Accuracy of Blood Group Typed on National Identity Card

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Abstract:

Background: The ABO blood group was discovered in 1900 by Austrian scientist, Karl Landsteiner. The ABO blood group antigens are one of the most important issues in blood transfusion, because transfusion of ABO incompatible red cells will almost result in symptoms of a hemolytic transfusion reaction(HTR) and may cause disseminated intravascular coagulation, renal failure, and death. The ABO antigens may be found in many tissues and body fluids including red blood cell, platelets and endothelial cell. ABO grouping and Rh typing aid in the diagnosis, prevention and management of immunization associated with: Transfusion, pregnancy and solid organ and bone morrow transplantation.

Aim of study: the aim of the present study was evaluation the accuracy of the written blood group in the national ID card. **Material and Methods:** The current descriptive, cross-sectional study was conducted on a total of two hundred volunteers who live in Al-turbah city during March and April of the year 2015 by using the questionnaires in collecting of data. A total of two Hundred blood samples were collected from the volunteers. Direct, and indirect agglutination techniques (Tube method) used to determine the ABO blood group and Rh factor.

Result: the study results found that (5.5%) of the blood group type written on the national identity card issuing centers were incompatible with the tested blood group examined on this study of the same volunteer's group. **Conclusion:** clarify from results that the main cause for the incompatible evaluation, especially in development country, was due to carelessness of some medical laboratory staff for issuing fake blood group card to some people without examine their actual blood groups type., in addition, use un- reliable method that were used inside civil affair centers to test the blood group type.

Introduction

Blood group antigens are hereditary determined and play a vital role in transfusion safety, understanding genetics, inheritance pattern, and disease susceptibility. Nearly 700 erythrocyte antigens are described and organized into 30 blood group systems by the International Society of Blood Transfusion. [(1)] but the ABO and Rhesus (Rh) blood groups remain the most clinically important. [(2)] The red blood cell membranes have important and best known antigens; of these are the A and B antigens. Blood group Type A, has the A antigen and the blood group type B has B antigen, whereas the blood group type AB has both A and B antigens. Type-O has neither antigen [(3)] The antibodies against red blood cell antigens are called agglutinins and individuals are divided into four major blood groups A, B, AB & O, according the presence of these antigens and agglutinins. [(4).] ABO blood group is often referred to as a histo-blood group system because, in addition to being expressed on red cells, ABO antigens are present on most tissues and in soluble form in secretions. [(5)]

In the field of transfusion medicine, D is the most important blood group antigen after A and B. Anti-D, it can cause severe and fatal

haemolytic transfusion reactions (HTRs) and haemolytic disease of the fetus and newborn (HDFN).[6] Numerous variants of D exist, mostly caused by mutations within the *RHD* gene in which the whole D antigen is expressed, but expressed weakly.[7] individuals with weak D cannot make anti-D when immunized by a normal, complete D antigen and also there is Partial D, in which part of the D antigen is missing and individuals with partial D can make an antibody to those epitopes they lack, following immunization with complete D antigen, and this antibody behaves as anti-D in tests with red cells of common D phenotypes. Another type of D variant is DEL, in which the D is expressed so weakly, it cannot be detected by conventional serological methods and requires specialist techniques, in particular adsorption and elution. Consequently, it is possible that all D variants have the potential to immunise D_ transfusion recipients.

The greater the interface between antigen and antibody, the stronger are the binding forces generated and the greater the affinity of the antibody for its specific antigen. [10]. Some Factors that affect the equilibrium constant include pH, ionic strength and temperature. In additions, the degree of contact of the antibody-coated red cells with each other, the span of the antibody molecules, the electrical charge of the red cells, the location and density of the antigen sites on the red cells and the capacity of the antibody to bind complement after reacting with the antigen.

Problem Statement of study:

A Knowing and writing of the actual blood type in National ID card will help in knowing the blood type rapidly or to make sure for persons who they are in cases dangerous and require for blood transfusion quickly such as accidents, the soldiers in warfare' s , and for

facilitate searching for donors. therefore, we should care about writing the blood group type on national ID card properly and accurately.

Aim of study:

The aim of the present study was evaluation the accuracy of the written blood group in the national ID card.

Materials and methods:

This study was conducted on 200 volunteers live in Al-Turbah city in Yemen and who they are holding national ID cards during duration from March to April in 2015.This study excluded people whom they do not hold national ID cards.

The study carried out by:

1- Data collection by 2 questionnaire forms that were distributed to:

- The first questionnaire: be answered by the people who dwell in the city and holding on national ID cards. (Appendix .no1)
- The second questionnaire: be answered by those working in the field of determining blood groups in the civil status centers in the city. (Appendix .no2)

2- Determine the blood type of the target by:

- Direct agglutination test.
- Indirect agglutination test.

Laboratory procedures

- Tube method was used for determine the **ABO** groups of targets peoples. (5)

ABO grouping consists of:

- **Cell grouping** in which the red cells are tested for antigens A and B using anti-A and anti-B sera.
- **Serum grouping** (reverse grouping) in which the serum is tested for anti-A and anti-B by tapping gently the base of each tube, looking for agglutination or haemolysis.

- check for agglutination. Also look for any evidence of hemolysis in the supernatant which is read as a positive result. If no agglutination is seen, the contents of the tube must be examined microscopically.

- Rhesus grouping technique was used for detection of D antigen by monoclonal anti-D (IgM) which has the same detection procedures of ABO group, but by one tube , RBC washed .

Data analysis

Data collected and analyzed using the Statistical Package social program SPSS (version 22) According to the following stages:

1- Data entry.

2- Ensure health data.

3- Analysis.

3- Output data in the form of tables and figures.

Result

The results were illustrated in tables and in the figure indicated by their specific details for each table.

Table No. 1. Shows that the most of the blood group typing 88.5% were done in the civil affairs center while the lowest blood group typing 4% were done on other places.

Table1: place of diagnosis the blood group in ID card

Place of diagnosis the blood group in ID card	**Number**	**%**
Inside civil affairs center	177	**88.5**
Outside civil affairs center	15	**7.5**
Parent's blood group	00	**00**
Other (Non-diagnosed)	08	**04**
Total	200	**100**

Table No: 2. showing the highest percentage of blood group type that found in the volunteer´s national ID card that was is (O+) with 52% and the smallest percentage of blood group type that (AB-) with 0 %, and the result of blood group that noted by our blood group typing show a little difference.

Table 2: Distribution of sample according to blood group in ID card.

Blood group typed on ID card	Number	%
A+	50	**25**
B+	18	**9**
O+	104	**52**
AB+	4	**2**
A-	6	**3**
B-	6	**3**
O-	12	**6**
AB-	0	**0**
Total	200	**100**

Table No: 3, difference between the tested volunteer's blood groups and the actual blood group typed on the volunteer´s national ID card.

Blood group	Matching results between ID cards result and study's result					
	Match		Not match		Total	
	Number	%	Number	%	Number	%
A+	44	88	06	12	50	**100**
B+	18	100	00	00	18	**100**
O+	101	97.5	03	2.5	104	**100**
AB+	04	100	00	00	04	**100**
A-	05	84	1	16	06	**100**
B-	06	100	00	00	06	**100**
O-	11	92	01	08	12	**100**
AB-	00	99	00	00	00	**100**
Total	94.5	91.1	11	5.5	200	**100**

Table NO: 4 A mismatch result of blood group system which were noted by this study. The mismatched of ABO system was with 8 samples while the Rh system mismatched was with 3 samples.

Blood group	ID card	Match	Non-match	Discovered	
A+	50	44	5 1	O + A -	**ABO** **Rh**
O+	104	98	3	A +	**ABO**
A-	6	5	1	A +	**Rh**
O-	12	11	1	O +	**Rh**
(B+,B-,AB+ and AB-)	28	28	0		
Total	200	189	11		

Table 5*:* Distribution of samples according to matching, not matching with ID cards result according to the place of issuing of ID card.

ace of creating ID card	Matching results between ID cards result and study's result					
	Match		Not match		Total	
	Number	%	Number	%	Number	%
Taiz	139	94.6	8	5.4	147	**73.5**
Sana'a	13	100	0	0	13	**6.5**
Aden	2	66.7	1	33.3	3	**1.5**
Ibb	2	100	0	0	2	**1**
Other	33	94.3	2	5.7	35	**17.5**
Total	189	91.1	11	8.9	200	**100**

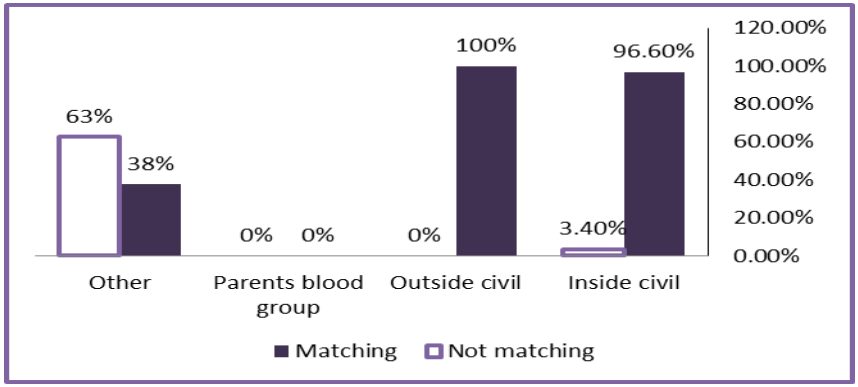

Figure**:** Distribution of samples according to place of determining blood groups**.**

Discussion

The need for knowing the blood group type is not only important for transfusion medicine but also for organ transplantation and genetic research. It has been observed that Current policy allows the use of national identity cards and tags for transfusion purposes during contingency operations. [(9)] Out of 200 volunteers in this study, there were eleven persons (5.5%) with written blood groups type in their national ID card were incompatible with result of blood groups types examined on this study. Out of those 11 of discrepancies, 8 cases (73%) were ABO group errors and 3 cases (27%) were Rh type errors. The ABO blood group errors include (A, O) , where A blood group errors were 5 cases (63%) , These errors were in peoples who they did not get an actual blood groups typed for them during the issuing the national identity cards. While O blood group errors were 3 cases only (37%). Table No 3 showed that, some volunteers had blood group type "O" while we find out in the investigation done on this study, they were actually having blood group type "A", that was because, the civil affairs center was using

a slide method to demonstrate of blood group typing which was not a reliable procedure to determine the blood sub-group type "A" in reliable miner.[7] While the errors of Rh factor were for 3 peoples, two people have weak D antigen (Du), and one was due to error in laboratory investigation method which was used. Weak "D antigens" are difficult to determine when reagent is used of the type incomplete Anti-D (IgG). These errors for ABO, Rh factor could lead to transfusion of the wrong blood type during contingency operations. [7] In our study we observed that most participating peoples in this study were issued their national ID cards from civil affairs center Taiz branch of Al-turba city which acts as a target on this study. This study showed that, most participating peoples determined their blood groups done inside civil affairs center 177 (88.5%), while others (not diagnosed) are 8 (4%) As it show in Table -5, the percentage of mismatches was highest in the provinces of Taiz, Aden, and this is due to the civil affairs centers of the provinces of Aden and Taiz which were located in the rural areas where the population do not have proper attention about blood groups as indicating on questionnaire forms.

Conclusions

The accuracy of blood group type written on national id card is not that much reliable target during blood transfusion procedure instead it need real time blood group typing whenever we need blood transfusion, more over we need to improve the old stile procedure that still in use on our national civil affair hospitals, which play an important role in correction the old style error that is critical in saving the live.

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Appendix1

Republic of Yemen
Ministry of high Education
Taiz university
Al-turbah branch
Faculty of Allied Medical Science
Department of Medical laboratories

Questionnaire

Questionnaire of Determined Blood groups for people of Al-turbah Town.
Name : _____
No : _____
Date : _____

Age	15 – 25y	26 – 35y	36 – 45 y	46y <	
Sex	**Male**	**Female**			
Live	**Dobhan**	**Al-turbah Center**	**Al-sharaf**	**Al-qahfah**	**Al-maqam**
Qualification	**Illiterate**	**Primary School**	**Secondary School**	**High school**	**university**
Place of creating ID card	**Taiz**	**Sana'a**	**Aden**	**Ibb**	**Other**
Type of ID card	**Digital**	**Old**		**46y >**	
ABO and Rh grouping on ID card	**A+**	**B+**	**O+**	**AB+**	
	A-	**B-**	**O-**	**AB-**	
Way of Diagnosis the ABO and Rh grouping in ID card	**According to the result inside civil affairs center**	**According to the result outside civil affairs center**	**According to the Parent's blood group**	**Other**	

Did you diagnosis your ABO and Rh grouping after having ID card ?	**Yes**	**No**			
If answer yes Why ?	**Operation**	**Accident**	**Other**		
Did the results Was the same as ID card result ?	**Yes**	**No**			
Blood group results individual who had This Questionnaire (Done by researcher)	**O+**	**A+**	**B+**	**AB+**	**O+**
	O-	**A-**	**B-**	**AB-**	**O-**
Do you trust in worker of civil affairs center that detect your blood group ?	**Yes**	**No**	**Not keeping the reagents well**	**Use bad techniques**	**Other**
	Not qualified	**Use dirty tools**			
Would you like to enter your name in the data base of donors in the blood?	Yes	No		T. no	