
Distribution of ABO and Rh Blood Groups Among Students of Some Ethnic Groups at Dilla University, Ethiopia

Fekadu Alemu Atire

Department of Biology, College of Natural and Computational Sciences, Dilla University, Dilla, Ethiopia

Email address:

fekealex@gmail.com

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Abstract: Red Blood cells (Erythrocytes) have an inherited combination of proteins, glycol-proteins, and glycol-lipids on their surfaces. These function as antigens that enable our immune system to distinguish our own cells from foreign invaders. Part of the immune response is the production of globulins called antibodies to combat the invader. In blood typing, the antigens of Red Blood Cell surfaces are also called agglutinogens because they are partially responsible for Red Blood Cell agglutination in mismatched transfusions. A blood sample was taken from the voluntary students of Dilla University. There are differences in frequency distribution of the blood group (ABO) among the ethnic groups and administrative of the students at Dilla University. The most prevalent blood group was type O (44.49 %) followed by A (26.32 %), B (26.32 %), and AB (2.87 %). The most prevalent Rh-positive blood group among students were type O⁺ (41.94 %) followed by A⁺ (31.72 %), B⁺ (26.34 %), and AB⁺ (2.15 %) as well as the highest Rh-negative blood groups among students were type O⁻ (65.22 %) followed by B⁻ (26.08%), AB⁻ (26.34 %), and no A⁻ blood group. Therefore, the blood type and group of Dilla University students varies across the ethnic groups.

Keywords: Dilla University, Ethnic Groups, Red Blood Cell, Rh-Negative Blood Groups, Rh-Positive Blood Group

1. Introduction

The blood plays more roles than one might expect, it is involved in respiration, nutrition, waste elimination, thermoregulation, immune defense, water and acid-base balance, and internal communication. Most adults have 4 to 6 L of blood. Erythrocytes are also known as red blood cells (RBCs), leukocytes are also known as white blood cells (WBCs) and Platelets. Erythrocytes have two principal functions: (1) to pick up oxygen from the lungs and deliver it to tissues elsewhere and (2) to pick up carbon dioxide from other tissues and unload it in the lungs. An erythrocyte is a disc-shaped cell with a thick rim and a thin sunken center where the nucleus used to be. It is about 7.5 μm in diameter and 2.0 μm thick at the rim [1]. The differences in human blood are due to the presence or absence of certain protein molecules called antigens and antibodies. The antigens are located on the surface of the red blood cells and the antibodies are in the blood plasma. Individuals have different types and combinations of these molecules [2].

The ABO and Rh blood groups are the most important blood groups despite the long list of several other blood

groups discovered so far [3, 4]. ABO and Rh blood groups are the most studied blood systems among human populations due to their clinical, genetic and anthropological importance [5, 6, 7]. The grouping of ABO and Rh factor into blood groups is based on the antigenic properties on the surface membrane of the red blood cells (RBCs) [8]. The two significant blood group systems were discovered during early experiments with blood transfusions, the ABO group in 1901 and the rhesus group in 1939 [9]. Blood types A, B, AB, and O form the ABO blood group. ABO blood type is determined by the hereditary presence or absence of antigens A and B on RBCs. The antigens are glycol-proteins and glycol-lipids membrane proteins and phospholipids with short carbohydrate chains bonded to them. Figure 1 shows how these carbohydrates determine the ABO blood types. In blood typing, the antigens of RBC surfaces are also called agglutinogens because they are partially responsible for RBC agglutination in mismatched transfusions. The plasma antibodies that react against them are also called agglutinins as indicated in Figure 2 [1].

The Rh blood group is named for the rhesus monkey, in which the Rh antigens were discovered in 1940. This group is determined by genes called D which has two alleles: D, d.

Whatever other alleles a person may have, anyone with genotype DD or Dd has D antigens on his or her RBCs and is classified as Rh-positive (Rh⁺). In Rh-negative (Rh⁻) people, the D antigen is lacking. The Rh blood type is tested by using an anti-D reagent. ABO group, anti-D antibodies are not normally present in the blood. They form only in Rh⁺ individuals who are exposed to Rh⁻ blood. If an Rh⁻ person receives an Rh⁺ transfusion, the recipient produces anti-D. A related condition sometimes occurs when an Rh⁻ woman carries an Rh⁺ fetus. The first pregnancy is likely to be

uneventful because the placenta normally prevents maternal and fetal blood from mixing. However, at the time of birth, or if a miscarriage occurs, placental tearing exposes the mother to Rh⁺ fetal blood. She then begins to produce anti-D antibodies as indicated in Figure 3. If she becomes pregnant again with an Rh⁺ fetus, her anti-D antibodies may pass through the placenta and agglutinate the fetal erythrocytes. Agglutinated RBCs hemolyze, and the baby is born with a severe anemia called hemolytic disease of the newborn (HDN), or erythroblastosis fetalis [1].

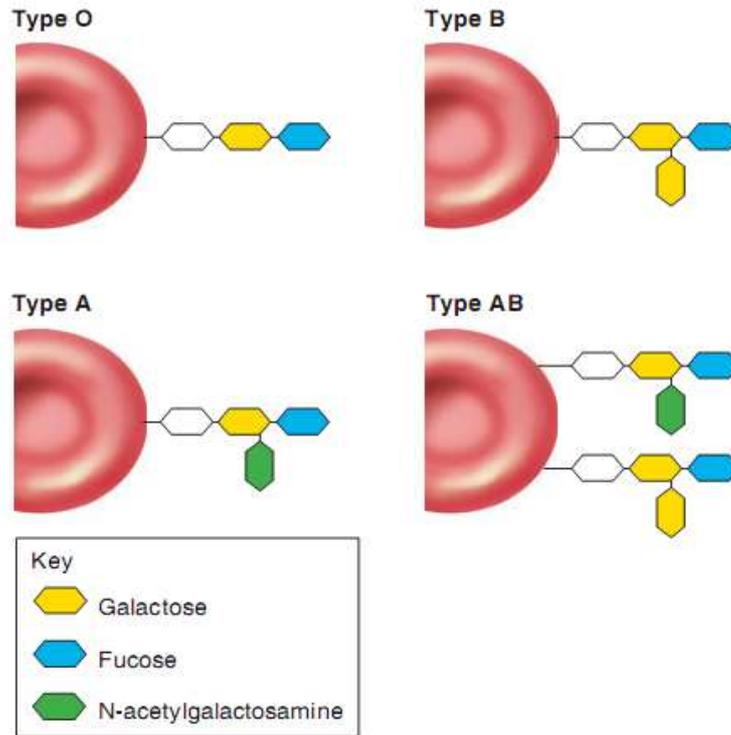


Figure 1. Chemical bases of the ABO Blood Types, the terminal carbohydrates of the antigenic glycolipids are shown. All of them end with galactose and fucose (not to be confused with fructose). In type A, the galactose also has an N-acetylgalactosamine added to it; in type B, it has another galactose; and in type AB, both of these chain types are present[1].

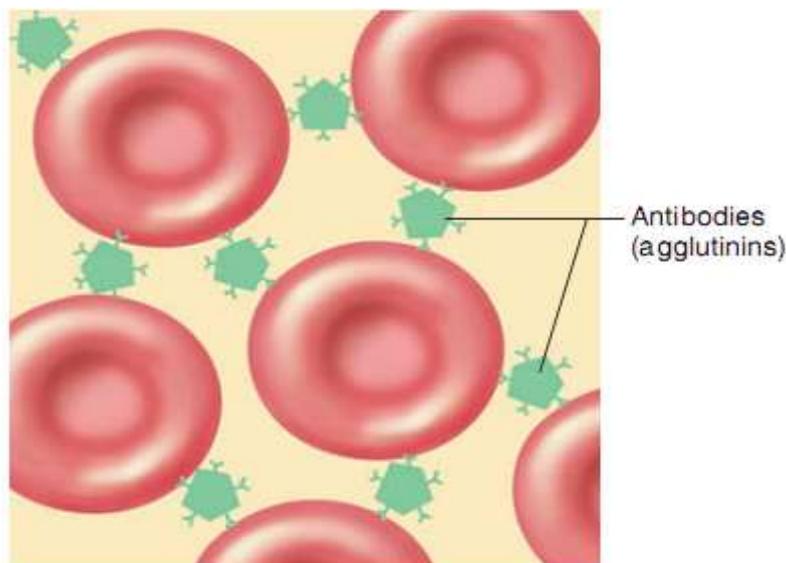


Figure 2. Agglutination of RBCs by an Antibody, Anti-A and anti-B have 10 binding sites, located at the 2 tips of each of the 5 Ys, and can therefore bind multiple RBCs to each other [1].

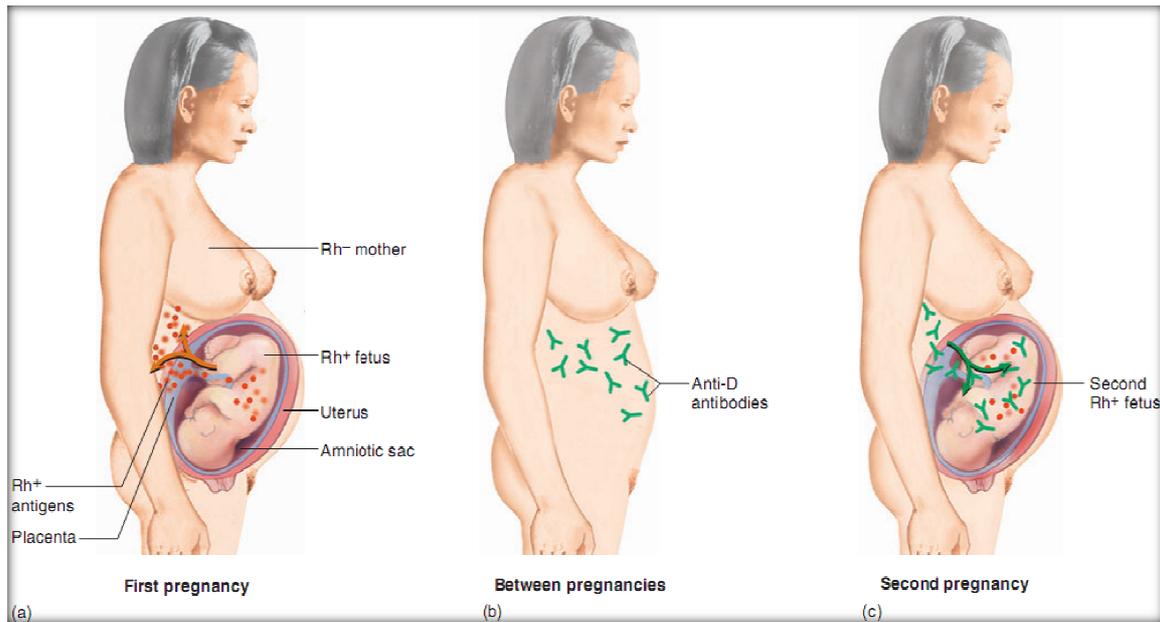


Figure 3. Hemolytic Disease of the Newborn (HDN), (a) When an Rh⁻ woman is pregnant with an Rh⁺ fetus; she is exposed to D (Rh) antigens, especially during childbirth. (b) Following that pregnancy, her immune system produces anti-D antibodies. (c) If she later becomes pregnant with another Rh⁺ fetus, her anti-D antibodies can cross the placenta and agglutinate the blood of that fetus, causing that child to be born with HDN[1].

Furthermore, the discovery of ABO and Rh blood groups has contributed immensely to blood banking services and transfusion medicine in preventing many of the immunogenetic, hematological and transfusion problems [10]. The ABO and Rh blood groups varies worldwide and are not found in equal numbers even among different ethnic groups. Among African-American ABO blood group, the distribution of type O, 46%; type A, 27%; type B, 20%; and type AB, 7%. In Caucasians in the United State, the distribution is type O, 47%; type A, 41%; type B, 9%; type AB, 3%. Also, among Western Europeans, type O, 46%; type A, 42%; type B, 9%; and type AB, 3% [11, 12]. Moreover, Rh-positive is documented as 95% in African-Americans, 100% in Africans whereas Rh- negative is 5.5% in South India, 5% in Nairobi, 7.3% in Lahore, 4.8% in Nigeria [13, 14]. The ABO bloodsystem was the first blood typesystem (Landsteiner, 1900) and it is also the most clinically important system with regard to blood transfusion. The blood grouping is done in laboratories by slide test which is a manual method. Most of the techniques applied are still based on the principle of interaction between antigen and antibody and subsequent agglutination of RBCs (positive result). The absence of agglutination indicates the lack of interaction (negative result) [15].

Determination of ABO grouping is important in pre-transfusion studies of patients and donors as well as in cases of patients. There are different techniques to determine ABO grouping in the laboratory: slide, test tube and micro plate. In each technique results are interpreted based on the presence or absence of agglutination reaction. Agglutination reaction is interpreted as a positive (+) test result and indicates, based on the method used, the presence of specific antigen on erythrocytes or antibody in the serum of an individual. No agglutination reaction produces a negative (-) test indicating

the absence of specific antigens on erythrocytes or antibody in the serum of an individual. Apart from their importance in blood transfusion practice, the ABO and Rh blood groups are useful in population genetic studies, researching population migration patterns as well as resolving certain medico-legal issues, particularly of disputed paternity cases. In modern medicine besides their importance in evolution, their relation to disease and environment is being increasingly important [16, 17].

Interestingly, apart from the importance of ABO and Rh blood groups in blood transfusion practice, they are useful in population genetic studies, researching population migration pattern. It is, therefore, imperative to have information on the distribution of these blood groups in any population group that comprise different ethnic groups. This present study will be investigated to have information on the distribution of ABO and Rh blood groups among each of all Dilla University which represent all Ethiopian population (nation and nationality). This is also giving the way of selecting blood type and knowing that will be needed during marriage and accident for donating to patient and receiving from healthy individuals. Present study was focused on determination of the blood types of voluntary students of Dilla University which are coming from all ethnic groups.

2. Materials and Methods

2.1. Study Site and Sample of Population

This study was carried out at the College of Natural and Computational Science, Department of Biology, in Microbiology Laboratory at Dilla University, Ethiopia, during 2014.

A total of 209 voluntary students were randomly selected

among the all students at Dilla University and tested. The students were divided into 6 major ethnic groups and one administration i.e., Amhara, Southern Nations Nationalities and Peoples (SNNP), Oromia, Gambela Peoples, Tigray, Benshangul-Gumaz and Addis Ababa ethnic groups and administrative respectively. Out of 209 voluntary students, 77 (52 males, 24 females), 71 (40 males, 31 females) and 47 (33 males, 14 females), 4 (4 males, 0 females), 3 (0 males, 3 females) 1 (0 males, 1 females), 7 (3 males, 4 females) students were Amhara, SNNP, Oromia, Gambela Peoples, Tigray, Benshangul-Gumaz and Addis Ababa ethnic groups and administrative with mean age 22.5, range 19-26 years respectively.

2.2. Laboratory Analyses

2.2.1. Blood Samples Collection and Blood Group Determination

ABO and Rh blood groups tests: Blood samples from each student was taken by scrub the middle finger with a piece of cotton saturated with 70% alcohol and pierce it with a sterile disposable lancet and was placed a small drop of blood on a three clean white glass slide on which a few drops of antisera for blood group A and B was applied as shown Figure 4, 5, 6, 7. A drop of each of the antisera, anti A, anti B and anti D was added and mixed with each blood sample, with the aid of applicator stick as shown in fig 7. Blood was mixed thoroughly with the antisera and rocked gently for 60 sec to observe agglutination. The slide was then tilted to detect for agglutination and the result recorded accordingly [18, 19]. In case of doubt, the test was examined under a microscope, or the results were confirmed by reverse grouping using known group A and B red cells [20]. This procedure was repeated for all the subjects.



Figure 4. During blood sample taken from voluntary students.

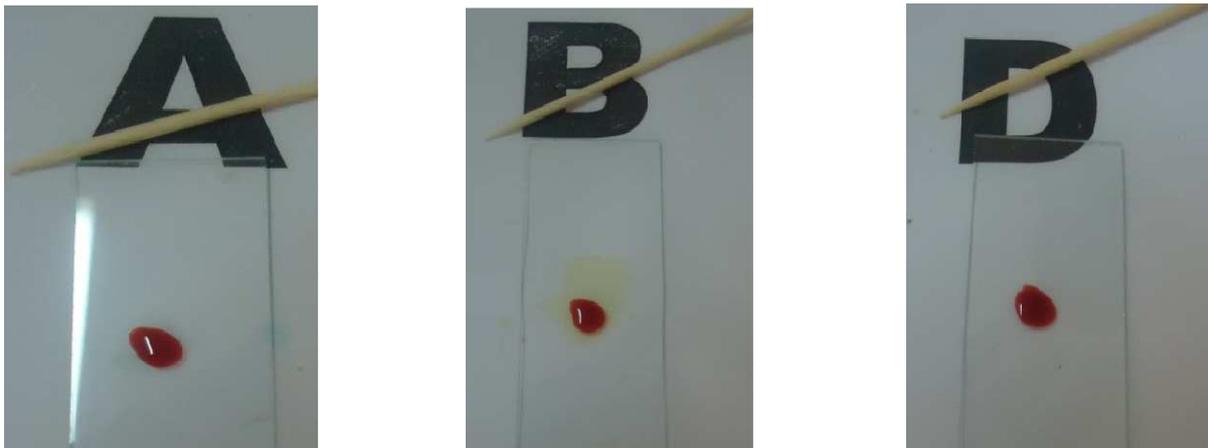


Figure 5. After blood sample taken on clean glass slide from voluntary student.



Figure 6. Anti-A, anti- B, and anti-D Monoclonal.



Figure7. Addition of antisera on each blood group.

2.2.2. Observation of Blood Type and Group

The following are the blood samples of various blood groups taken and mixed with Anti-A, Anti-B and Anti-D (Anti-Rho D) Monoclonal and observed by naked eye and under the microscope either form clumping or not.

A.A Positive Group

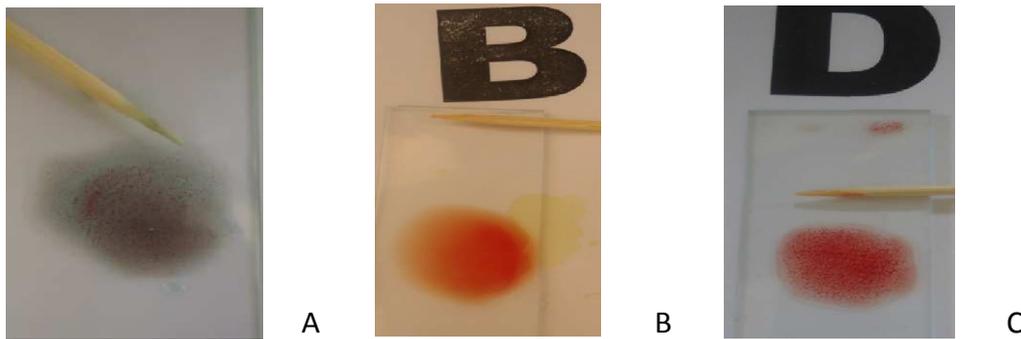


Figure 8. Positive blood group sample.

Figure 8 (A, B, C) shows the A Positive blood group sample on adding Antigen-A, Antigen-B and Antigen-D respectively. When Antibody A, Antibody B and Antibody D was added on the positive A blood type, the blood sample on slide A and C was form aggregates (agglutinate) butthe blood sample found on slideB remain fluid (No aggregates).

B.A Negative Group

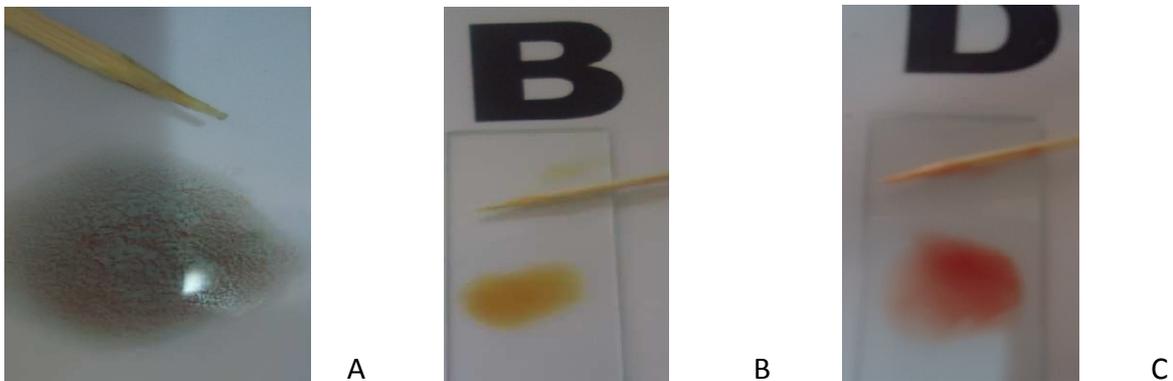


Figure 9. A Negative blood group sample.

Figure 9 (A, B, C) shows the A Negative blood group sample on adding Antigen-A, Antigen-B and Antigen-D respectively. When Antibody A, Antibody B and Antibody D was added on the positive A blood type, the blood sample on slide A was form clump (agglutinates) butthe two blood sample found on slideBand C remain fluid (No clump).

C. B Positive Group

Figure 10 (A, B, C) shows the B Positive blood group sample on adding Antigen-A, Antigen-B and Antigen-D respectively. When Antibody A, Antibody B and Antibody D

was added on the positive B blood type, the blood sample on slide B and C was form aggregates (agglutinates) but the blood sample found on slide A remain fluid (No aggregates).

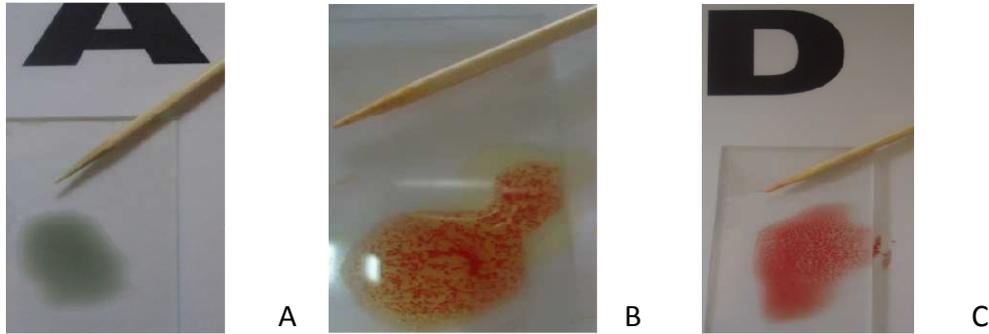


Figure 10. B Positive blood group samples.

D. B Negative Group

Figure 11(A, B, C) shows the B Negative blood group sample on adding Antigen-A, Antigen-B and Antigen-D respectively. When Antibody A, Antibody B and Antibody D

was added on the positive B blood type, the blood sample only on slide B was form aggregates (agglutinates) but the two blood sample found on slide A and C remain fluid (No aggregates).

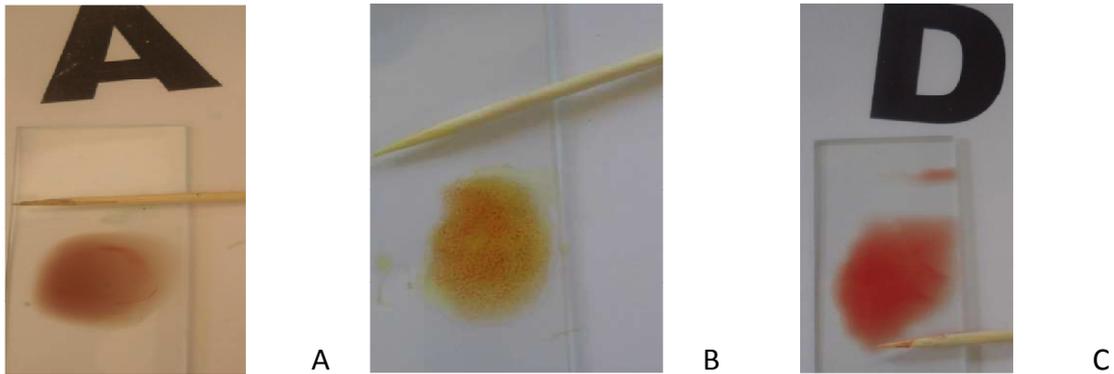


Figure 11. B Negative blood group samples.

E. AB Positive Group

Figure 12 (A, B, C) shows the AB Positive blood group sample on adding Antigen-A, Antigen-B and Antigen-D respectively. When Antibody A, Antibody B and Antibody D

was added on the positive AB blood type, all blood sample found on slide A, B and C was form aggregates (agglutinates).

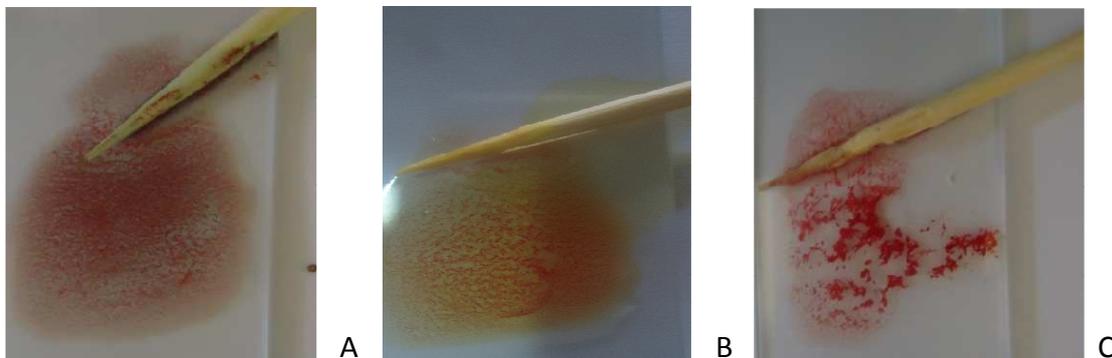


Figure 12. AB Positive blood group sample.

F. AB Negative Group

Figure 13 (A, B, C) shows the AB Negative blood group sample on adding Antigen-A, Antigen-B and Antigen-D

respectively. When Antibody A, Antibody B and Antibody D was added on the negative AB blood type, the blood sample on slide A and B was form aggregates (agglutinates)

but the blood sample found on slide C remain fluid (No aggregates).

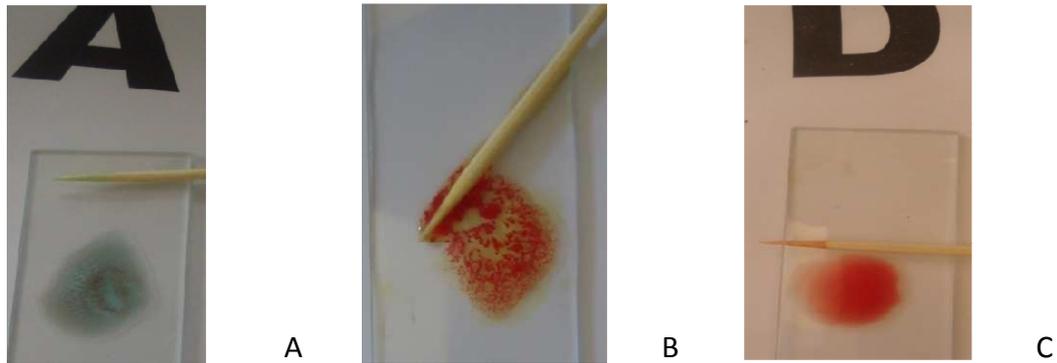


Figure 13. AB Negative blood group sample.

G.O Positive Group

Figure 14 (A, B, C) shows the O Positive blood group sample on adding Antigen-A, Antigen-B and Antigen-D respectively. When Antibody A, Antibody B and Antibody D

was added on the positive O blood type, the blood sample found only on slide C was form aggregates (agglutinates) but the two blood sample found on slide A and B remain fluid (No aggregates).

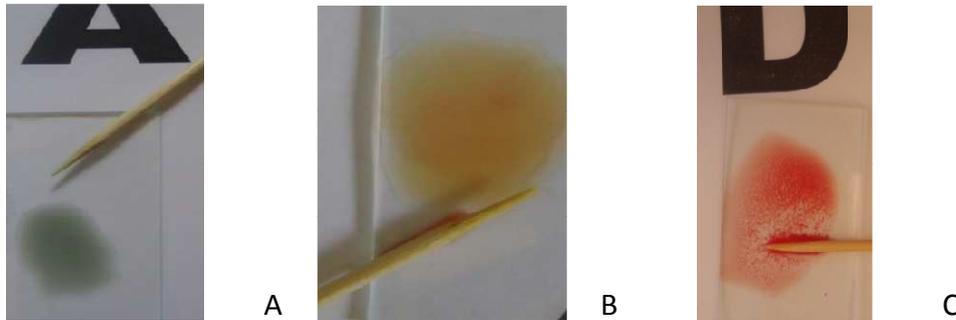


Figure 14. O Positive blood group sample

H.O Negative Group

Figure 15 (A, B, C) shows the O Negative blood group sample on adding Antigen-A, Antigen-B and Antigen-D

respectively. When Antibody A, Antibody B and Antibody D was added on the negative O blood type, all blood sample found on slide A, B and C was remain fluid (No aggregates).

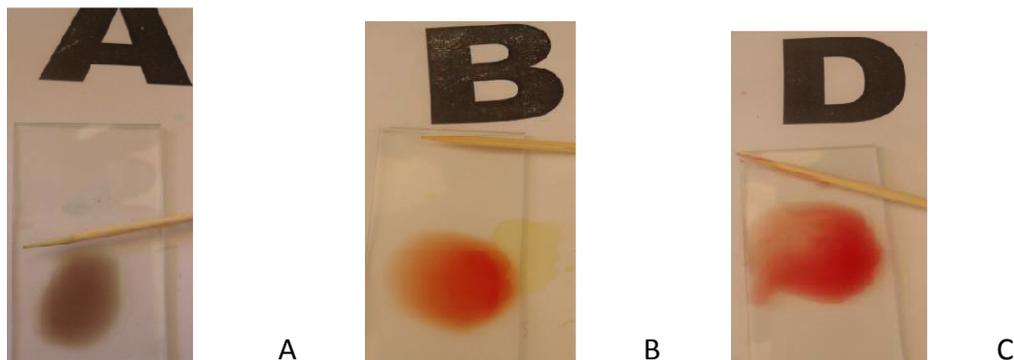


Figure 15. O Negative blood group sample.

2.3. Ethical Clearance

The study protocol was reviewed and approved by the Ethical Review Committee of Department of Biology, Dilla University. Written informed consent was obtained from all study participants who participated in the study after explaining the purpose and objective of the study.

2.4. Statistical Analysis

Data was analyzed using SPSS software (version 13.0, Chicago, IL, USA) and SISA software. Data was expressed in percentage through graph, figure and tubular.

3. Results and Discussion

The different types and distribution of ABO and Rh blood group system recorded in the 6 state and one administrative represent students at Dilla University students at 2014 are shown in Table 1 and 2. Percentage distribution of the ABO blood group types among the students were 55 (26.32 %), 55 (26.32 %), 6 (2.87 %) and 93 (44.49 %) blood group A, B, AB and O, respectively. The most prevalent blood group was type O (44.49 %) followed by A (26.32 %), B (26.32 %), and AB (2.87 %) as shown in Table 1. There are differences in frequency distribution of the blood group (ABO) among the ethnic groups and administrative of the students at Dilla University. Blood group O has the highest frequency while blood group AB has the lowest frequency as shown in Table 1.

In the previous study reports, the Ethiopians ABO blood group, the distribution of type O, 40%; type A, 31%; type B, 23%; and type AB; 6% [21]. Many other studies have shown that blood group O was the most common blood group and blood group AB was the least common blood group in different ethnic groups [22]. For instance, in African-American ABO blood group, the distribution of type O, 46%; type A, 27%; type B, 20%; and type AB; 7%. In Caucasians in the United State, the distribution is type O, 47%; type A, 41%; type B, 9%; type AB, 3%. Also, among Western Europeans, type O, 46%; type A, 42%; type B, 9%; and type AB, 3% [11, 12]. Thus, the gene segregation for ABO systems always followed a particular pattern for its distribution in different ethnic group with exceptional cases.

3.1. Percentage Distribution of the ABO Blood Group Types in the Six Ethnic Groups and One Administrative of Dilla University Students

Of the 76 blood samples determined their blood type category, there were 15 (19.73%), 15 (19.73%), 3 (3.95%), 19 (25.00%) and 7 (9.21%), 6 (7.89%), 0 (0 %), 11 (14.47%) blood group A, B, AB and O male and female sex categories, respectively students came from Amhara state indicated Table 1. Similarly, O blood group has the highest overall percentage frequency (67.26%) among a Nigerian population while AB blood group has the least overall percentage

frequency (3.10%) [23]. In Nigeria, among 7653 individuals in Ogbomoso, Oyo State, 50% had type O, type A, 22.9%; type B, 21.3% and type AB, 5.9% [6].

Of the 71 blood samples determined their blood type category, there were 13 (18.31 %), 9 (1.26 %), 0 (0 %), 18 (25.35 %) and 7 (9.85 %), 7 (9.85 %), 1 (1.41 %), 16 (22.54 %) blood group A, B, AB and O male and female sex categories, respectively students came from SNNP state as indicated Table 1. Akinnuga [24] had reported that the students were 26.9% A blood type, 16.1% B blood type, 4.2% AB blood type and 52.9% O blood type.

Of the 47 blood samples determined their blood type category, there were 6 (12.76 %), 10 (21.27 %), 2 (4.25 %), 16 (34.04 %) and 3 (6.38 %) 5 (10.64 %), 0 (0 %), 5 (10.64 %) blood group A, B, AB and O male and female sex categories, respectively students came from Oromia state indicated Table 1. Patel [25] had reported that it can be seen that 39.40 % were detected to be having B blood group followed by O group 30.79 %, A group 21.94 % and AB group 7.86 %.

Of the 4 blood samples determined their blood type category, there were 4 (100%), blood group O and only male sex category, students came from Gambela Peoples state indicated Table 1. Of the 3 blood samples determined their blood type category, there were 1 (33.33%) and 2 (66.67) blood group B and O and both female sex category, students came from Tigray state indicated Table 1. Of the 1 blood samples determined her blood type category, there was 1 (100%), blood group A and female sex category, students came from Benshangul-Gumuz state indicated Table 1. Patel [25] had reported that regarding female, the total Rh blood group the rates were 92.92 % Rh- positive and 7.08% Rh-negative.

Of the 7 blood samples determined their blood type category, there were 1 (14.28 %) 1 (14.28 %) 0 (0 %), 1 (14.28 %) and 2 (28.57 %) 1 (14.28 %) 0 (0 %) 1 (14.28 %) blood group A, B, AB and O male and female sex categories, respectively students came from Addis Ababa administrative indicated Table 1. Similarly Bakare [26] report showed that 22.9% were blood group A, 21.3% were blood group B, and 5.9% was blood group AB and 50.0% were blood group O.

Table 1. Percentage distribution of the ABO blood group types in the Dilla University among 209 Voluntary students.

Ethnic groups and administrative	Sex	A (%)	B (%)	AB (%)	O (%)	Total
Amhara	Male	15 (19.73)	15 (19.73)	3 (3.95)	19 (25.00)	52
	Female	7 (9.21)	6 (7.89)	-	11 (14.47)	24
SNNP	Male	13 (18.31)	9 (1.26)	-	18 (25.35)	40
	Female	7 (9.85)	7 (9.85)	1 (1.41)	16 (22.54)	31
Oromia	Male	6 (12.76)	10 (21.27)	2 (4.25)	16 (34.04)	33
	Female	3 (6.38)	5 (10.64)	-	5 (10.64)	14
Gambela Peoples	Male	-	-	-	4 (100)	4
	Female	-	-	-	-	-
Tigray	Male	-	-	-	-	-
	Female	-	1 (33.33)	-	2 (66.67)	3
Benshangul-Gumuz	Male	-	-	-	-	-
	Female	1 (100)	-	-	-	1
Addis Ababa	Male	1 (14.28)	1 (14.28)	-	1 (14.28)	3
	Female	2 (28.57)	1 (14.28)	-	1 (14.28)	4
Total	Both sex	55 (26.32)	55 (26.32)	6 (2.87)	93 (44.49)	209

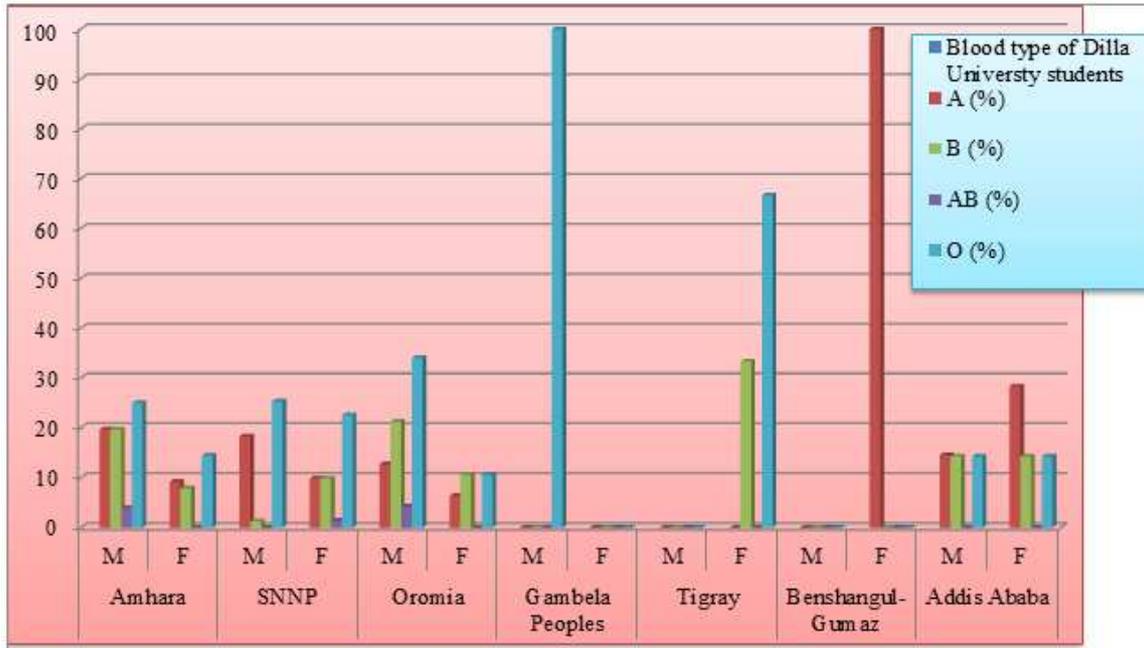


Figure 16. Percentage of blood type distribution among six ethnic groups and one administrative of Dilla University students.

3.2. Percentage of Blood Type Distribution Among Dilla University Students

Students came from Amhara state had highest O (25.00%) and (14.47%) blood group on both sex male and female respectively. Students came from SNNP state had highest O (25.35 %) and(22.54 %) blood group on both sex male and female respectively. Students came from Oromia state had highest O (34.04 %) and (10.64%) blood group on both sex male and female respectively. Students came from Addis Ababa administrate had highest A (28.57 %) blood group on female sex. Students came from Gambela Peoples state their

number are few and got only four male students, their blood type were O (100.00 %). Students came from Benshangul-Gumaz state their number are few and got only one female student, her blood type was A (100.00 %). Students came from Tigray state had highest O (66.67 %) blood group having female sex as indicated Figure 16. Bakare [26] report showed that the highest blood group 46.3 % were blood group O, 24.7 % were blood group B, 23.6 % were blood group A and the least blood group 5.4 % were blood group AB at Baptist Medical Centre.

Table 2. Rh blood group distribution among ethnic groups and administrative of 209 voluntary Dilla University students.

Ethnic groups and administrative	Rh-blood groups	A (%)	B (%)	AB (%)	O (%)	Total
Amhara	Positive	22 (28.94)	21 (27.63)	2 (2.63)	24 (31.57)	69
	Negative	-	-	1 (1.32)	6 (7.89)	7
SNNP	Positive	20 (28.16)	14 (19.72)	-	28 (39.44)	62
	Negative	-	2 (2.82)	1 (1.41)	6 (8.45)	9
Oromia	Positive	9 (19.15)	13 (27.66)	2 (4.26)	19 (40.43)	43
	Negative	-	2 (4.25)	-	2 (4.25)	4
Gambela Peoples	Positive	-	-	-	4 (100)	4
	Negative	-	-	-	-	-
Tigray	Positive	-	-	-	2 (66.67)	2
	Negative	-	1 (33.33)	-	-	1
Benshangul-Gumaz	Positive	1 (100)	-	-	-	1
	Negative	-	-	-	-	-
Addis Ababa	Positive	3 (42.85)	1 (14.28)	-	2 (28.57)	6
	Negative	-	1 (14.28)	-	-	1
Total	Both Rh-blood group	55 (26.32)	55 (26.32)	6 (2.87)	93 (44.49)	209

3.3. Rh Blood Group Distribution Among Ethnic Groups and Administrative

Table 2 showed the frequency distributions of ABO blood group and ethnic groups and administrative based on Rh blood group. The percentage of distribution of the ABO bloods

group and ethnic groups and administrative varies significantly based on Rh blood group. The most prevalent blood group was positive blood type (90.78 %), followed by negative blood type (9.21%), in the Amhara state of the students similarly, in the SNNP state of students was positive blood type (87.32 %) followed by negative blood type (12.68 %) (Table 2). On the

other hand, the highest blood type in the Oromia state of students was positive type (91.50 %) followed by (8.50 %) as indicated in Table 2. Bakare [25] report showed that the

highest Rh- blood types were Rh-positive 95.00 % and the Rh-blood types 5.00 % were Rh-negative at Baptist Medical Centre.

Table 3. Rh Negative blood group distribution among ethnic groups and administrative of 209 voluntary Dilla University students.

Ethnic groups and administrative	Sex	A ⁻ (%)	B ⁻ (%)	AB ⁻ (%)	O ⁻ (%)	Total
Amhara	Male	-	-	1 (12.50)	5 (62.50)	6
	Female	-	-	-	2 (25.00)	2
SNNP	Male	-	-	-	5 (55.56)	5
	Female	-	2 (22.22)	1 (11.11)	1 (11.11)	4
Oromia	Male	-	1 (25.00)	-	2 (50.00)	3
	Female	-	1 (25.00)	-	-	1
Gambela Peoples	Male	-	-	-	-	-
	Female	-	-	-	-	-
Tigray	Male	-	-	-	-	-
	Female	-	1 (100.00)	-	-	1
Benshangul-Gumaz	Male	-	-	-	-	-
	Female	-	-	-	-	-
Addis Ababa	Male	-	-	-	-	-
	Female	-	1 (100.00)	-	-	1
Total	Both sex	-	6 (26.08)	2 (8.69)	15 (65.22)	23

3.4. Rh-Negative Blood Groups Distribution

Table 3 showed the frequency distributions of ABO blood group and ethnic groups and administrative based on Rh blood group. The percentage of distribution of the ABO bloods group and ethnic groups and administrative varies significantly based on Rh blood group.

The most prevalent blood group was type O⁻ (62.50 %), followed by O⁻ (25.00 %), both male female respectively while only one AB⁻ (12.50%) female in the Amhara state

students as shown in Table 3. While, the most prevalent blood group was type O⁻ (55.56 %) followed by B⁻ (22.22 %) with male and female sex in the SNNP state. On the other hand, the highest blood group in the Oromia state of students was O⁻ (50.00 %) as indicated in Table 3. Bakare [26] report showed that the highest Rh- blood types were Rh-positive 95.00 % and the Rh-blood types 5.00 % were Rh-negative at Baptist Medical Centre.

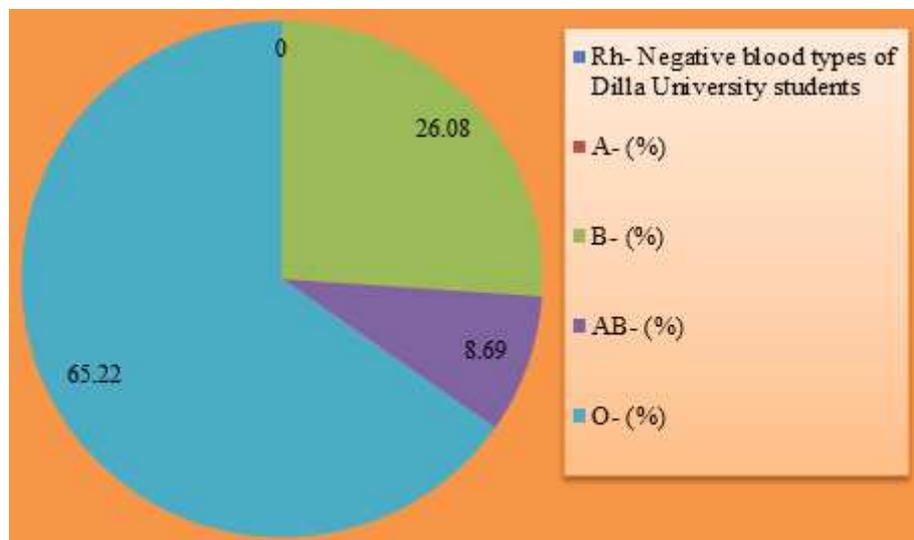


Figure 17. Percentage of Rh-negative blood groups distribution among students in Dilla University.

3.5. Distribution of Rh Blood Among Dilla University Students

The most prevalent Rh-negative blood groups among students were type O⁻ (65.22 %) followed by B⁻ (26.08%), AB⁻ (26.34 %), and no A blood group as shown in Figure 17. Bakare et al. (2005), report showed that the highest Rh-blood types were Rh-positive 96.70 % and the Rh-blood types 3.30 % were Rh-negative. Patel [25] had reported that

looking at the rhesus grouping, on male sex, 7.38 % were Rh positive AB Blood type and remaining 0.45 % were Rh negative AB Blood type .

3.6. Rh-Positive Blood Groups Distribution

Table 4 showed the frequency distributions of ABO blood group and ethnic groups and administrative based on Rh-blood group. The percentage of distribution of the ABO bloods

group and ethnic groups and administrative varies significantly based on Rh blood group.

The most prevalent blood group were type O⁺, B⁺, A⁺ and 25.00 %, 22.05 %, 20.58% male and A⁺, B⁺, AB⁺ and 11.76%, 8.82% , 8.82% female respectively students came from Amhara state as shown in Table 4. The most prevalent blood group were type O⁺, A⁺, B⁺, 25.80%,19.35 %11.29 %, and 19.35%,12.90%, 11.29 %both male and female respectively students came from SNNP state While there is no AB⁺ blood type in both sex in the present study of blood sample taken from SNNP state of students as shown in Table 4. The

prevalent Rh-positive blood groups among students were type, A⁺,B⁺,O⁺ and A⁺, O⁺,16.66 % and 33.33%, 16.66 % both male and female students came from Addis Ababa administrative respectively. Patel [25] had reported that looking at the rhesus grouping, on an average, 95.05 % were Rh positive and remaining 4.95 % were Rh negative. Male Rh-blood group 95.15 % were Rh positive whereas remaining male 4.85 %) were Rh negative. Patel [25] had reported that looking at the rhesus grouping, on female sex, 21.67% were Rh positive A blood type and remaining 0.83 % were Rh negative A blood type.

Table 4. Rh Positive blood group distribution among ethnic groups and administrative of 209 voluntary Dilla University students.

Ethnic groups and administrative	Sex	A ⁺ (%)	B ⁺ (%)	AB ⁺ (%)	O ⁺ (%)	Total
Amhara	Male	14 (20.58)	15 (22.05)	2 (2.94)	17 (25.00)	48
	Female	8 (11.76)	6 (8.82)	-	6 (8.82)	20
SNNP	Male	12 (19.35)	7 (11.29)	-	16 (25.80)	35
	Female	8 (12.90)	7 (11.29)	-	12 (19.35)	27
Oromia	Male	6 (13.95)	9 (20.93)	2 (4.65)	14 (32.56)	31
	Female	3 (6.97)	4 (9.30)	-	5 (11.63)	12
Gambela Peoples	Male	-	-	-	4 (100.00)	4
	Female	-	-	-	-	-
Tigray	Male	-	-	-	-	-
	Female	-	-	-	2 (100.00)	2
Benshangul-Gumaz	Male	-	-	-	-	-
	Female	1 (100.00)	-	-	-	1
Addis Ababa	Male	1 (16.67)	1 (16.66)	-	1 (16.66)	3
	Female	2 (33.33)	-	-	1 (16.67)	3
Total	Both sex	59 (31.72)	49 (26.34)	4 (2.15)	78 (41.94)	186

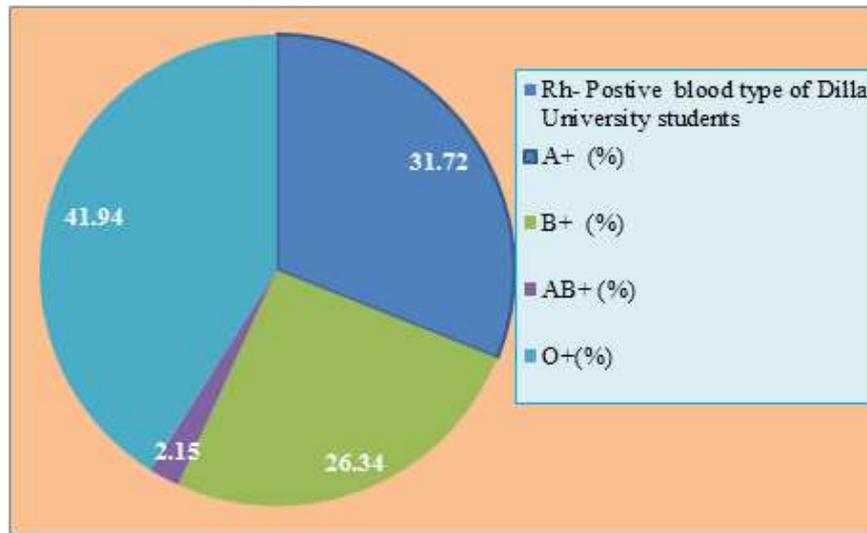


Figure 18. Percentage of Rh-positive blood groups distribution among students in Dilla University.

3.7. Rh-Positive Blood Groups Distribution

The most prevalent Rh-positive blood group among students were type O⁺ (41.94 %) followed by A⁺ (31.72 %), B⁺ (26.34 %), and AB⁺ (2.15 %) as shown in Figure 18. Patel [25] had reported that 95.48% were male and 4.52% were female subjects. As well as the commonest ABO blood group present was B (39.40 %) followed by O (30.79 %), A (21.94 %) and AB (7.86 %) in blood donors. Patel [25] had reported that looking at the rhesus grouping, on female sex, 28.33 % were Rh positive O blood type and remaining 2.92 %

were Rh negative O blood type.

4. Conclusion

The blood ABO and Rh blood group varies among ethnic group and administrative of Dilla University students. The relevance of having knowledge about the blood group systems among different ethnic groups in any population is enormous. The types of information obtained from the findings are useful for genetic information, genetic counseling, medical diagnosis and general and physiological

wellbeing of individuals in a population. And also very importance during emergency and accidental healthy disorder especially, at deficient blood and again for donating.

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