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Audit-Based Actions to Reduce Wastage and Transfusion-Transmitted Infection (TTI) Positivity at a Hospital-Based Blood Center

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Abstract: ***Background: Blood wastage and transfusion-transmitted infection (TTI) positivity reflect the efficiency and quality of a blood center. Reducing discard rates through structured audits and corrective actions is key to improving transfusion safety. Aim: To evaluate the trends of blood component wastage and TTI positivity through audit-based quality improvement measures in a hospital-based blood center. Methods: A retrospective clinical audit was conducted at a tertiary care hospital blood center from July 2023 to December 2024 in three stages: baseline data collection, root-cause analysis, and implementation of corrective and preventive actions using the Plan-Do-Study-Act (PDSA) approach. Data were collected for four consecutive cycles. Key Performance Indicators (KPIs) studied were TTI positivity (HIV, HBsAg, HCV, Syphilis, Malaria) and blood component wastage. Results: TTI positivity remained low throughout the study, while wastage rates declined with each cycle. Mean TTI positivity (%): HIV 0.17 ± 0.03, HBsAg 0.33 ± 0.04, HCV 0.11 ± 0.02, Syphilis 0.33 ± 0.04, Malaria 0.02 ± 0.02. Mean component wastage (%): Whole Blood 0.01 ± 0.004, Platelets 0.07 ± 0.02, Total 0.08 ± 0.02. Conclusion: Regular audits with targeted corrective and preventive measures significantly reduce wastage and maintain infection control. Continuous monitoring ensures sustained quality improvement in transfusion services.***

Keywords: Blood wastage, TTI positivity, Quality audit, PDSA cycle, Blood center

1.Introduction

A well-functioning blood center must ensure both an adequate and safe blood supply. Monitoring of TTI positivity and wastage rates serves as key quality indicators. Excessive discards often point to issues in donor screening, storage, or utilization. Hence, systematic auditing helps identify and address process gaps, thereby ensuring efficient use of collected blood.

2.Materials and Methods

Study Design and Period

This was a clinical audit-based quality improvement study conducted at a Rukmani birla hospital-based blood center in northwestern India (July 2023-December 2024).

Audit Process

Three-stage audit using the **PDSA model**:

Stage 1-Data Collection: TTI positivity and discard data were extracted from records.

Stage 2-Analysis: Causes of wastage and infection trends were analyzed.

Stage 3-Corrective Actions and Re-audit: Interventions like improved component labeling, better inventory rotation, and refresher training for staff were implemented, followed by re-audit.

Statistical Analysis

Data were compiled in MS Excel and analyzed using SPSS 19. Descriptive and inferential statistics were applied. Mean, standard deviation (SD), and standard error (SE) were calculated

Target Site

The study was carried out at a tertiary care hospital-based blood center in Northwestern India, which collects and processes approximately 250 blood components monthly.

Inclusion Criteria

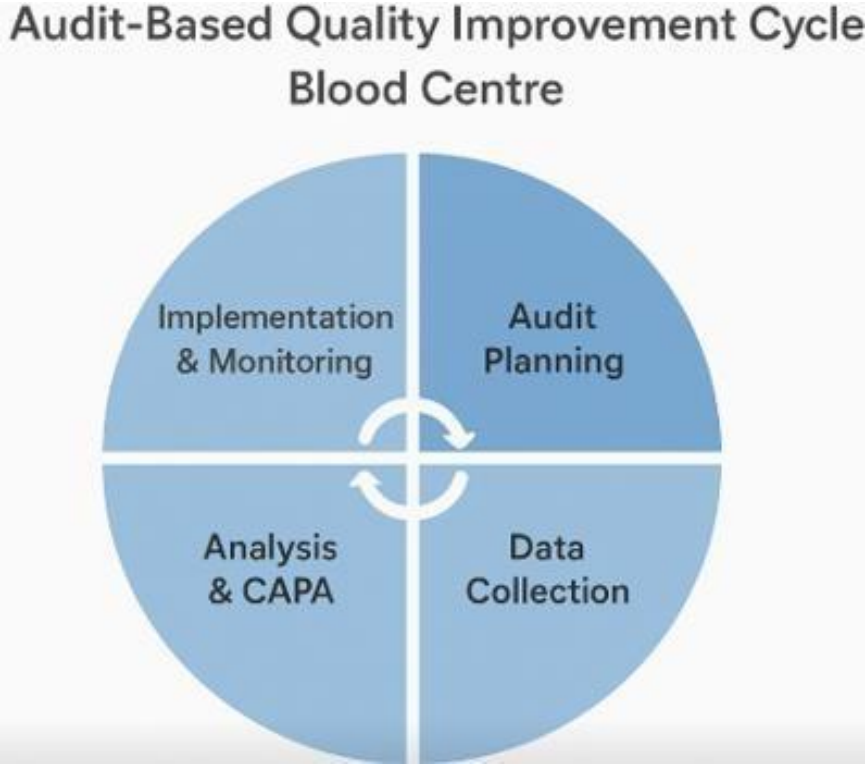
- All whole blood donations collected during the study period.
- All components (Whole Blood, PRBC, Platelets) processed and tested for TTIs.
- Records with complete documentation for TTI testing and component status.

Exclusion Criteria

- Autologous donations, as they are not routinely tested for TTIs.
- Incomplete or missing TTI test records.
- Components discarded for causes unrelated to infection (e.g., underweight bags, leakage, clots).

Sample Size

All eligible donations during the 18-month study were included (≈4000 total samples).



The PDSA cycle. PDSA=Plan do study act

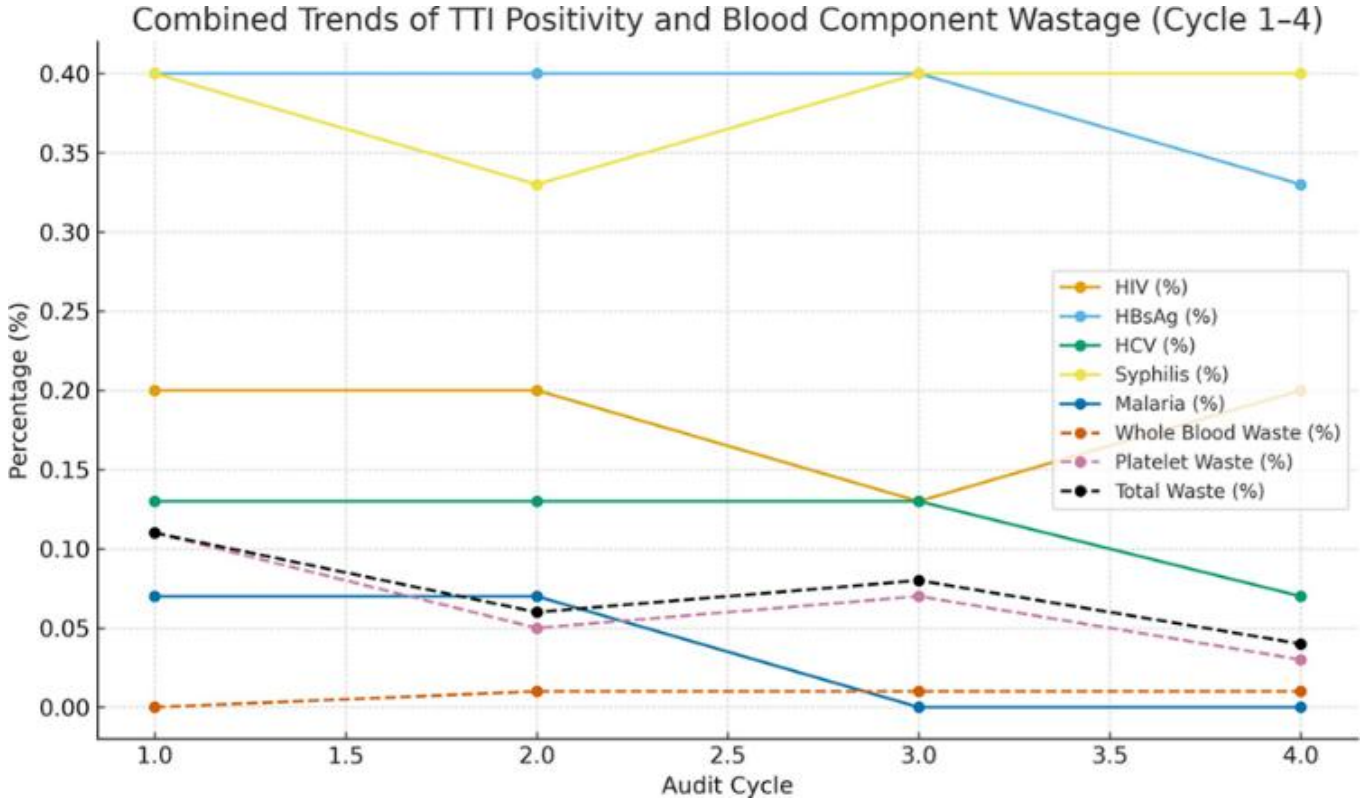
The whole cycle comprising the three stages was repeated four times in total.

Cycle	HIV (%)	HBsAg (%)	HCV (%)	Syphilis (%)	Malaria (%)
1	0.16	0.4	0.12	0.4	0.04
2	0.16	0.32	0.12	0.32	0
3	0.2	0.28	0.08	0.32	0
4	0.16	0.32	0.12	0.32	0

Parameter	Mean	SD	SE
HIV	0.17	0.03	0.015
HBsAg	0.33	0.04	0.02
HCV	0.11	0.02	0.01
Syphilis	0.33	0.04	0.02
Malaria	0.02	0.02	0.01

Cycle	Whole Blood Wasted (%)	Platelet Wasted (%)	Total Wastage (%)
1	0.01	0.09	0.1
2	0.01	0.07	0.08
3	0.01	0.06	0.07
4	0.01	0.05	0.06

Parameter Whole Blood Platelets Total	Mean (%)	SD (%)	SE (%)
	0.01	0.004	0.002
	0.07	0.02	0.01
	0.08	0.02	0.01



3.Discussion

Audit-based monitoring revealed that TTI positivity remained stable due to consistent donor selection and effective screening practices. The steady decline in component wastage highlights the success of corrective interventions like improved stock management and timely issue of near-expiry platelets.

The implementation of the PDSA cycle promoted staff accountability and a culture of continuous improvement within the blood center.

4.Conclusion

Regular audits and corrective measures effectively reduce component wastage and maintain transfusion safety. Continuous monitoring of TTI positivity and discard rates should be integral to all quality assurance programs in blood centers to ensure efficient, safe, and sustainable transfusion services.

References

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