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Mayur J Kokani
Assistant Professors,
Department of Pathology,
GMERS Medical College & Hospital, Near Majewadi Gate, Paddock Road, Junagadh, Gujarat, India

Chiragkumar B Menapara
Assistant Professors,
Department of Pathology,
GMERS Medical College & Hospital, Near Majewadi Gate, Paddock Road, Junagadh, Gujarat, India

Correspondence
Chiragkumar B Menapara
Assistant Professors,
Department of Pathology,
GMERS Medical College & Hospital, Near Majewadi Gate, Paddock Road, Junagadh, Gujarat, India

Donor blood wastage: Reasons & Prevention

Mayur J Kokani and Chiragkumar B Menapara

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Abstract
Aims: 1 Analysis of various reasons for discard or wastage of donated human blood & 2) Discussion on possible preventive measures for minimization of this loss
Materials & Methods: This retrospective study was conducted at the blood bank, department of pathology, GMERS medical college & hospital, Junagadh (Gujarat-India) and included data from records of previous 26 months (January 2017 to February 2019). Reasons for wastage were categorized into four groups namely expiry, under-collection, sero-positivity for TTI & others including leakage, contamination, hemolysis, etc.
Results: Total 16,057 blood units were collected and out of them, 240 units (1.49%) were discarded. Out of discarded units, 13.33% were due to Expiry, 37.09% were due to Under-collection, 42.08% were due to Seropositivity and 7.50% were due to other reasons.
Conclusion: It is almost impossible to achieve 0% wastage of donated blood. So, appropriate preventive measures must be taken in order to minimize the same.

Keywords: Wastage, expiry, seropositivity, under-collection, preventive measures

Introduction
Human blood has no substitute till date and nowadays, it is almost impossible to perform major surgical procedures without utilization of blood & blood products in any hospital or clinic. Therefore it becomes necessary and advisable to utilize each and every unit of blood in an appropriate manner. In many developing countries including India, demand for blood always exceeds or outweighs its supply. Resources of blood & blood products are always limited and particularly useful for gynecological problems & trauma cases. In such condition, wastage of donated blood can have a negative impact on blood transfusion services. [1-3]
Therefore, aims of our present study include, 1) Analysis of various reasons for discard or wastage of donated human blood & 2) Discussion on possible preventive measures for minimization of this loss.

Materials & Methods
This retrospective study was conducted at the blood bank, department of pathology, GMERS medical college & hospital, Junagadh (Gujarat-India) and included data from records of previous 26 months (January 2017 to February 2019). All blood donations included in this present study fulfilled the donor selection criteria as mentioned in WHO guidelines.
Total number of blood units or bags collected during this period was noted. Number of in-house & outdoor camp donors were also included. Number of male & female donors were also included. Total number of discarded units was counted and reasons for discard or wastage were categorized in four different groups as mentioned below:

1) Expiry or Out-dating of blood units
2) Seropositivity for various transfusion transmitted infections (TTI) including HIV, HBs Ag, Anti-HCV, syphilis & malaria
3) Under-collection or Low volume collection
4) Other reasons including leakage, contamination, hemolysis, clot formation, etc.

Results
A total number of 16,057 blood units were collected during the study period. Out of them, 11,566 units (72.03%) were collected from In-house blood donation while 4,491 units (27.97%) were collected from Outdoor blood donation camps. 15,063 Donors (93.81%) were males & 994 (6.19%) were females.

A total number of 240 blood units were discarded during the study period.
Discard rate of whole blood was 1.49%. Details are mentioned below in table no.1.

Table 1: Details of donor blood wastage from January 2017 to February 2019 (26 months)

Reason for discard		No. of units discarded	Percentage	
Expiry or Out-dating		32	13.33	
Seropositivity	HIV	14	5.83	42.08
	HBsAg	86	35.83	
	Anti-HCV	01	0.42	
Under-collection		89	37.09	
Others		18	7.50	
Total		240	100	

At present, facilities for blood component separation are not available at our institute, so the observations mentioned above indicate the collected & discarded units of whole blood only. Data related to blood components is not included in our present study.

Discussion

Discard rate of whole blood in our present study is 1.49%. Comparison of these rates of different studies is mentioned below in table no.2.

Table 2: Comparison of discard rates of different studies

Name of the study	Year of Publication	Discard Rate of whole blood (%)
Kaur Puneet *et al.* [1]	2016	5.80
Arora I *et al.* [2]	2018	3.52
Sharma N *et al.* [3]	2014	4.46
Roy & Pal [4]	2015	2.18
Kumar A *et al.* [5]	2014	3.25
Chavan SK [6]	2017	4.00
Suresh B *et al.* [7]	2015	5.70
Mahapatra S *et al* [8]	2017	1.75
Kanani AN *et al.* [9]	2017	3.15
Duarah B *et al.* [10]	2016	2.41
Present Study	2019	1.49

In our present study, Seropositivity constitutes the commonest (42.08%) reason for wastage or discard and among all transfusion transmitted infectious diseases, Hepatitis B constitutes the major problem. Comparative evaluation of total seropositivity and HBsAg seropositivity of different studies is mentioned below in table no. 3.

Table 3: Comparative evaluation of total seropositivity and HBsAg seropositivity

Name of the study	Rate or Percentage of total seropositivity	Rate of percentage of HBsAg seropositivity
Sharma N *et al* [3]	58.5 (261 out of 446)	--
Kumar A *et al* [5]	74.30 (257 out of 346)	51.73 (179 out of 346)
Suresh B *et al* [7]	49.00 (146 out of 298)	31.54 (94 out of 298)
Duarah B *et al* [10]	39.97 (305 out of 763)	19.66 (150 out of 763)
Present Study	42.08 (101 out of 240)	35.83 (86 out of 240)

To reduce the wastage due to seropositivity, appropriate screening & counseling of donor are must. Detailed history must be taken including history of any major illness, major surgery, trauma, vaccination, occupation and habits. Doubtful donors & Professional donors must not be allowed to donate the blood. Strict criteria for selection & rejection, established by WHO must be applied during registration, history taking, physical examination & counselling of donors.
Under-collection or Low volume collection constitutes the next common (37.09%) reason for wastage or discard in our present study. Inappropriate selection of vein for phlebotomy, faulty techniques, lack of experience, adverse donor reactions (ADR) etc constitute the possible factors responsible for this problem. To reduce or minimize this problem, adequate training should necessarily be given to all phlebotomists working in a blood bank. Unexperienced or untrained person should not be allowed to perform phlebotomy. ADRs like headache, giddiness, palpitation, fainting, convulsions, etc also lead to inadequate or low volume collection, so only apparently healthy donors are allowed to donate the blood. The donors who come to donate the blood for first time are more prone to develop such ADRs and therefore adequate and appropriate counselling plays a vital role in such cases.
Expiry or out-dating due to non-utilization of blood constitutes 13.33% of wastage or discard in our present study. In other similar studies like those done by Arora I *et al.* [2], by Roy & Pal [4] and by Chavan SK [6], rates of expiry or out-dating are 51.40%, 66.67% and 88.45% respectively. These rates are quite higher than that of our present study. Unnecessary blood donation camps, excessive replacements, lack of demand especially for rare blood groups, etc are the common factors responsible for non-utilization. To minimize this problem, all these factors should be kept in mind. Unnecessary camps should be avoided. We should not insist for replacement of blood unless it is necessary. Those persons who have rare blood groups like Bombay blood group, AB negative blood group, etc should be explained about not to donate their blood on routine or regular basis as their blood is precious and always required in emergency conditions only. Arrangement of near-expiry units in front shelves of the storage areas, following of FIFO (first in first out) policy and regular audit of blood bank by hospital transfusion committee can reduce such loss. [1]
Other reasons leading to wastage of donated blood include hemolysis, clot formation, contamination, leakage, turbidity, etc. Appropriate collection & storage of blood can reduce such loss. Temperature control of blood bank refrigerators play an important role in reduction of such problems.

Conclusion

Wastage of donated blood creates a negative impact on blood transfusion services particularly in developing countries like India and it is almost impossible to achieve zero percent wastage of donated blood. Therefore, appropriate preventive measures discussed above must be taken in order to minimize the same and to ensure adequate supply of safe blood to the recipients.

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