

Adverse Donor Reaction During and After Blood Donation at Tertiary Care Center-An Observational Study

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Abstract: ***Background:** Blood donation is an uneventful smooth procedure and normally tolerated very well when the history and preliminary examination is clear related to the health status of the donor. But, occasionally, adverse reactions of variable severity may occur during or at the end of donation. **AIM:** Aim of this study is to estimate the type of donor reaction and to consider steps to be taken to avoid the cause of unwanted donor reactions. **Materials and Methods:** This study is conducted over a period of three years, from January 2016 to December 2018. The donor population consisted of 51,413 donors, 48490 males and 2923 females. The minimum age for blood donation was 18 years and the maximum age in this study was 58 years. **Results:** Overall a total of 228 adverse reaction events were reported in relation to the total of 51,413 donations for an overall adverse reaction rate of 0.44 %. Of the 228 adverse reactions to blood donations 215 were observed in male while 13 were observed in females. Out of 228 donor reactions 219 were replacement donors and only 09 were voluntary donor. Based on the type of blood donor reaction 146 reported giddiness, 23 reported venepuncture swelling, 21 had an episode of vomiting, 15 had sweating episodes, 12 reported nausea, 04 reported chills, 04 reported fainting attack, 03 felt cramps. **Conclusions:** Although the number of donors who developed disturbances during or at the end of blood donation was very low and was mostly mild type which resolved rapidly, it is nevertheless desirable to reduce risks to a minimum by following a set of advices provided for preventing problems associated with blood donation.*

Keywords: Adverse Reactions, Blood Donation, Extravasation, Venepuncture, Vaso-Vagal Attack.

1. Introduction

Blood donation procedure is normally tolerated very well by the donors, but occasionally adverse reactions of variable severity may occur during or at the end of the collection. The adverse reactions that occur in donors can be divided into local reactions early systemic and delayed systemic reactions.¹

- 1) Local reactions occur predominantly because of issues related to venous access. They are often hematomas due to extra-vasation from the veins, caused by incorrect placement of the needle during the venepuncture. Pain, hyperemia and swelling may develop at the site of the venepuncture. Other local events include pain due to slight trauma to the subcutaneous nerve endings. In most cases, however, there are minor complications that do not require any treatment. Local phlebitis and thrombophlebitis are more serious complications which are very rare that takes longer time to subside.
- 2) The early systemic reactions, in contrast to the local reactions, can be divided into mild or severe. In most cases, they are vasovagal reactions that could be triggered by the pain of the venepuncture and /or by the donor seeing his or her own blood, by the donor seeing another donors illhealth and by the anxiety and stress of undergoing the donation, etc. The early systemic reactions are characterized by the appearance of pallor, sweating, agitation, dizziness, cold feeling, and sense of weakness, gastrointestinal disorders, nausea, hypotension, and bradycardia. Therapeutic intervention

must be swift, otherwise this clinical picture, typical of a vaso-vagal reaction, will progress into an episode of syncope of variable severity, which may or may not be complicated by the onset of tonic-clonic muscle spasms, loss of consciousness, convulsive syncope accompanied by vomiting and loss of sphincter control.¹⁻⁹

- 3) Delayed systemic reactions are defined as adverse reactions occurring between 1 hour and 12 hours of blood donation which are characterized by pallor, sweating, nausea and vomiting, hypotension, bradycardia. Few of the triggering factors are smoking, alcohol intake, strenuous exercise after blood donation, lack of sleep etc.¹

2. Aim

The aim of this study is to estimate the frequency and type of adverse events and distinguishing mild disturbances from more severe reaction. In this way it is possible to monitor and improve the blood donation procedure. This may help in setting of steps to govern the behavior of the staff and improve the quality of the interventions and to mind the precautions for preventing problems associated with blood donations.

Our study identified a group of donors predisposed to the development of adverse reactions and enabled us to prevent problems in these subjects at subsequent donations.

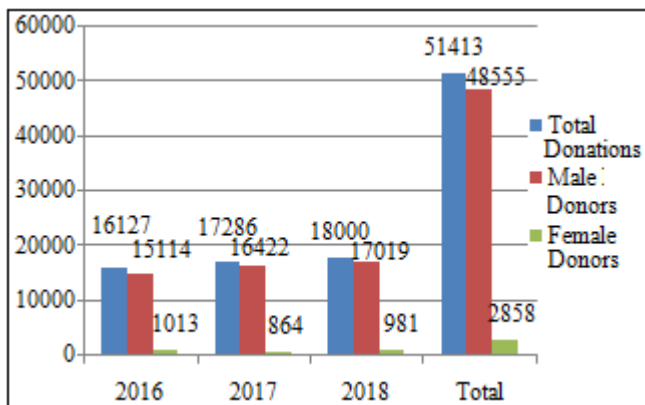
3. Material and Methods

In this study a total of 51413 whole blood donations during the study period. Out of the total 51413 donations, 48490 were male (94.3 %) donors and 2923 (5.6%) were female donors. The minimum age is 18 years and the maximum age for blood donation in this study was 58 years. The blood donors selected in this study were complying with requisites established by the Drugs and Cosmetics Act and Standards for Blood Transfusion Services as recommended by National Blood Transfusion Council (NBTC) and National Aids Control Organization (NACO).

The data collection form had donor demographic data, present health status, past history of any immunization or illness in the last 12 months, previous adverse reactions etc. In our study, the important factors were listed out from the questionnaire which our blood bank uses before giving fitness for blood donation and were grouped. The various groups consisted of gender, first donation, periodic/ regular donation or occasional donation, age of the donors, time gap between the food intake and blood collection, type of donor reactions like- dizziness, sweating, nausea, vomiting, feeling of weakness, loss of consciousness and combination of various symptoms.

4. Results

We have recorded a total of 51413 whole blood donations during the study period of three years, from January 2016 to December 2018.



Total No. of Donations on Y-Axis, Year on X-Axis
Chart 1: Year Wise Blood Donation with Total Male and Female Donors,

Of the total 51413 donations 48555 were male donors and 2858 were female donors. Male donors were 94.4 % and female donors formed 5.6 % of the total donations. (CHART 1)

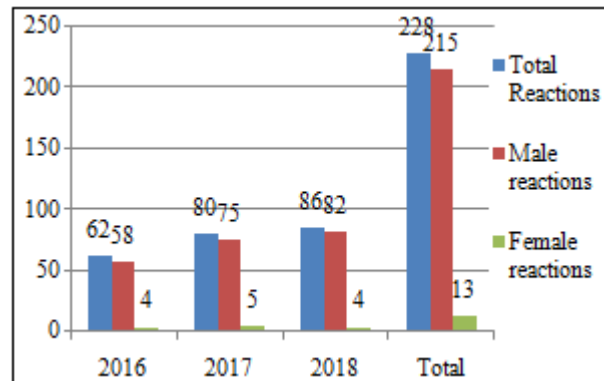
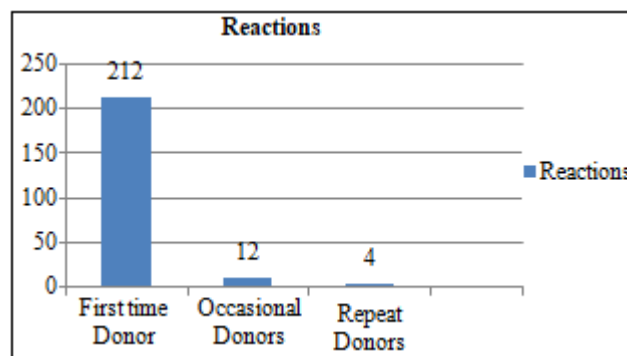


Chart 2: Year Wise Blood Donor Reactions among Males and Females

Overall a total of 228 adverse reaction events were reported in relation to the total of 51413 donations for an overall adverse reaction rate of 0.44 %. Of the 228 adverse reactions to blood donations 215 were observed on males while 13 were observed in females. (CHART 2)



Charts 3: Numbers of Donor Reactions based on Type Of Donors.

When the type of donor was considered of adverse reactions, 212 (92.8%) reactions were observed in first time donors and 12 (5.2%) reactions were observed in occasional donors while 04 (1.75%) of the adverse reactions were seen in repeat donors. (Chart 3)

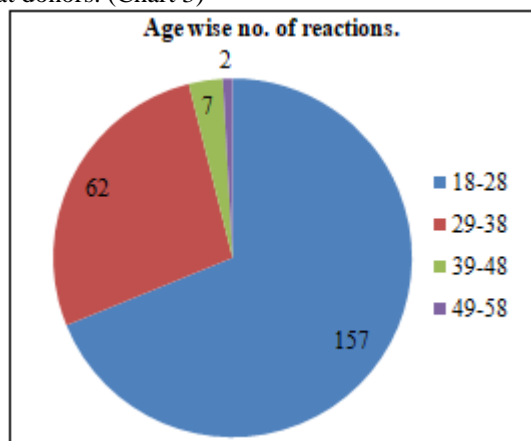


Chart 4: Showing Age Wise Blood Donor Reactions.

When age wise plotting of the adverse reactions was done, 157 (68.7 %) of the adverse reactions were seen in the donors of age group 18-28years. 62 (27.19%) of the reactions were seen in 28-38 years age group, 07(3.07%) of reactions were seen in the age group of 38-48 years and

donor reactions was seen in the age group of 48-58years accounting to 02(0.8%) of the reactions. (Chart 4).

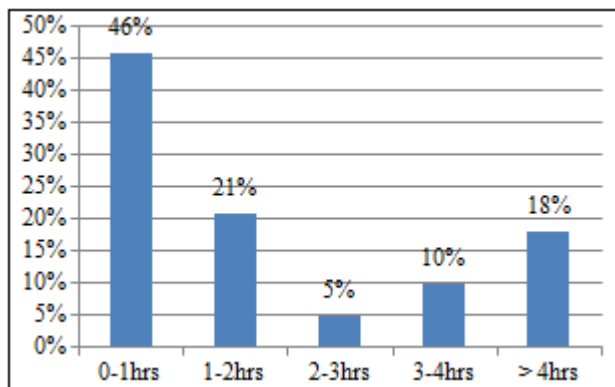


Chart 5: Food Intake and Duration before Donation

Chart 5 Percentage of Reactions on Y-Axis, Time Interval on X-Axis.

When the duration between blood donation and time since last meal were studied 46% of the total reactions occurred in the donors who donated blood within 0-1 hour since their last meal, 21% of the reactions were seen when the time between blood donation and their last meal was 1-2 hours, 5% and 10% of the total reactions were seen in the time gap of 2-3 and 3-4 hours respectively, while the third highest number reactions accounting to 18% of total reactions were seen when the duration between last meal and blood donation was more than 4 hours. (CHART 5)

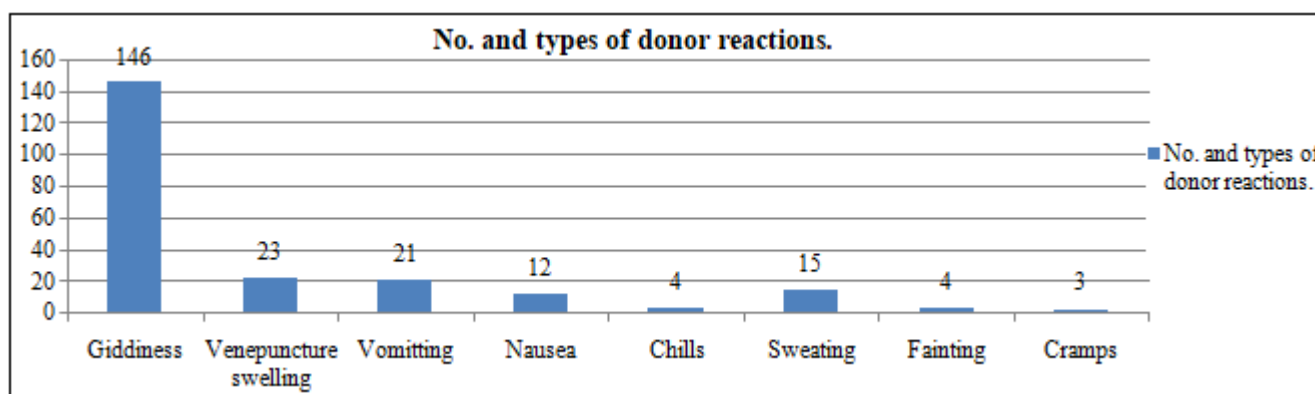


Chart 6: Number and Types of Donor Reactions

Based on the type of blood donor reactions 146 reported giddiness, 23 of them reported venepuncture swelling, 21 reported vomiting, 15 reported sweating, 12 reported nausea, 04 reported chills, 03 cramps, 04 reported fainting attack. (CHART 6)

5. Discussion

In our study, we have recorded a total of 51413 whole blood donations during the study period of three years, from January 2016 to December 2018. Of the total 51413 donations 48555 were male donors and 2858 were female donors. Male donors were 94.4 % and female donors formed 5.6 % of the total donations.

A three year study done by Kandukuri M etal, donor population consisted of 43492 (37724 Males and 5768 Females).¹ A 6 months study done by Antonio C, etal, with donor population 4906 (3716 Male and 1190 Female).¹⁰

In our study, overall a total of 228 adverse reaction events were reported in relation to the total of 51413 donations for an overall adverse reaction rate of 0.44 % and an incidence of 1 every 225 donations. Of the 228 adverse reactions to blood donations 215(94.3%) were observed on males while 13(5.7%) were observed in females.

Our study showed lower rate of adverse donor reaction as compared to the study conducted by Kandukuri M, etal, who

reported 0.93% adverse donor reaction and an incidence of 1 every 107 donors.¹

In our study, when the type of donor was considered of adverse reactions, 212 (92.8%) reactions were observed in first time donors and 12 (5.2%) reactions were observed in occasional donors while 04 (1.75%) of the adverse reactions were seen in repeat donors. This is in discordance with the study done by Antonio etal, who found greatest tendency of anxiety in periodic donor.¹⁰

When age wise plotting of the adverse reactions was done, 157 (68.7 %) of the adverse reactions were seen in the donors of age group 18-28years. 62 (27.19%) of the reactions were seen in 28-38 years age group, 07(3.07%) of reactions were seen in the age group of 38-48 years and donor reactions was seen in the age group of 48-58years accounting to 02(0.8%) of the reactions.

This is in concordance with study performed by Kandukuri etal, who also found maximum adverse reaction in age group between 18-28 years.¹

This could be explained by maximum number of first time donors falling into this age group in which anxiety of first time donation is predominant.

When the duration between blood donation and time since last meal were studied 46% of the total reactions occurred in

the donors who donated blood within 0-1 hour since their last meal, 21% of the reactions were seen when the time between blood donation and their last meal was 1-2 hours, 5% and 10% of the total reactions were seen in the time gap of 2-3 and 3-4 hours respectively, while the third highest number reactions accounting to 18% of total reactions were seen when the duration between last meal and blood donation was more than 4 hours. This could be due to sudden shift of the fluid to the vascular compartment during bleeding, the most common adverse reaction being nausea/vomiting, while the third highest number reactions accounting to 18% of total reactions were seen when the duration between last meal and blood donation was more than 4 hours is due to hypoglycemia.

Based on the type of blood donor reaction 146 reported giddiness, 23 reported venepuncture swelling, 21 reported vomiting, 15 reported sweating, 12 reported nausea, 04 reported chills, 03 cramps and 04 reported fainting attack. Adverse reaction was more common in first time donor, then in occasional donor and least percent of reaction were found in repeat donors. This could be explained by the fact that first time donor are more anxious for donation purpose. Indeed, for many people, one of the uncertainties about giving blood derives from the psychological impact of the needle insertion.

The commonest reaction found in our study was giddiness.

In our study there was no major adverse reaction occurred which needed hospitalization.

All this is in concordance with the referred literatures.

These are some of the explanation for adverse reactions given by various authors in their study. They described that an anxiogenic stimulus, represented by the strong emotion of giving blood or the donor's sight of his or her own blood, evokes fear and anxiety and the expectation that the phenomenon could be repeated has the same emotional significance. From a purely psychological point of view, this phenomenon can be likened to what is technically defined, in psychology, as a "simple phobia", which is nothing other than a learned behaviour associated with an anxiogenic stimulus.⁽¹¹⁻¹³⁾

Sweating, in fact, causes a further decrease in blood pressure because of vasodilatation, with sequestration of the blood in splanchnic organs and stasis in the lower limbs, due to gravity. All this is added to the fall in blood pressure caused by the removal of blood during the donation. The result is a slight and temporary deficit in blood flow to the brain.

Dizziness follows on from hypoxia and causes a sense of ill-being or a vasovagal reaction, which sometimes evolves into syncope in the absence of a swift therapeutic intervention. Therefore there is a chain reaction, which starts gradually with a banal vaso-vagal stimulus and then evolves inexorably into syncope, if not adequately treated.⁽¹¹⁻¹⁷⁾

6. Conclusions

Although the number of donors who developed reactions during donation of blood was very low, it is important to reduce risks to a minimum, for which certain precautions and advices have been introduced to facilitate not only the work of the staff, but also safe donation by the blood donors. The points to be taken care are: to shorten the waiting time, to avoid donor to remain standing for long time before donation, advise the donor to have light breakfast, excluding sugar, milk and milk products, to ensure a comfortable room temperature and humidity to identify those subjects who are anxious and ensure them comfort and the special attention by the working staff, to council first time donor regarding donation procedure and motivate them to engage the donors during donation, particularly anxious donors in conversation to distract their attention during the donation to perform venepuncture precisely and cleanly to avoid traumatic needle insertion with invasive and painful maneuvers, to identify the best venous access, by inspecting both forearms.

If the first venepuncture is unsuccessful, allow the donor to rest and reassure him or her, before attempting a new venepuncture. Do not let the donor leave the donor site too quickly. Do not let the donors drink very hot or very cold drinks during the recovery phase, make the donor have the refreshment drink in the refreshment room for 10 to 15 minutes. Monitor very carefully young, bradycardic donors, whose blood pressures tend to be low. Do not take blood from donors, who have carried out very intensive sporting activities in the preceding 24 hours. Do not accept the donor who smoked in the preceding 2 hours or who had alcohol in the preceding 24 hours.

We should take great care to those donors who take antihypertensive drugs, particularly β -blockers. Do not allow donors to eat solid foods during the donation. Reassure the donor about procedure before blood donation. Loosen any tight clothing such as tie, belt etc. in order to facilitate normal respiration. If necessary, administer vasopressors. If the donor has low blood pressure, infuse fluids (physiological saline, Ringer's lactate solution, and balanced solutions). Monitor the donor and retain him or her at the donor site until there has been an adequate hemodynamic recovery. If recovery is very slow, corticosteroids can be administered as a continuous infusion. If the pulse is very weak and the heart rate slow, atropine can be administered. If the clinical situation evolves into an episode of syncope, ensure that the airways are patent.

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