



## Prevalence of Post Donation Adverse Donor Reactions in a Medical College Hospital at Dhaka

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### ABSTRACT

**Objectives:** Adequate blood supply that must be safe depends on healthy and also with altruistic volunteers who are inclined to donate blood regardless of the potential risk of discomfort or adverse reactions. Blood donation has an tremendous safety record and most of the donors have a good experience or only a mild symptoms after donation. Although even a very low rate of reactions may pessimistic affect their inclination to donate again. The main aim of our study was to calculate the adverse donor reactions among the blood donors in a tertiary care hospital.

**Methods:** We conducted a prospective study between January to December of 2018 in Department of Transfusion Medicine of Sir Salimullah Medical College Hospital, Dhaka. Knowledgeable medical attendants drew blood from selected donors under guidance of a Medical Officer. All donors were observed during and after the procedure of blood donation for any adverse effect up to 30 minutes. Donors were asked to contact the department if they fill any adverse reaction afterwards.

**Results:** A total of 10056 blood donors were registered to donate blood and of them 9453 (94.004%) were eligible for donation. Among 9453 eligible donors a total of 360 (3.8%) donors experienced adverse reactions. The incidence was 1 in every 27 donations. Majority of donors 101 (28.05%) who experienced adverse effect is of age group of 18-25 years with female predominance 192 (53.33%). Among the 360 donors 151(41.94%) developed vasovagal reactions, 83(23.05%) felt nauseated or vomited, 51(14.1%) hyperventilated, 25 (6.94%) cope with delayed syncope, 22 (6.11%) felt dizziness, 18 (5%) formed a hematoma around site of needle prick and 10 (2.77%) others developed problems with blood flow. No delayed donor reactions were recorded. First time donors have higher frequency 479 (79.43%) of adverse reactions than repeat donors.

**Conclusion:** The prevalence was reasonably low in this study of tertiary center. But still it is a potential problem for the donors, especially the new donors. All donors should be briefed prior to donation about the probable side effects of donation. Donation related adverse reactions are often a multifactorial process and can further be minimized by using previous knowledge to prevent it. Donors with adverse effects must be encouraged for future donations along with donor education.

**Key words:** Donor reaction–Vasovagal reaction–Blood donors–Syncope

### 1 INTRODUCTION:

The obtainability of the donated blood supply is depending on members of the community who choose to donate. [1]

One of the most influential predictors of return is a positive donation experience itself. [2] Blood donors usually permit the donation very well, but sometimes adverse reactions of variable severity may occur during or at the end of the collection. [3] In contrast to a positive donation experience, an adverse reaction to blood donation is a negative event

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known to impact subsequent blood donation. [4] An inauspicious event was defined as the symptoms or signs of the donor discomfort of adequate severity such that either the donor drawing the attention of the attending staff or they were noticed by staff while pain at the time of venipuncture was excluded. [3] Amelioration of some unfavorable events has the likely to improve return rate. [4] Studies have documented that donor reactions are also associated with lower donor return. It causes pain, anxiety, and awkwardness to the donors who evolved the inauspicious reaction along with uneasiness, anxiety, and agitation among the donors who are looking for the donation. [5] There are frequently blood shortages in the developing countries owing to lack of perception and unprovoked community support and are mainly self-dependent on family/replacement donors. Replacement donors can be cling to as future regular voluntary donors. [6] Generally, these are minor symptoms interconnected to the donation process. Although, rarely, serious inauspicious symptoms may occur. These symptoms range from a mild vasovagal reaction (VVR), nausea, vomiting, and hyperventilation to hematoma, incontinence, nerve injury, arterial prick, and may culminate in delayed syncope, cardiac arrest, and seizures. [7]

Inauspicious responses to donation can be (a) acute: Immediate or delayed (after single donation) (b) chronic: In response to long-term donation. Acute reactions most regularly arise from anxiety regarding to painful venipuncture or attributable to blood volume shortage during donation. The most common type of acute reaction during or immediately after blood donation is a vasovagal reaction that can progress to syncope resulting in fall which can cause injuries. Hematomas, thrombophlebitis, infection, and physical damage to nerve, tendons, or muscles are possible adverse effects of blood donation and can present as immediate or delayed complications. Nerve damage can present with numbness, tingling, radiating pain, with occasional loss of strength but since peripheral nerves can regenerate and heal; total recovery occurs in over 90%, but it can take a prolonged time. [8] Chronic adverse reactions such as iron depletion can occur in regular voluntary donors which commonly results in iron deficiency anemia. [9]

The adverse reactions that occurs in blood donors can also be divided into local reactions and systemic reactions. The local reactions occur mainly because of problems related to venous access. They are usually hematomas due to extravasation from the veins, caused by incorrect placement of the needle during the venipuncture. [10, 11] Pain, hyperemia, and also swelling may be developed at the site of the extravasation. The usual systemic reactions are vasovagal reactions, that can be precipitate by the pain of the venipuncture, when the donor seeing his or her own blood, also the donor seeing another donor unwell, by the perturbation and state of persecution of undergoing the donation, etc. These are characterized by the arrival of pallor, sweating, dizziness, gastrointestinal disorders, nausea, hypotension, and bradycardia. Therapeutic intervention must be swift as vasovagal reactions at times progresses into syncope which may or may not be complicated by the onset of

tonic-clonic muscle spasms (convulsive syncope), vomiting, loss of sphincter control sudden fall, and injuries. [12]

The aim of our study was to assess the frequency of these adverse reactions at a tertiary care hospital in Bangladesh and also to determine the entire spectrum of different adverse events. We also wanted to determine any association with age, gender, weight, educational status and donation status (new first time/repeat donor). Thus, our study sought to identify a vulnerable donors group who are at risk of developing various adverse reactions.

## 2 METHODS:

A prospective study was conducted between January to December of 2018 in Department of Transfusion Medicine of Sir Salimullah Medical College Hospital, Dhaka. Experienced medical attendants let out blood from eligible donors under guidance of a Medical Officer. Departmental SOPs was strictly followed. Asepsis was maintained by disinfecting the site of venipuncture using Hexidine preparation. The minimum weight requirement for donation was 50 kg and the lower limit of acceptable haemoglobin concentration was set at 12 g/dl. A warm and comfortable atmosphere for donors was provided. Those donors who complained of adverse reactions like dizziness, light headedness, nausea and vertigo were managed by stopping the let out process immediately. The legs of donor were raised by changing position of donor bed. Donors were requested to wait at the rest room for at least 30 min before their departure. Presyncopal symptoms include sweating, pallor or light headedness without any loss of consciousness. Syncope with or without loss of consciousness are noted under broad heading whether they are of minor or major types. Unconscious patients were managed Local adverse reactions included hematomas, bruises, infiltration, allergic reaction and a tingling sensation. Donors were asked to communicate the department of transfusion medicine if they fill any complains afterwards. All donor reactions were noted accordingly. If a donor experiences more than one reaction, then the major one was recorded.

## 3 RESULTS:

Total 10056 donors were registered during the study period, 9453 (94.004%) were eligible for donation and 603 (5.996%) blood donors were deferred due to various reasons. Of all the donors male were 7526 (74.84%) and female were 2530 (25.16%).

Majority of donors were young in 26-35 age groups (40.80%). The rate of deferral was the highest in the age group of 36-45 (32.67%) followed by 46-55 (30.35%), 56-65 (17.25%), 26-35 (15.26%) and 18-25 (4.48%). A major portion of donors were new donors (57.21%) and remaining were repeated donors (42.79%). Among the donations relative donors were much high (92.23%) than the voluntary donors (7.77%).

Among 9453 eligible donors a total of 360 (3.8%) donors experienced adverse reactions. The incidence was 1 in every

27 donations. Majority of donors 101 (28.05%) who experienced adverse effect is of age group of 18-25 years with female predominance 192 (53.33%). Among the 360 donors 151(41.94%) developed vasovagal reactions, 83(23.05%) felt nauseated or vomited, 51(14.1%) hyperventilated, 25 (6.94%) cope with delayed syncope, 22 (6.11%) felt dizziness, 18 (5%) formed a hematoma around site of needle prick and 10 (2.77%) others developed miscellaneous reactions. Donors having education below Higher Secondary experienced more reactions (49.44%) than others. First time donors have higher frequency 479 (79.43%) of adverse reactions than repeat donors.

#### 4 DISCUSSION:

Transfusion medicine related blood banks have a two responsibilities. First one is to meet the blood supply for the serving community and secondly to ensure maximum safety of blood. The physical experiences of donors' have a noticeable impact on donors' return in future and donor return rate depends on adverse incidents. [13] Our study revealed different adverse donor reactions in 3.8% of donors from in a tertiary care hospital of Bangladesh.

Our results showed higher incidence than study from India that reported adverse donor reaction events in 2.5% of healthy blood donors. [14] Another study from locality of Bangalore India revealed a prevalence of 2.04% which is also lower than ours. [8] A comparatively higher prevalence of 4.9% was reported in a study from Bangladesh. That study assessed randomly selected whole blood donors in a tertiary medical college at Dhaka. [15] Compared to data from different developed countries, our results are relatively higher. A study from Italy found an overall prevalence 1.2%. [12] A large scale study from Japan on 98,389 blood donors found a 2.8% positivity rate of adverse reactions. [16] However, a frequency of 0.63% adverse reactions was determined in a German study which was relatively low. It was conducted in elderly citizens (66-71 years) who voluntary donate blood. [17] The difference in results in our study is mainly due to mixed age group in our study. Many of the donors are also relative, friend or replacement donors. Regular and voluntary blood donors experience relatively less adverse donor reaction.

Vasovagal reactions (VVR) are the most common adverse reaction occurring in 67-95% of all donation-related reactions and affected 1-5% of blood donors. [18] Donation related VVR is a multifactorial response primarily determined by young age, low weight, female gender, and first-time donors. [18-20] In a study of two blood banks at Karachi city of Pakistan by Rohra et al reported a very low prevalence (8.2%) of VVR in 674 exchange blood donors. [21] The majority of donors of their study were aged < 30 years and the sample size was relatively small. Our cohort is larger than the study and therefore reflect reactions more precisely. Some previous studies from different states of India reported VVR prevalence of 63.5% and 70.0%, which are higher to our findings of 41.94%. [14, 22] Age and weight

might predict the VVR in blood donors, significant associations were observed in some studies. Previous studies reported a significantly low frequency of VVR in those aged  $\geq$  36 years old. [14] The highest prevalence was seen in the 18-25 years age group in our study. A study from France postulated that vasovagal reactors exhibited decreased baroreceptor sensitivity in healthy younger donors when they are physically or psychologically strained. [23] With increasing age towards youth, the body becomes hemodynamically stable.

Relation of adverse donor reactions can be observed in relation to weight. An adverse event was frequently (62.36%) seen in donors who weighed less than 60 kg. Previous studies support our findings. Donors who experienced adverse reactions had a lower mean weight compared to donors without adverse events. [24] Newman showed that the VVR reaction rate was inversely proportional to the donors weight. [4] A report from three large United States blood centers also revealed that donors low in weight had high VVR rates compared to other donors. [19] In our study females (53.33%) were suffered much than male donors. Some studies are conducted on only male donors, so they failed to show any association. [7] Female blood donors constituted 30% of total blood donations reported from Italy. [25] However, the situation in Pakistan is even more alarming, where the prevalence was < 1% as reported in prior studies. [7, 21] It is mainly due to relatively lower blood donation by females (20%) at Pakistan. [26]

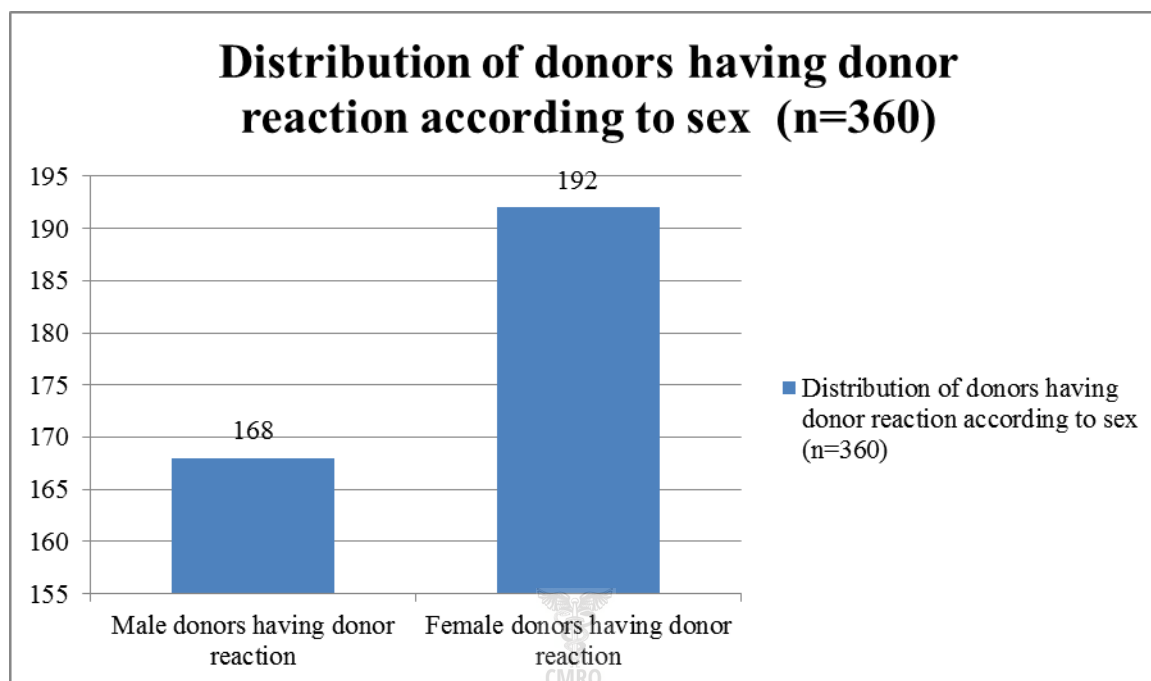
In terms of educational background, it was found that most donors with reactions are from below undergraduate levels (49.44%) with minimum among illiterates (15.27%). As the age group of undergraduates is from relatively younger age, so they suffered more. Illiterate persons are registered much less in number than literates as blood donor, so it might reflect their lower incidence of donor reaction. A previous study by Salia et al [7] among Urdu-speaking populations has shown undergraduate educational status as strong predictors of delayed syncope and fainting, which is similar to us.

In our study, the second most common type of adverse events were nausea (23.05%) and third most common was hyperventilation (14.1%). In one European study, fainting was reported as an adverse event in 20.5% of blood donors. [27] The authors of that study concluded that the experience of stress during phlebotomy was the reason for the higher frequency of reactions. The divergence perception of donor along with demographics, awareness, and understanding could may contribute.

Needle injuries along with hematomas were encountered among 5% donors which was higher than a prior study from Bangladesh among 14413 blood donors. [15] Newman et al [19] had found high frequency of bruises in 15.1% of donors while Agnihotri et al [14] determined hematoma as an adverse event in 35% of all reactions, both of which were much higher than our study. The differences between studies seems to be the faulty technique, untrained phlebotomists and failure to select an appropriate vein. [14] Needle-associated nerve injuries occur in one of every 6300

**Table 1.** Percentage of accepted and deferred donors from registered donors during the study period (n=10056)

Donor type	Registered	Percentage (%)
Registered	10056	100
Accepted	9453	94.01
Deferred	603	5.99

**Figure 1.** Distribution of donors having donor reaction according to sex (n=360)**Table 2.** Distribution of age of donors who experienced donor reaction (n=360)

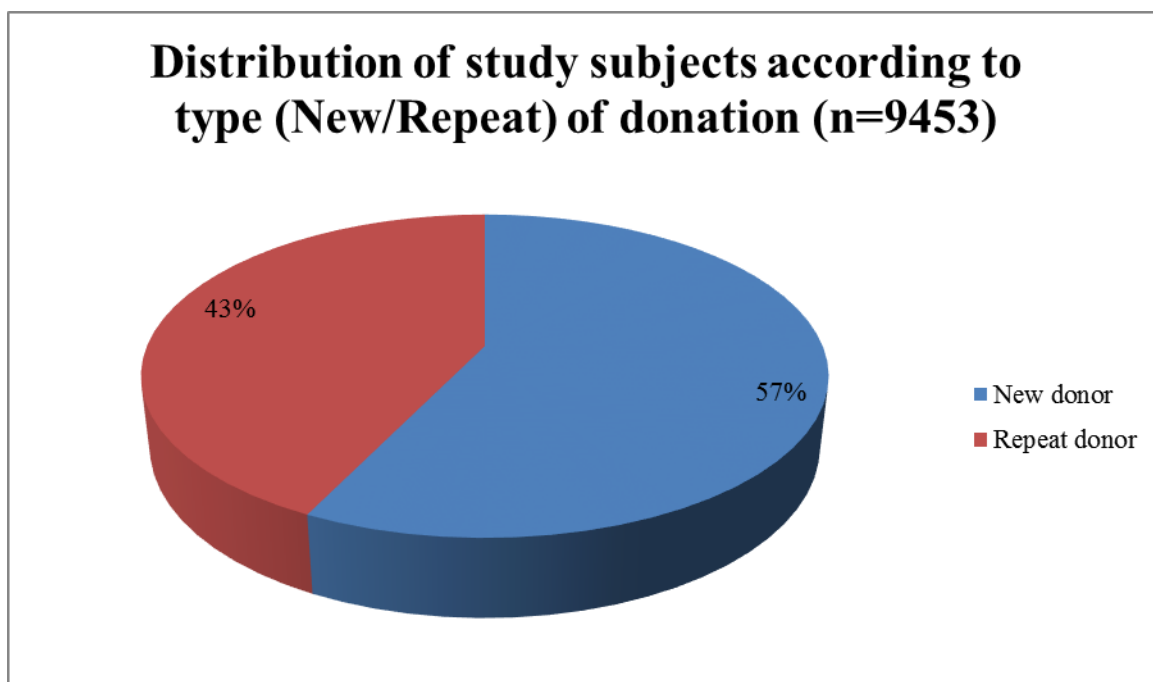
Age in Years	Number of subjects	Percentage
18-25	101	28.05
26-40	84	23.33
41-55	83	23.05
>55	92	25.55

**Table 3.** Distribution of donors with reaction according to educational status (n=360)

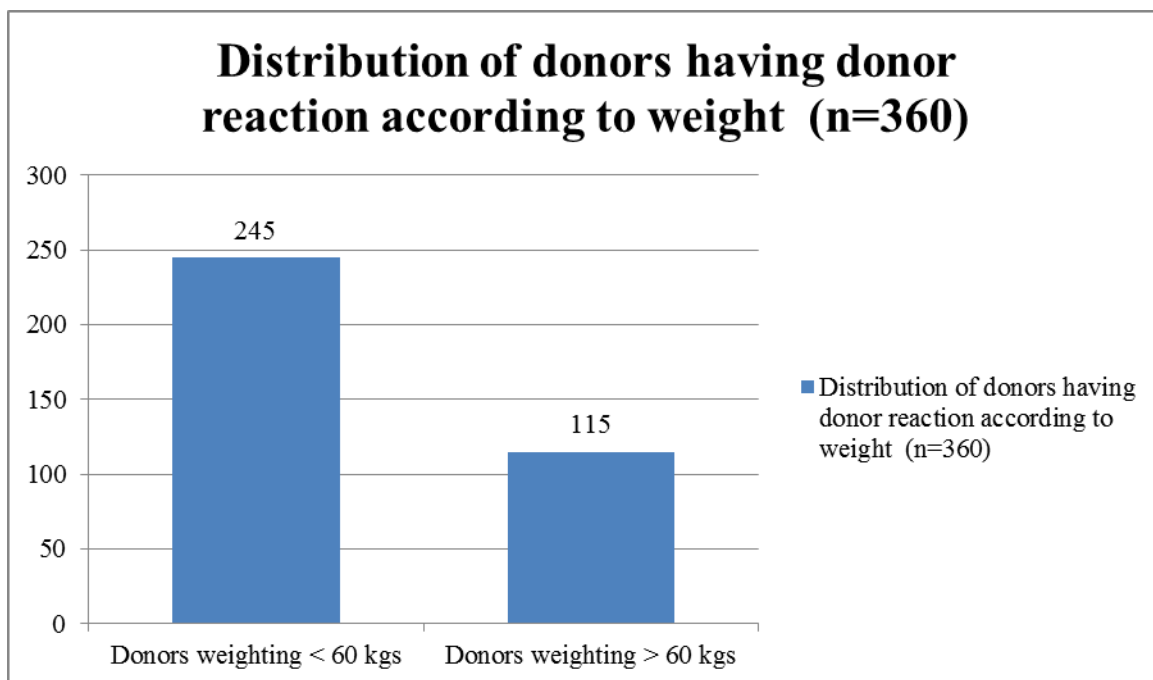
Educational status	Number of subjects	Percentage
Illiterate	55	15.27
Under or Higher Secondary equivalent	178	49.44
Graduate	127	35.27

**Table 4.** Distribution of donors with donor reaction according to type of reaction (n=360)

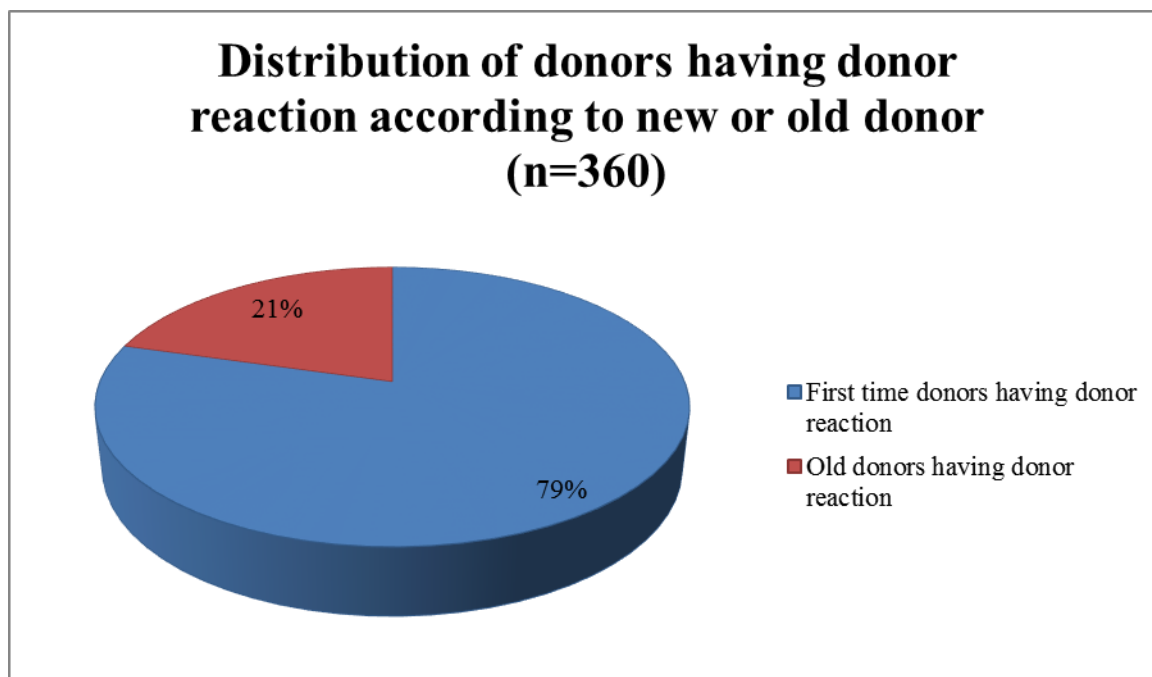
Type of donor reaction experienced	Number of positive donor reactions subjects	Percentage of positive donor reaction
Vasovagal reactions	151	41.94
Feeling nauseated or vomited	83	23.05
Hyperventilation	51	14.1
Delayed syncope	25	6.94
Felt dizziness	22	6.11
Hematoma around site of needle prick	18	5
Problems with blood flow	10	2.77
Delayed donor reactions	0	0



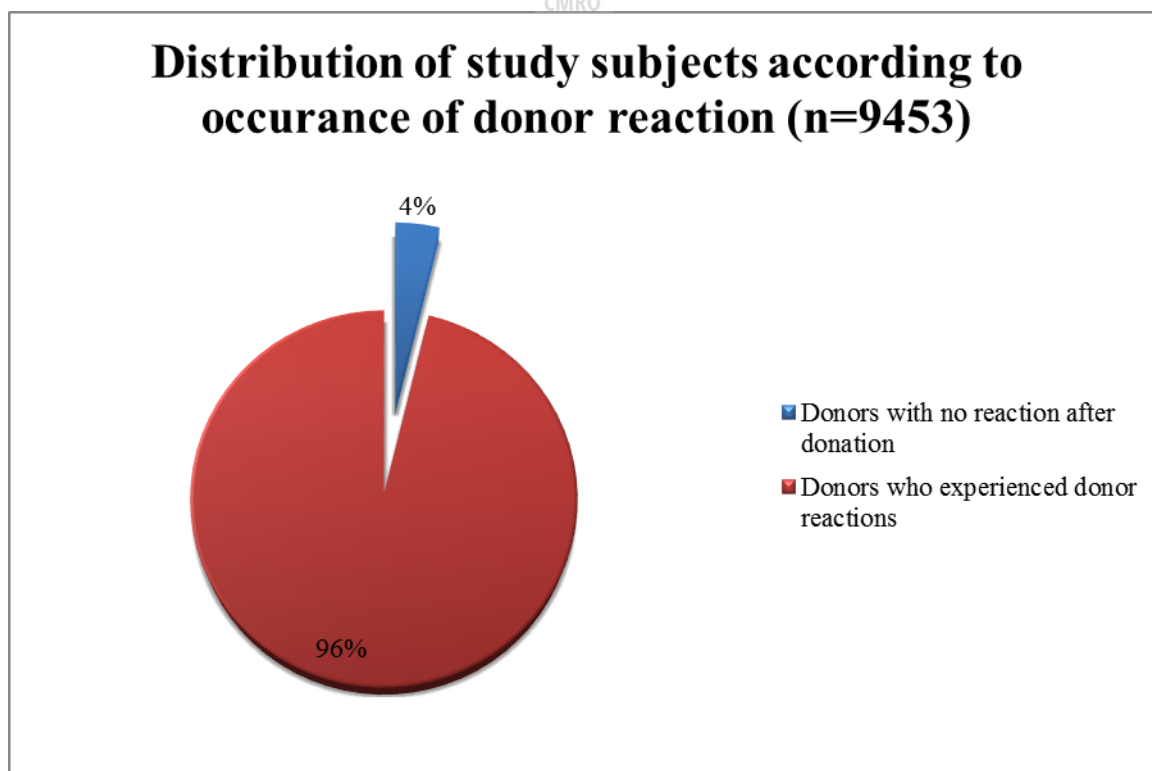
**Figure 2.** Distribution of study subjects according to type (New/Repeat) of donation (n=9453)



**Figure 3.** Distribution of donors having donor reaction according to weight (n=360)



**Figure 4.** *Distribution of donors having donor reaction according to donor type (n=360)*



**Figure 5.** *Distribution of study subjects according to occurrence of donor reaction (n=9453)*



donations. [19] Nerve injury was not observed in our donors. In case of 2.77% donors we experienced low blood flow, which was a little higher than a previous study. [15] Faulty technique along with problem collection bag with tube might be responsible.

## 5 CONCLUSIONS:

Donation related adverse reactions are multifactorial in origin. The prevalence of adverse donor reactions in our study was not so high. However, to further minimize observed adverse events and to sustain the donor pool with an objective to increase it, we would suggest a number of strategies. These include more donor education and counseling before letting out of blood, decreasing the donor-to-phlebotomist ratio, not allowing unprepared or fasting donors to donate, giving more individual concentration to each donor, keeping donors in supine position for longer, offering fluids before starting phlebotomy and training blood donors about applying muscle tension exercises and proper post donation care. We should try to make donation process more safe and event free in coming days.

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