *Biological Forum- An International Journal* **3** 44-47

[26]. PeriyavanS, Sangeetha SK, Marimuthu P, Manjunath BK, Seema DM 2010. Distribution of ABO and Rhesus-D blood groups in and around Bangalore. AsianJ.Transfus.Sci. 4:41.

[27]. Periyavan S, Sangeetha S, Marimuthu P, Manjunath B, Seema D 2010. Distribution of ABO and Rhesus-D blood groups in and around Bangalore. Asian Jour. Transfusion ScienceJan 1; 4(1):41. Pradesh, India *Not Sci Bio* **3** 7-14

[28]. Prakash D S R S, Varma P J, Reddy S G and Dasgupta A 2013. Genetic Variation of Blood Group Polymorphism among an Endogamous Human Population from Andhra Pradesh,India. *International Journal of Scientific Study* **1** 22-25

[29]. Pramanik, T., Praminic, S., 2000.,Distribution of ABO and Rh blood groups in Nepalese medical students: a report. East Mediterr Health J 6(1):156-158

[30]. Rai V and Kumar P 2011. Genetic Analysis of ABO and Rh Blood Groups in Backward Caste Population of UttarPradesh, India *Not Sci Bio* **3** 7-14

[31]. Raja KA, Dobariya GH, Unagar CA, Pandya AN, Patel JN, Wadhwani SJ 2016. Frequency and distribution of ABO and Rh blood groups among blood donors in tertiary care hospital of South Gujarat, India.Internat. Jour. Res. Med. Sci.; 4(12):5377–81.

[32]. Rao C,Shetty J 2012. Frequency of ABO and Rhesus (D) blood groups in Dakshina Kannada district of Karnataka- A study from rural tertiary care teaching hospital in south India. Nitte University Journal of Health Science. 2014 Sep 1; 4(3):57.

[33]. Reddy, K.S.N., Sudha, G., 2009. Rh (D) blood groups among the desuri Reddis of Chittoor District, Andhra Pradesh.Anthropologist. 11(3): 237-238.

[34]. Sah A K and Sahadalal B 2016. Frequency and distribution of blood groups in the donors of a rural hospitals, Barasat,24 Parganas, West Bengal, India *Int J Pharm Bio Sci* **7** 414-418

[35]. Saladin K 2003. Anatomy and Physiology: The unity of Form and Function, 3rd edition. The McGraw- Hill Companies, USA pp. 679-698
[36]. Shakir M, Khan SA and Ghani E. Frequency of ABO and Rh (D) blood groups among blood donors in NewYork , Simon &Schustz 1-50.
[37]. Shrivastava S, Gahine R and Kapse V 2015. ABO, rhesus blood group and allele frequency in and around Raipur (Chattisgarh state), India *IJCRR* **7** 52-58
[38]. Sidhu S 2003. Distribution of the ABO blood groups and Rh(D) factor among the scheduled caste population of Punjab. Anthropologis t;5:203
[39]. Sokolov R (1993) Why we eat ,What we eat.How Colombus changed the way the world eats. Rawalpindi/Islamabad area. Journal ;2:Pages
[40]. Soram J S, Panmei K and Biswas S P 2014. Distribution of ABO and Rh (D) blood group among the people of Mao naga Tribe of Mao, Senapati district of Manipur, North East India *International Journal of Development Research* **4** 184-187
[41]. Subhashini A B 2007 Distribution of ABO and Rh (D) Blood Groups among Irulas a Tribal Population of Pondicherry,India *Anthropologist* **9** 163-64
[42]. Sukumaran M K, Padma A S, Vanitha S, Rajani D and Padma S 2016 Frequency of ABO and Rh Blood Groups among High School Children of Alwal, Secunderabad, Telangana,India *Journal of dental and medical sciences* **15** 47-49
[43]. Swamy CM, Basavaraj PB, Kavitha GU, Shashikala P 2012. Prevalence of ABO and Rhesus blood group among blood donors. Indian J Public Health Res Dev.3:106-9.
[44]. Vinutha B ,Shashikala P,and Kavitha GU 2018.Frequency and Distribution of ABO and Rhesus Blood Groups in Women of a Degree College *ISSN (Print) : 2231-1947* DOI: 10.26463/rjms/2018/v8/i1/121005.
[45]. Zahid H, Yahyaoui A, Uwingabiye J, El Khazraji A, El Hadef R,Messaoudi N 2016. Phenotypic and allelic distribution of ABO and Rh-D blood Groups in Blood Transfusion Center of Avicenna Military Hospital, Marrakech,orocco.International Journal of Medicine and Health Research 2(1):1-9.

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