Assessment of Adverse Donor Reactions in Iraqi National Blood Bank

Waleed A. Omar*,Sarah Shihab Ahmed,**
Sura Ahmed Mohammed*, Zainab Fadel Abbas******

ABSTRACT:

BACKGROUND:

blood donation is a safe procedure and thousands of persons donate blood without any ill effect, however, few donors show adverse donor reactions.

OBJECTIVE:

To assess the occurrence of adverse donor reactions in a sample of blood donors attending Iraqi National Blood Bank in Baghdad

PATIENTS AND METHODS:

This is a cross sectional study, carried out in Iraqi National Blood Bank (INBB) between October and December 2013. The donors included in the study randomly. Especial form was prepared for each donor and the required information was recorded including the adverse reactions that were observed during donation and later for 15 minutes.

RESULTS:

The study included 200 blood donors; their mean of age was 35 years with range of (19-66) years; their mean of weight was 88 Kg with range of (62 -152) kg.

Twenty seven (13.5%) donors showed adverse reactions during the first 15 minutes post donation and the most frequent reaction was hematoma at the venipuncture site with frequency of 4 % from all donors and followed by pallor and sweating with frequency of 3.5 % for each reaction; nausea and dizziness 3% for each, muscular twitching 1.5%, weakness and syncope 1% for each while the least frequent reaction was convulsion with a frequency of 0.5%.

The results showed that donors taking breakfast and donors with previous donations showed significantly less frequency of adverse reactions.

CONCLUSION:

Blood donation is a safe procedure and 13.5% of the studied donors showed adverse donor reactions and the most frequent reactions were hematoma followed by pallor and sweating while the least frequent reaction was convulsion and donors taking breakfast and donors with previous donations showed significantly less frequency of adverse reactions

KEY WORDS: Iraqi national blood blank, adverse donor reaction, blood donation.

INTRODUCTION:

Blood donation should be voluntary and there are measures to protect donor and for donor selection; these are : age, which should range between 17 and 70 years , weight above 50 Kg, hemoglobin more than 13 g/dl for male and more than 12 g/dl for female, minimum donation interval of 12 weeks, pregnant and lactating women should be excluded; also persons with cardiovascular disease, epilepsy, gastrointestinal disorders with impaired absorption, chronic renal disease and insulin dependent diabetes are excluded from donation. Any donors returning to occupations such as driving bus, plane or train, heavy machine, should be excluded because delayed faint would be dangerous [1,2]

Most donors tolerate the withdrawal of a unit of blood without incident; however, in the event an adverse reaction does occur. Donor reactions cover a wide spectrum from nervousness and fainting to loss of consciousness [3]. Reactions can generally be divided into local and systemic. The systemic Reactions can be divided into three categories: mild, moderate, and severe. Mild reactions include nausea or vomiting, dizziness, hyperventilation, twitching, muscle spasm and fainting**.** Moderate reactions can include any of the reactions listed above in addition to loss of consciousness while the presence of convulsions exhibited by the donor defines as severe reactions [3]

*Medical City.
**Bachelor in Medical Laboratory Techniques.
***Bachelor in Medical Laboratory Techniques.
****Bachelor in Medical Laboratory Techniques.

Local reactions include hematoma which is a localized collection of extravasated blood under the skin, resulting in a bluish discoloration. It is caused by the needle going through the vein, with subsequent leakage of blood[3]

When light-headedness and bruising at the venipuncture site are included, some 11–36% of blood donors will suffer adverse donor reactions. The majority of these reactions are mild. However, some of which are avoidable and some may result in donor injury [4].

AIM OF THE STUDY:

To assess the occurrence of adverse donor reactions in a sample of blood donors attending the Iraqi National Blood Bank in Baghdad.

PATIENTS AND METHODS:

This is a cross sectional study was carried out in Iraqi National Blood Bank (INBB) in the period from October 2013 to December 2013.

The donors included in the study randomly. Especial form was prepared for each donor and the following information were recorded:- Name, Age, Sex, Address, any disease, Weight, Blood pressure (before and after donation), Pulse rate (before and after donation), taking a Breakfast, Frequency of donation (First, second, third,), Type of donation (Voluntary or Replacement), Volume of blood donated, Duration of donation, any signs or symptoms (adverse donor reactions) occur during donation or during 15 minutes after donation such as: Nausea, Vomiting, Dizziness, Twitching, Convulsion, Hematoma, Tetany, Hysteria, Loss of consciousness (Syncope), Sweating, Weakness, Pallor,)

At the beginning the donor was informed that these informations were required for research purposes and after the donor was examined and accepted by the responsible physician, the questionnaire form filled by the required information. Then the following procedures were carried out: 1- Measurement of body weight which should be more than 50 kg 2- Measurement of pulse rate which should be in the range of 50 to 100 beat per minute and regular. 3- Measurement of blood pressure which should be in the range of 50-100 mmHg for the diastolic pressure and in the range of 100 -180 mmHg for the systolic pressure.

The phlebotomy procedure was carried out by the responsible staff and the donor was followed up during the blood donation.

The donor asked to stay in supine position for 10-15 minutes and any adverse reaction was recorded whether at the time of the phlebotomy or within 15 minutes afterward. After that the donor leaves the phlebotomy ward.

Statistical analysis

Data analysis had been made by the use of statistical package SPSS version 16. The data was presented by frequency distribution, and means and standard deviations were made for selected variables.

The statistical significance of the association between two numerical or categorical variables was assessed by T-test and Chi square test respectively and an estimate was considered statistically significant if the p value was ≤ 0.05.

RESULTS:

The study included 200 blood donors; the mean of their age was 35 years (SD+/ - 11) with range of 19-66 years old of age; the mean of their weight was 88 Kg (SD+/-15) with range of 62 - 152 kg. One hundred and eighty nine (94.5%) donors were from Baghdad city while 11(5.5%) donors from outside Baghdad. All the donors were males as females rarely donate blood in the INBB. Table 1 shows the results of pulse rate, blood pressure before and after donation and duration of donation for all donors.

Table 1: shows the means and range of age, weight, pulse rate, blood pressure before and after donation and duration of donation for all donors.

Parameter	Mean	SD	Range
Age (years)	35.2	11.0	19 - 66
Weight (Kg)	88.9	15.0	62 - 152
Pulse rate before donation/ (min)	93.6	14.1	64 - 140
Pulse rate after donation /(min)	83.6	11.6	59 - 122
S.B.P.B.D[1] (mmHg)	137	13	100 - 170
S.B.P.A.D[2] (mmHg)	126	13	90 - 160
D.B.P.B.D[3] (mmHg)	87	10	60 - 110
D.B.P.A.D[4] (mmHg)	77	10	50 - 100
Duration of donation (min.)	7.5	1.8	4 - 15

1:Systolic Blood Pressure before Donation.
2: Systolic Blood Pressure after Donation
3: Diastolic Blood Pressure before Donation
4: Diastolic Blood Pressure after Donation

The study showed that 114 (57%) donors were family (replacement) donors while 86 (43%) donors were voluntary (non- remunerated) donors.
One hundred and sixty (80 %) donors have been take breakfast before donation while 40(20%) donors did not take breakfast before donation.
One hundred and seven (53.5%) donors donated blood for the first time while 93(46.5 %) donors have been donated previously.
One hundred and seventy three (86.5%) donors complete donation without any reaction during the donation and 15 minute post donation.
Twenty seven (13.5%) donors showed adverse reactions during the first 15 minutes post donation and the most frequent reaction was Hematoma at the site of venipuncture (4 %) of all donors and followed by Pallor and Sweating (3.5%) for each reaction whiles the least frequent reaction was Convulsion which constitutes 0.5% of all donors -table-2.

Table 2: the types of adverse donor reactions, number and percentage of each reaction in the group of the reactions and in the total donors.

Type of reaction	Number of donors	% in group of reactions	% in all donors
Hematoma	8	29.6	4
Pallor	7	25.9	3.5
Sweating	7	25.9	3.5
Nausea	6	22.2	3
Dizziness	6	22.2	3
Muscle twitching	3	11.1	1.5
Weakness	2	7.4	1
Syncope	2	7.4	1
Convulsion	1	3.7	0.5
Total	27	100%	100%

In comparison between donors who showed adverse donor reactions and those who did not showed such reactions, there were certain criteria did not show significant difference between the two groups and these were age, weigh, pulse rate before donation, blood pressure, duration of donation and type of donor (voluntary or replacement) –table 3 and 4 while other features showed significant difference- Table 5and 6.

Table 3: the criteria of non significant difference between the group of adverse donor reactions and the group of no donor reactions.

The criteria	Number of Donors did not show reaction	Number of Donors showed reaction
Mean of age (years)	34.27	34.81
Mean of weight (Kg)	89.41	85.93
Mean of pulse before donation/ (min)	93.57	94.04
Mean of S.B.P.B.D[1] (mmHg)	137	137
Mean of D.B.P.B.D[2] (mmHg)	87	86
Mean of donation duration (min)	7.8	7.4

1: Systolic Blood Pressure before Donation
2: Diastolic Blood Pressure before Donation

Table 4: The comparison between types of donors (p value < 0.05).

Effect of Donation	Number and % of Voluntary donors	Number and % of Replacement donor	Total
Donors did not show reaction	76(88.4%)	97(85.1%)	173
Donors showed reaction	10(11.6%)	17(14.9%)	27
Total	86	114	200

The study showed that donors who take breakfast before donation showed significantly lower frequency of adverse reactions while donors who did not take breakfast showed significantly higher frequency of adverse reactions-table 5.

Table 5: The comparison regarding taking breakfast between the group which show adverse reaction and the group which did not show such reaction (p value < 0.05).

Effect of donation	Donors took breakfast	Donors did not take breakfast	total
Number and % of Donors did not show reaction	141(88.1 %)	32 (80. %)	173
Number and % of Donors showed reaction	19 (11.8 %)	8 (20.0 %)	27
	160	40	200

Regarding the frequency of donation, the study showed that donors who donated previously showed significantly lower frequency of reactions while donors who donate for the first time showed higher frequency of adverse reactions-table 6.

Table 6: Shows the comparison regarding the frequency of donation between the group which show adverse reactions and the group which did not show such reactions (p value < 0.05).

Effect of donation	Number and % of donors with first donation	Number and % of donors with more than one donation	total
Donors did not show reaction	88(82.2%)	85(91.4%)	173
Donors showed reaction	19(17.8%)	8(8.6%)	27
total	107	93	200

DISCUSSION:

Blood donation is a safe procedure and most donors tolerate the withdrawal of a unit of blood without incident, but in spite of its safety many donors may suffer adverse reactions; these donor reactions cover a wide spectrum from nervousness and fainting to loss of consciousness (3). This study revealed that 13.5% of the studied donors showed adverse donor reactions in INBB. Similar study in Tehran (Iran) shows similar frequency; Majlessi et al 2008 recorded a frequency of adverse donor reactions of 13.4 % in Tehranian blood donors [5].

However the frequency of these reactions may reach 36% in other centers; Newman et al 2003 recorded a frequency of 36 % [6] while other studies showed very lower frequency ; Pathak et al 2011 reported a frequency of 0.6% in a regional blood transfusion center in India [7]. Crocco and Elia 2007, also, reported a low frequency (1.2 %) of adverse donor reactions in Italy [8], but Hosseini et al 2010 put a questions mark on such results [9] .

All the donors in this study were males due to very limited number of females attend NBTC for donation relatively to the males and the social causes may play a rule in this situation.

The current study showed that the most common adverse effect was hematoma which constitutes 4% of all donors followed by pallor and sweating (3.5%) while the least reaction was convulsion (0.5%) while syncope has the frequency of 1%. Rohra et al 2010 in Karachi-Pakistan reported that weakness and dizziness were the two most common symptoms with a frequency of (13.5%)

and (10.8%) respectively while syncope occurred at a frequency of 8.2% [10]; these figures are more higher than our study where the frequency of dizziness and weakness was 3% and 1% respectively , and 1% for syncope .

Klein and Anstee 2005, also, reported a frequency of 9-16% for hematoma adverse effect (4) which is higher than the result of this study.

There are criteria for donor selection which protect donor and reduce the frequency of adverse donor effects, and the present study showed that these criteria were considered in INBB for donor selection; these include age, body weight, blood pressure, pulse rate. This study showed that there is no relation between these criteria and the occurrence of adverse reactions when these criteria are within the required limits. Also, the study showed there is no significant difference between voluntary and replacement donors in the occurrence of adverse donor effects, but Goncalez et al 2012 showed that younger age group and replacement donor were associated with increased frequency of donor reactions [11]. Also, Philip et al 2014 showed that donors with low blood volume, low weight donors had higher absolute donation reaction rate than other donors [12].

The study showed that donors who donate previously (periodic or frequent donors) showed significantly lower frequency of adverse reactions than first time donors and this criteria can be used as a predictor for suspicion of adverse reaction; Philip et al 2014, Goncalez et al 2012 and Rohra et al 2010 showed similar results[10,11,12]. One of the explanations for the occurrence of some reactions, especially pallor, sweating and dizziness, in the first time donor is the simple phobia from the painful insertion of the needle during venipuncture and loss of the blood while the periodic or frequent donors pass such experience [8]; and another explanation is the sight of blood or by watching someone else giving blood, which is usual for the periodic donor [3].

The current study showed that there was significant lower frequency of adverse reactions between donors who take breakfast before donation and donors that do not take breakfast before donation ; thus in some centers, the donors are offered snacks and fluids before donation and are required to consume a light meal after donation [11]

CONCLUSION:

1-The frequency of adverse donor reactions in INBB was 13.5%.

2-The most frequent reaction was hematoma followed by pallor and sweating while the least one was convulsions.

3-Donors with previous donation and donors taking breakfast before donation showed significantly less frequency of donor reactions.

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REFERENCES:

1. Hoffbrand A.V., Moss P.A.H. and Pettit J.E.- Essential Haematology- 6th ed. -Wiley Blackwell – UK -2011: 398-422.
2. Hoffbrand A.V., Catovsky D. and Tuddenham E. and Green AR- Postgraduate Haematology - 6th ed. – Wiley_Blackwell – UK-2011:268-98.
3. Harmening M.D.-Modern blood banking and transfusion practices -5th ed- F.A. Davis Company - Philadelphia-2005: 207-41.
4. Klein H. and Anstee D. -Mollison's blood transfusion in clinical medicine. – 11th ed.– Blackwell publishing- USA-2005:1-18.
5. Majlessi F, Ghafari S, Rahimi A and Maghsoodlou M – Systemic complications and their risk factors among Tehranian blood donor 2005- Acta medica Iranica – 2008;46:253-57.
6. Newman BH, Pichette S, Pichette D, and Dzaka E- Adverse effects in blood donors after whole blood donation: a study of 1000 blood donors interviewed 3 weeks after whole blood donation.- Transfusion 2003;43:598-603.
7. Pathak C, Pujani M, Pahuia S and Jain M- Adverse reactions in whole blood donors ; an Indian scenario- Blood Transfus.2011;9:46-49.
8. Crocco A, and D Elia D –Adverse reactions during voluntary donation of blood and /or blood components. A statistical epidemiological study-Blood Transfusion - 2007;5:143-52.
9. Hosseini M J, Latiff L, Hassan T, and Hanachi P-Comments on adverse reactions in blooddonors-Blood transfusion-2010;8:71.

10. Rohra DK, Juriasinghani V, Rai K, and Azam SI - Prevalence of immediate vasovagal reaction in blood donors visiting two blood banks of Karachi - Transfus Med. 2010;20:129-33.
11. Goncalez TT, Sabino EC, Schlumpf KS, and others – Vasovagal reactions in whole blood donors at threeRED-II blood centers in Brazil- Transfusion 2012 52:1070-78.
12. Philip J, Sakar RS, Jain N-A single –center study of vasovagal reaction in blood donors: Influence of age, sex, donation status , weight , total blood volume and volume of blood collected-Asian J Transfus Sci. – 2014;8: 43-46.