Original Article

Prevalence of whole blood adverse donor reactions in SKIMS medical collegeand hospital –A study at health care of North India

Faisal Ashraf, Mohammad Suhail Malik

Abstract:

Background and Purpose: To find the incidence and analysis of adverse donor reactions in whole blood donations.

Materials and Methods: This study has been done for a period of three years in Department of Blood Transfusion Medicine and Immunohaematology SKIMS, MCH Srinagar from May 2020 –April 2023. Donors were accepted for blood donations only after proper screening and counseling as per the national guidelines. Any adverse reaction during and post donation was managed conservatively successfully and recorded accordingly.

Results: Out of 5952 donors comprising of both voluntary and replacement donors. Males comprised of 5426 (91.16%) and females 526(8.84%) donations. Male to female blood donor ratio is 10:1. 4635 i.e. (77.87 %) of total donors were on replacement basis. Prevalence of the donors experiencing adverse reactions was 177 (2.97%). Female donors 171 (57.77%) are most susceptible to reactions. Vasovagal reactions141 (79.73%) were found to be among most common reaction with its mild grade in majority of cases.

Conclusion: Only 177 (2.97%) of blood donors had some kind of adverse reactions. As we know that the cause of blood donation reactions varies, most of which can be easily mitigated through strict adherence to guidelines and competence of blood centre staff.

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Introduction:

Uneventful blood donations are backbone of a successful blood transfusion service. Developing countries usually have less blood donations due to lack of unmotivated population and if an adverse reaction will happen will lead to weak blood transfusion service (BTS) in a population. [1]Educated and well informed population leads to healthy non remunerated blood donors, but despite of that adverse reactions can occur at beginning, during and end of donation [2].The most common type of reaction is a vasovagal reaction. Fainting (syncope) has found to be more in female gender, low body weight and first time donors. >7% of the donors don't come back after suffering any adverse event. Even after thorough screening of donors adverse reactions still can occur hence the need to observe and report the events become more necessary to mitigate the chances. The nature of reactions can vary from severe to mild. A blood donation which is goes smoothly increases the chances of retaining the donor for future as a regular voluntary donor. Apart from starting Hemovigilance Programmes for surveillance of transfusion reactions in 1900's soon it was felt important to record analyse and mitigate blood donation related reactions [3].After ISBT [International Society of Blood Transfusion] and IHN [International Hemovigilance Network] Working Party and AABB Hemovigilance Programme, India also started reporting its own blood donation related reactions under National Blood Donor Vigilance Programme[NBDVP]on14th June, 2015 on world blood donor day in Kolkata [4].

Data Collection:

Variables such as age, gender, weight, donation status and type of adverse reaction were collected from departmental data registers. Also recorded concerned data such as type of adverse events and its management was piled up and inserted on MS Excel sheets.

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Adverse Donor Reactions, Immunoheamatology

Statistical Analysis:
The overall analysis of the data was descriptive with results presented as percentage for categorical data. Statistical analysis was done using Statistical Package for the Social Sciences Version 22.0. If $p \leq 0.05$, it was considered to be statistically significant.

Material and Methods:
This hospital based single centre retrospective study was conducted over a period of 3 years from May 2020 to April 2023 on voluntary and replacement based whole blood donors in Department of Blood Transfusion and Immunohematology SKIMS, MCH. Both voluntary and replacement non remunerated donors aged 18-65 years and having body weight equal to and more than 45 kg's were properly counselled and screened under the guidelines provided by Director General of Health Services prior to donation. Asepsis was maintained by disinfecting the site of venipuncture properly by using betadine and alcohol preparation.The lower limit of acceptable hemoglobin concentration was at 12.5 gm/dl.
At every step of donation proper SOP was followed. Prior informed consent was taken from donors and confidentiality maintained. The blood donors were observed during and 20 minutes post donation for any adverse event. All adverse reactions were noted accordingly in departmental register. Data entry was done in Microsoft excel and appropriate Statistical test were applied. All blood donors who experienced reaction in blood centre as well as during blood donation camps were included in our study. All donor reactions were conservatively managed successfully as per the SOP.

Results:

Total Donations (N)(%)	5952 (100%)
Males(%)	5426 (91.16%)
Females(%)	526 (8.84%)
Replacement donation(%)	4635 (77.87 %)
Voluntary donation(%)	1317 (22.13%)

Table 1.Total number of blood donations with gender and donation type wise distribution.

Figure 1 displays that total 5952 whole blood donors were recorded in our data system. Male donors were 5426 (91.16%) and females comprised of 526 (8.84%) donations. Male to female ratio was 10:1. As per donation status replacement donors4635 (77.87 %) surpassed voluntary donations.

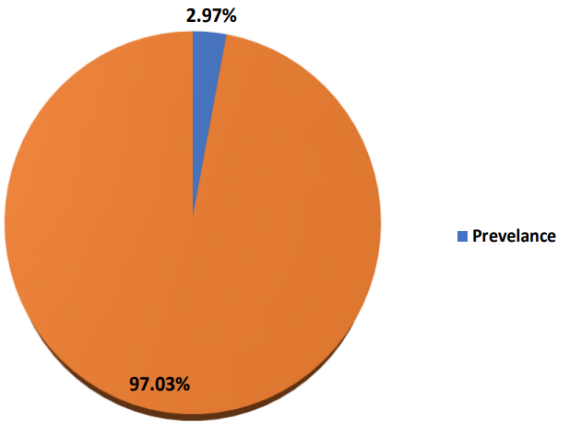

Figure 2: Prevalence of adverse donor reactions
According to this figure about 177 (2.97%) blood donors experienced some kind of adverse reactions.

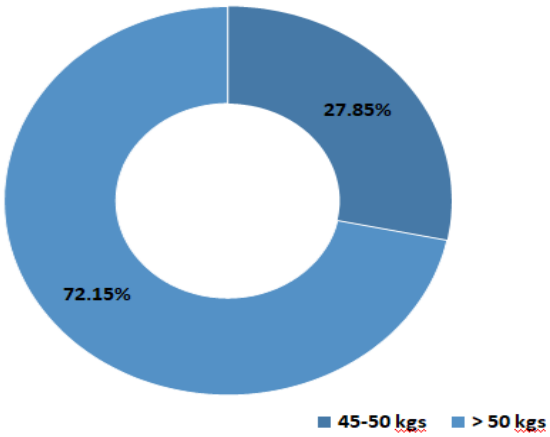

Figure 3: Weight wise distribution of total blood donations.
Figure 3 displays total blood donation as per body weight .It can be seen that 1658 (27.85%) donors were between 45-50 kg's while as 4294 (72.15%) of donors were above 50 kg's.

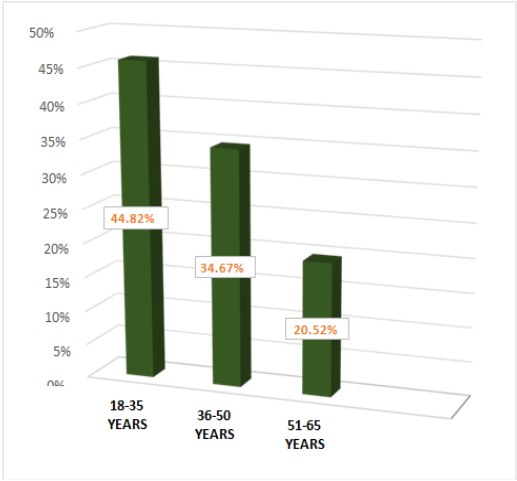

Figure 4:Age wise distribution of total blood donations.

In the above figure, blood donors within age group 18-35 years contributed 2668 (44.82%),36-50 years 2064(34.67%) followed by age group51-65 years 1222 (20.52%) of total blood donations. Hence younger age group seem to donate more oftenly.

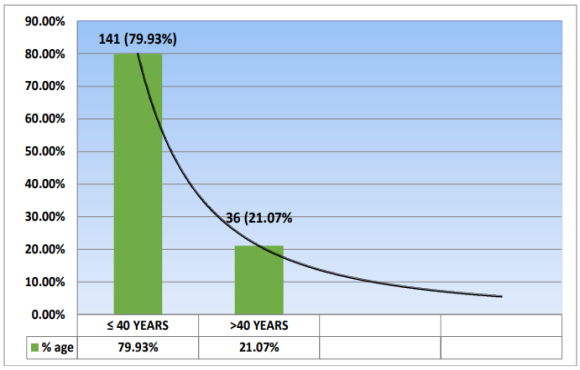

Figure: Age wise donor reactions.

A significant and sharp decrease in donor reactions with increase in age is seen in the above figure.

[p value ≤0.05].

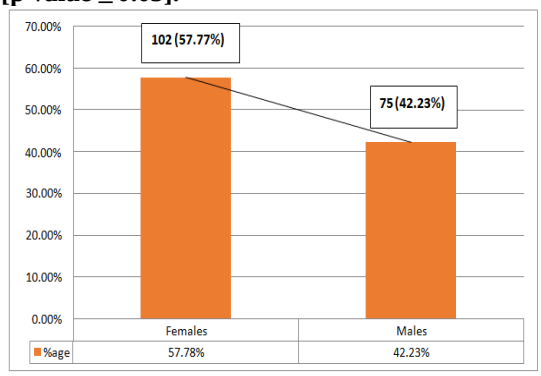

Figure: Gender wise donor reactions

Above figures shows us that female gender donors 102 (57.77%) are most susceptible to experience adverse donorreactions than male donors 75 (42.23%).

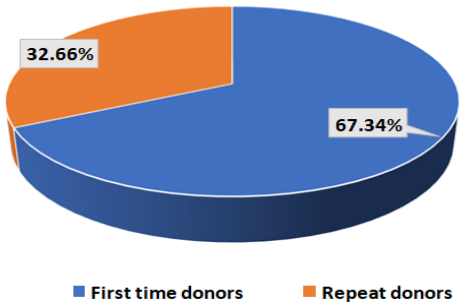

Figure 5: First time and repeat blood donations.

Figure 5 displays that among the all blood donations, first time donors were in majority i.e. 4008 (67.34%) hile repeat donors comprised 1944 (32.66%) donations.

REACTION CLASS	TOTAL NO. OF REACTIONS(N)	CTIONS(%)
VASOVAGAL REACTIONS	141	79.73%
HEMATOMA	17	9.46%
TINGLING/NUMBNESS	11	6.42 %
EXTRAVASATIONS (BRUISES)	08	4.40%
	177	100

Table 8: Percentage and number of reactions by major reaction class

The above figure displays all the reactions experienced overall by the donors in terms of both the number and percentage. It is clearly seen that vasovagal reactions 141 (79.73%) are the most common of them all.

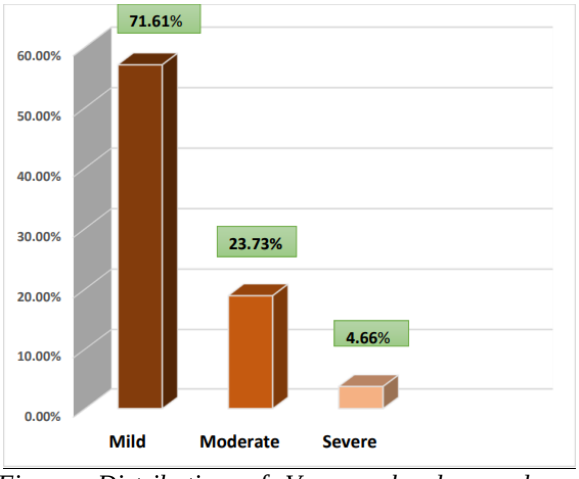

Figure: Distribution of Vasovagal adverse donor reactions as per grading.

The above figure displays that among all adverse reactions mild form of vasovagal reaction was most

common reaction experienced by donors, comprising of majority i.e. 127 (71.61%) of reactions. 42 (23.73%) developed moderate reactions and 08 (4.66%) experienced severe vasovagal reaction.

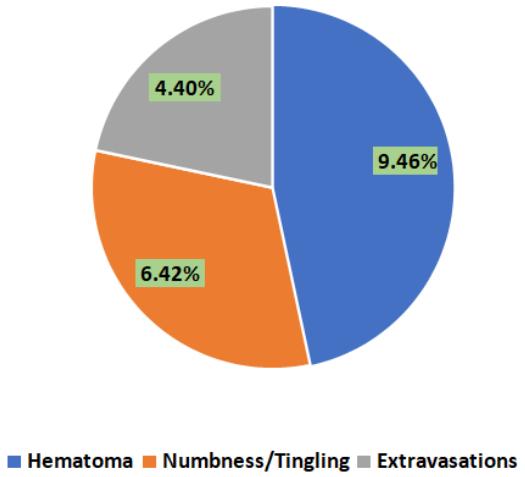

Figure10: Needle injuries

Figure 10 shows that total percentage of needle injuries experienced by donors is 36 (20.27%). Here hematoma was shown by 17 (9.46%) of donor population followed by tingling/numbness 11 (6.42 %) and extravasations (bruises) 08 (4.40%).

Discussion

Only 296 (2.97%) of blood donors showed adverse donor reactions with vasovagal reaction being most common but still it is a potential problem for the donor retention , especially the new donors. 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. Blood donation has proven to be a safe and uneventful procedure when applied with some of mitigations such as effective pre donation counseling and screening, attentive and skilled staff, timely refreshment and post donation counseling. Thus helping eventually to meet all challenges and maintain an optimum blood transfusion services.

In our study, 2.97 % of all whole blood donations were complicated by adverse events. This is in concordance to various studies conducted all over the world in which the rate of adverse events associated with donations ranged from 0.3% to 3.8% [9– 11,13, 14, 17, 18] Also some studies showed the incidence of adverse reactions to be in between 2% to 7% [18-21]. Although whole blood donation is considered to be quite safe, reports in the medical literature about the frequency of adverse events during donation show broad heterogeneity. [12-14]

Our study found that out of total 5952 donors, 5426 [91.16%] belonged to male gender & only 526 [8.84%] were female donors. Similar studies by Mangwana S 2013; [21] Majlessi F et al, 2008; [22] Chowdhury FS et al, 2011; [23] Jain N et al, 2014 [24] showed almost same frequency of male [96.96 %, 94 %, 92.5%, 96.1 %] & female [3.04 %, 6 %,7.5 %, 3.9 5] donors respectively. As male have bigger social circles, can be contacted more easily and have higher chances of eligible hemoglobin levels therefore all these factors contribute towards majority of donations.

In present study, age group between 18-35 years 2668 (44.82%) were found to be in majority of blood donations which was found to be in accordance with study conducted by Mahbub-ul-Alam M et al, 2007 [15] Rohra D K et al, 2010 [16] & Agnihotri N et al, 2012 [17]. These studies also concluded increased incidence of donors in younger age groups. The reason of young people being in high number can be due to the fact that younger population are comparatively more energetic, have altruistic behavior and more enthusiasm in them.

It was found in our study, that most of the donors who experienced adverse donor reactions, 79.93 % [141] belong to the younger age groups i.e ,< 40 years. There was a significant decrease in the reaction percentage as the age increased [p value ≤ 0.05]. In various studies done by Mangwana S 2013; [25] Rathod K 2014; [26] Rohra DK 2010;

[27] Tondon R et al 2008; [28] they also reported that the adverse reaction percentage decreased as the age of donors increased. A study by Newman B H [29] 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.

The present study also found that female donors 102 (57.77%) experienced reactions more than those of male 75 (42.23%).donors also seen in study by Miah M. [30]

Under the class of needle injuries 36 (20.27%), hematomas 17 (9.46%) were more commonly observed similar to Tiwari *et al.*'s [31] study and whereas the bruises (extravasations) were also observed in regular donors [32] Most of the hematomas took more than 7 days to resolve. These results were documented, as donors with hematoma usually followed up again at a later date to ensure its resolution.

Finally, like various other authors [33-35] we found a low incidence of severe reactions (major syncopal reactions (3.72%, 11/296) with no episodes necessitating hospitalisation or administration of intravenous fluids. It is also to be mentioned that the maximum volume of blood withdrawn during the donation (450 mL ± 10%) is only about 10% of the total blood volume in an adult donor. Since at least 800-1,500 mL of blood, i.e. 15-20% of the total blood volume would have to be lost in order to be in at least class I risk of hypovolaemia, blood donors are unlikely to experience severe vasovagal reactions.

[36] As blood donors are screened properly under strict guidelines, which leave less chance of severe adverse reactions.

Conclusion

Blood donation is a safe process but still some adverse reactions can occur. These unpleasant events although less in percentage have gross and significant effect on donor retention rate. So it's very important to find the cause, and accordingly mitigate the occurrence of blood donation related adverse events. As offsite reactions go un-noticed and un-marked less data regarding it is found. As blood transfusion service centres have both responsibility of maintaining optimum blood and its components with assuring safety for blood donors too. Hence even a minor class of reaction drastically reduces repeated donations [5-11].

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Nil

Conflicts of Interest:

The Authors declare no conflicts of interest.

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