

Adverse Reactions In Whole Blood Donors: A Population Based Statistical-epidemiological Study

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Abstract: Background: Human blood is the most precious and essential element of human life. Safe and adequate blood supply is a big challenge in developing countries like India. Voluntary blood donors tolerate blood donation very well.

Objective: The aim of the study is to estimate and possibly avoid the cause of donor adverse reactions.

Materials and methods: The study was conducted over a period of one year from January 2017 to December 2017. The donor population consisted of 2455 donors of which 1823 were males and 632 were females. Donor adverse reactions were analysed.

Results: Only 16 (0.007%) donors had adverse reactions like sweating, giddiness, pain, itching and pallor. None suffered severe adverse reactions in the study.

Conclusion: Although number of donors who had adverse reactions were low, it is desirable to reduce the rate of adverse reactions so that repeat blood donation by the population can be promoted.

Keywords: Blood Donation, Donors, Adverse reactions.

Date of Submission: 18-01-2019

Date of acceptance: 02-02-2019

I. Introduction

The process of supplying sufficient blood components and derivatives for patient needs is complex, highly regulated and dynamic in adapting to the local and regional needs. Approximately 90 million units of blood are collected worldwide each year[1] by diverse blood organizations that vary based on local health initiatives, government intervention and available resources. Donors can be voluntary donors or replacement donors. During blood donation, certain adverse events can occur to the donor. These may be acute i.e., after a single donation or chronic i.e., in response to long term donation[2]. They can be divided into local and systemic reactions. Local reactions include pain, hyperemia and swelling at the site of extravasation. Systemic reactions include pallor, sweating, dizziness, nausea and hypotension[3]. Various factors are associated with donor reactions like first-time donation, anxiety, female gender, age less than 30 years, history of prior reactions, greater than 4 hours from last meal and low diastolic blood pressure. The most common type of reactions is a vasodepressor reaction associated with changes and blood pressure. Long-term effects of donation are limited to those who donate frequently over an extended period. Among the whole blood donors, the major effect is iron depletion, which leads to anemia. Over 200 mg of iron is lost with each whole blood donation.

II. Materials and Methods

This is a retrospective study, related to all whole blood donations made during a period of one year from January 2017 to December 2017. The blood was collected in a warm comfortable atmosphere using a 16 gauge needle inserted into a vein in the antecubital area. Strict asepsis was maintained by cleaning the area with betadine and alcohol. Minimum weight for blood donation was 45 kg and the lowest acceptable Hemoglobin was 12.5 grams/dl. 350 ml of whole blood was collected from the eligible donors. If a donor complains of any symptoms like giddiness or light headedness, blood collection was immediately stopped and the legs were kept raised in anti-shock position. After blood donation, the donors were given refreshment and observed in the recovery room for 30 minutes and sent away.

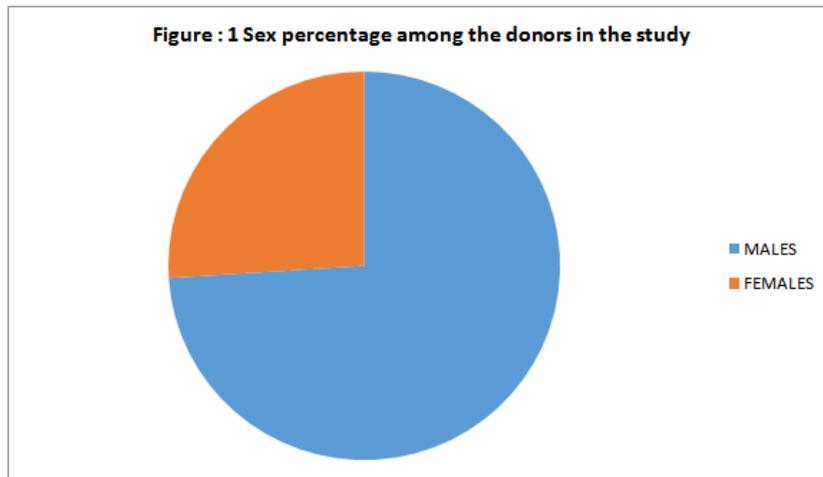
Donor adverse reactions were recorded as guided by National Blood Donor Vigilance Program that classifies complications into defined categories:

A1- Complications mainly characterized by the occurrence of blood outside the vessels. (hematoma, arterial puncture, delayed bleeding/re-bleeding)

- A2- Complications mainly characterized by pain (Nerve injury/irritation, other painful arm)
- A3- Localized infection/inflammation along the course of a vein (Thrombophlebitis, cellulitis)
- A4- Other major blood vessel injury (Deep vein thrombosis, arteriovenous fistula, compartment syndrome, Brachial artery pseudoaneurysm)
- B- Complications mainly with generalized symptoms: Vasovagal reactions (Loss of consciousness <60 seconds, Loss of consciousness >30 seconds, with injury, without injury, within blood collection facility, outside blood collection facility).
- C- Complications related to apheresis (Citrate reaction, haemolysis, Air embolism, infiltration of IV fluids)
- D- Allergic reactions (Local allergy, anaphylactic reaction)
- E- Other serious complications related to blood donation (Acute cardiac symptoms, myocardial infarction, cardiac arrest, transient Ischemic Attack, Cerebrovascular Accident, Death)
- F- Other reactions

III. Results

The population in the study consisted of 2455 blood donors of which 798 were voluntary and 1657 were replacement donors 1823 were males and 632 were females(Figure 1). The mean age of men was 26 years and women was 23 years.



Overall, 16 adverse reactions were reported, resulting in a rate of 0.007%.

Most common adverse reaction found in the study was pain at the site, accounting for 0.004% of all adverse reactions noted. Major complications/ severe adverse events did not occur in the study population. None necessitated hospitalization of the donor. The frequency distribution of various types of adverse reactions during the study period is shown in the Table :

ADVERSE REACTIONS	NUMBER OF DONORS
Pain	6
Delayed bleeding/re-bleeding	2
Hematoma	2
Vomiting	3
Giddiness	3
Seizures	1
Chest pain	1
TOTAL	16

Episodes of syncope occurred in 0.001% of the whole population. In these cases, crystalloids and cortisone were administered which helped to relieve the complications within 15 to 20 minutes.

3subjects developed vasovagal reaction with vomiting which resolved after administration of crystalloids. The donors were placed in anti-shock position. Their vital signs (blood pressure, heart rate and oxygen saturation) were measured.

The follow up of the donors with any type of complication was done for 30 minutes after blood donation. After this period, when the donors left the transfusion service, they were asked to inform the staff if any symptoms during the post-donation period. None reported physical or psychological disturbances.

IV. Discussion

Blood Transfusion Centers not only have the responsibility to provide adequate supply of blood components to the communities but also to ensure safety and well being of their donors^[4]. Though the systemic and phlebotomy related complications of blood donation are medically inconsequential, they reduce the likelihood of repeat donation^[8,9]. The aim of the study is to assess the minor and major adverse reactions of blood donation and to analyse the measures which would help to reduce their further occurrence.

Donation-related adverse events were recorded according to the standard criteria suggested by National Blood Donor Vigilance Program^[5]. In our study, 0.005% of all whole blood donations were complicated by a minor adverse event. This is similar to various studies conducted all over the world, where the rate of reactions varied from 0.3% to 3.8%^[6,7]. Presyncopal symptoms like sweating or giddiness accounted for approximately 0.002% of all adverse events, which is similar to a study conducted by Chinthamnani Pathak in 2010^[4].

Hematoma was found to be the most common local reaction which occurred likely due to donation-related neurological needle injuries.

The local adverse reactions were recorded only in the donation and recovery rooms and so the rate of these local complications was low.

The major complications did not occur with no episodes necessitating hospitalization of the donor. This is found in accordance with other studies^[6].

As part of our study, assessment was done to help minimize the adverse reactions associated with blood donation. It is important to provide a friendly warm and comfortable atmosphere for the donor and to engage the anxious donors in conversation during donation, in order to divert their attention. It is also necessary to react promptly to initial complaints like giddiness or light headedness by immediately stopping the donation and raising the legs of the donor. After donation, they should be retained in the recovery room for at least 30 minutes and given refreshment before sending away. These measures ensure safe donation and motivate the donors for repeat donations in future^[3].

The other measures which can be followed are the following:

- Shorten the waiting time
- If necessary, reduce the amount of blood collected within the limits allowed by law.
- Avoid traumatic needle insertion with invasive and painful maneuvers
- Invite donors to wear comfortable clothes, avoiding tight dresses and belts.
- Donation is contra-indicated after a night shift.
- Reassure the donors.

V. Conclusion

Only 0.007% of whole blood donations were complicated by adverse reactions and the most common was presyncopal symptom. Thus this study confirms the fact that blood donation is a very safe procedure. This can be made even more event-free by following few reassuring and appropriate measures. All Blood centers should constantly monitor the risks of blood donation and make necessary efforts to reduce the complications to the lowest rate as much as possible and to encourage repeat donation by the donors.

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Veena Venkatesh. "Adverse Reactions In Whole Blood Donors: A Population Based Statistical-epidemiological Study." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 1, 2019, pp 69-71.