e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com

International Journal of Pharmaceutical Quality Assurance 2026; 17(10); 122-126

Transfusion Medicine Section Original Research Article

A Study of Adverse Blood Donor Reactions in Normal Healthy Blood Donors in a Tertiary Care Hospital

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Received: 25-07-2026 / Revised: 23-08-2026 / Accepted: 26-09-2026

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Conflict of interest: Nil

Abstract:

Introduction: Blood is the lifesaving fluid that cannot be created artificially, but is only collected from donors which are the precious resources. Blood donation is generally considered to be a safe procedure, but occasionally adverse reactions of varying severity may occur at the time of collection in 2-3% of blood donors. Donor reaction had the most negative impact on the donor return rate. Mitigation of few adverse events has the potential to improve donor return rate.

Aim and Objectives: The aim and objectives of the present study is to estimate the frequency a of adverse events occurring during and after blood donation and to assess the severity of adverse donor reaction.

Material and Methods: It is a retrospective hospital based study carried out in the Blood Bank, Department of Transfusion medicine, Government General Hospital and Medical College, Kadapa, Andhra Pradesh, India over a period of two years (January 2023–December 2024). Data was collected retrospectively from adverse blood donor reaction register, donor history questionaries (DHQ) forms, master records to collect demographic details (age, sex), weight of the donor, type of donor (voluntary, replacement), Donor status (1st time donor/ Repeat donor), Place of donation (In blood bank, In outside camps). The donors were observed for any evidence of vasovagal reaction, and if it occurred, it was graded as mild, moderate, or severe as per standard criteria and other reactions were also analysed from adverse blood donor reaction register.

Results: During the study period a total of 16,134 donors donated blood out of which 81 adverse donor reactions were noted .Among them 57 (70.4%) were vasovagal reactions and 24(29.6%) were needle injuries. Majority of the donors were males (92.6%) and belongs to the age group of 18 -27 years (58.02%). First time donors were more prone for adverse reactions than repeated donors.

Conclusion: The blood donation is a very safe procedure which could be made more event free by following, certain friendly, reassuring and tactful practices.

Department: Transfusion Medicine.

Keywords: Donor Reactions, Vasovagal Reactions, Grading Of Reactions, Outdoor Camps, First Time Donors, Females.

DOI: 10.25258/ijpqa.17.10.19

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Introduction

Blood is the most precious and unique gift that one human being can give to another. It is lifesaving fluid that cannot be created artificially, but is only collected from donors which are the precious resources [1]. It is important to provide total satisfaction to donor as customers because only then they would become regular donors and remain loyal to system. Blood donation is generally considered to be a safe procedure, but occasionally adverse reactions of varying severity may occur at the time of collection in 2-3% of blood donors [2,3]. An Adverse event was defined as the symptoms or signs of donor discomfort of sufficient severity such that either the donor called for attention of the staff or they were noticed by the staff. Pain at the time of venipuncture was excluded [4]. Donor reactions were categorized as immediate and delayed depending upon whether a reaction was noted at the site of donation or was reported by the donor after leaving the site of donation. They were further classified according to nature and severity of the reaction. The donors were observed for any

evidence of vasovagal reaction, and if it occurred, it was graded as mild, moderate, or severe as per standard criteria [4]. Other adverse events observed were hematoma/bruise at the phlebotomy site, accidental arterial puncture, neurological injury, local allergy, and thrombophlebitis. Efforts to decrease reactions will be rewarded because donors who have reactions or suffer long term consequences are less likely to return for further donation [5]. Donor reaction had the most negative impact on the donor return rate. Mitigation of few adverse events has the potential to improve donor return rate [6,7]. Hence the aim of the present study is to estimate the frequency of adverse events occurring during and after blood donation and to assess the severity of adverse donor reaction and to assess various parameters of blood donors.

Material and Methods

This study for two years (January 2023–December 2024) on the evaluation of adverse donor reactions was carried out in the Blood Bank, Department of Transfusion Medicine, Government General Hospital and Medical College, Kadapa, Andhra Pradesh, India.

The study was approved by the Institutional Ethics committee, Government Medical College, Kadapa. It is a retrospective hospital based study. All the donors were screened and blood units were collected at the blood centre and outdoor camps as per NBTC and DGHS guidelines 2025, during the study period [8]. Strict asepsis was maintained by cleaning the site of venipuncture sequentially using betadine and alcohol.

The minimum weight required for donation was 45 kg and the lowest acceptable haemoglobin concentration was set at 12.5 g/dl. A warm, friendly and comfortable atmosphere for donors is provided at our department. Prior informed consent of the donors was taken and the donor information confidentiality was assured. The donors were observed before, during and after blood donation for any adverse event. On completion of the blood donation, the donors were given light refreshment and discharged with post-donation counselling. In case of any adverse donor reaction, the patient was promptly treated symptomatically as per departmental SOP. All adverse reactions were noted accordingly in departmental register. Data was collected retrospectively from adverse blood donor reaction register, DHQ forms, master records to collect demographic details (age, sex),weight of the donor, type of donor (voluntary, replacement), Donor status (1st time donor/ Repeat donor), Place of donation (In blood bank, In outside camp). The donors were observed for any evidence of vasovagal reaction, and if it occurred, it was graded as mild, moderate, or severe as per standard criteria [9] and other reactions were also analysed from adverse blood donor reaction register.

Inclusion Criteria: All blood donors who experienced reaction in blood centre as well as during blood donation camps were included in our study.

Exclusion Criteria: Incompletely filled donor reaction records.

Statistical Analysis: The frequency of adverse donor reactions was analysed from master records, monthly collection data reports, blood donor records and adverse donor reaction register.

Data analysis: The results were tabulated and analysed.

Results

During the study period a total of 16,134 donors donated blood, out of which 12,183(75.5%) were voluntary donors and 3951(24.5%) were replacement donors.

About 129 blood donation camps were done at various places outside blood bank in the duration of 2 years. In blood bank 12,042 (74.6%) donated blood whereas 4092 (25.4%) donated in camps. There were 15,526 (96.2%) male donors and 508(3.8%) female donors were noted. About 81 adverse donor reactions were noted. The frequency of adverse donor reaction is 0.5%.

Table 1: Gender wise distribution of adverse donor reactions

Gender	No. of donor with reaction	Percentage (%)
Male	21	25.9%
Female	60	74.1%
Total	81	100%

Table 2: Age wise distribution of adverse donor reactions

Age Group	No. of donors with reaction	Percentage (%)
18-27	47	58.02%
28-37	12	14.81%
38-47	10	12.35%
48-57	6	7.41%
58-65	6	7.41%
Total	81	100%

Table 3: Adverse donor reactions

Parameter	Adverse events		
		Number of donors	Percentage (%)
Weight	45 to 65 kg	50	61.73%
	>65 kg	31	38.27%
Type of donor	Voluntary donor	19	23.46%
	Replacement donor	62	76.54%
Donor status	1st time donor	53	65.43%
	Repeat donor	28	34.57%
Place of donation	In blood bank	21	25.93%
	In outdoor camp	60	74.07%

Table 4: Grading of donor reaction [9]

Grade	Symptoms/Signs	Management
I (Mild)	Pallor, perspiration, sighing/yawning, hyperventilation, feeling of warmth/air hunger, dizziness/ light headedness, nausea with or without vomiting	□ Cold wet towel application on forehead □ Encourage donor to cough □ Loosen tight clothing □ Talk to the donor
II (Moderate)	Bradycardia, shallow respirations, Hypotension (systolic <60mm Hg), anxiety.	□ Trendelenberg position, □ 95% oxygen if required, □ Ammonia inhalation
III (Severe)	Rigidity or tremor of extremities, variable color (pale to cyanotic), incontinence of urine, convulsions.	□ Maintain airway □ Prevent injury from fall or tongue/cheek bite □ Saline infusion

Table 5: Frequency of Vasovagal reactions

	Number of donors	Percentage (%)
Mild	45	55.6%
Moderate	10	12.3%
Severe	2	2.5%
Total	57	70.4%

Table 6: Frequency of needle injuries

	Number	Percentage (%)
Hematoma	19	23.5%
Extravasations	4	4.9%
Injury to nerve	1	1.2%
Total	24	29.6%

Discussion

Although, blood donation is a safer procedure, there is a possibility for the development of adverse reactions in the donors. It may occur during or at the end of the procedure of blood collection [10]. Blood centers have a dual responsibility to provide an adequate supply of blood & blood components to the communities they serve and to protect the safety of their volunteer donors. [11] It also places an ethical responsibility on health care givers (the users of blood) to avoid wastage & unnecessary use of blood transfusion [12]. In the present study, the occurrence of adverse events was more commonly seen in females. We noted that the number of male donors were remarkably high compared to female donors, but the Percentage of adverse events occurrence was more in females (74.1%). This was attributed most likely due to high emotional liability the anxiety regarding needle prick and sight of blood which was expressed by most of the female sex. It was found in our study, that most of the donors who experienced adverse donor reactions,(58.02%) belong to the younger age groups i.e.18 to 27 years. Tondon R et al 2008; [13] also reported that the adverse reaction percentage decreased as the age of donors increased.

A study by Newman B H [14] postulated that baroreceptor sensitivity is decreased in healthy young individuals when they are physically or psychologically stressed. With increasing age, the human body becomes more stable hemodynamically. Also, the reason may be due to the fact young donors have first time anxiety and are more apprehensive to the pain of phlebotomy. In the present study donor reactions are most commonly seen in 45 to 55 kg weight group. Since blood volume collected was adjusted as per weight of the donor, weight seemed to affect the occurrence of reactions.

In our study ,higher rate of adverse reactions was observed among Replacement Donors 76.54% (62/81) as compared to Voluntary Donors 23.46% (19/81). This is comparable to the study done by Ruhana et al [15] where higher rate of adverse reactions was observed among Replacement Donors

6.6% (1048/15864) as compared to Voluntary Donors 4.5% (880/19392). The reason for high reaction rate among replacement donors may be due to anxiety, emotional & mental stress.it appears that there are probably psychological and attitudinal differences between the two categories of donors.

In our study, adverse donor reaction rate was observed to be higher among 1st time Donors (65.43%) as compared to Repeat Donors (23.46%). This is comparable to the study done by Sandhya M et al [16] where higher donor reaction rate is observed in first time donors (93.1%) than repeated donors (6.9%).

This may be due to associated anxiety & needle phobia with inexperienced 1 st time donors relative to repeat donors who are familiar with the donation process. First time donors are usually young and have less knowledge regarding blood donation procedure. Adequate water and nutrition intake reduces the donor reaction rate. All donors especially first time should be counselled properly prior to donation about the benefits and probable side effects of donation to alleviate their anxiety. Any query should be competently and empathically answered.

In our present study, the rate of adverse reactions was observed to be higher in outdoor donation camps (74.07%) as compared to reactions (25.93 %) in blood bank donations .Similarly, higher reaction rate was observed by Gupta S et al [17], 81.4% reactions in outdoor camps as compared to 18.65% reactions in blood bank premises.

The reason for higher reaction rate in camps may be due to that blood is collected in outdoor camps around kadapa district in hot and humid environment during most of the months in the year. More adverse events were observed in the afternoons when there was more donor dehydration & clustering and crowding of donors. Hence more stress was given on pre-donation fluid intake in addition to post donation refreshment. Other reasons may be due to hasty medical examination missing some important aspects of donor recruitment & selection, adequate post-donation rest or poor phlebotomy technique by less trained staff.

In the present study mild vasovagal reactions are higher (55.6%) compared to moderate (12.3%) and severe (2.5%) and other type of reactions. This is comparable to the study done by Abhishek et al [18] where total percentage of mild vasovagal reactions (46.81%) are more than severe reactions (2.66%).

Conclusion

The blood donation is a very safe procedure which could be made more event free by following, certain friendly, reassuring and tactful practices. In conclusion, blood donations have an obligation to constantly monitor risks of blood donation and to make a concerted and committed effort to achieve the lowest possible rate of complications.

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