

Reducing Clotted Full Blood Count (FBC) Samples in Neonatal QLL-86 Intensive Care Unit (NICU) and Special Care Nursery (SCN): A Quality Assurance Project in a Tertiary Centre in Sarawak

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SELECTION OF OPPORTUNITIES FOR IMPROVEMENT

A full blood count (FBC) is a commonly performed test in neonatal intensive care unit (NICU) and special care nurseries (SCN). However, clotted samples sent to the laboratory often result in specimen rejection, leading to unnecessary repeat drawing of blood and inevitably causing painful stimuli to the fragile newborns. The high rejection rate of haematology sample due to clotted FBC from these two wards is very concerning and need to be tackled immediately. This also contributes to repetitive shortfalls in quality as standard of rejection rate is set at less than 1.0% as per MSQH requirement.

KEY MEASURES FOR IMPROVEMENT

Our general objective for this study is to improve the rejection rate for FBC samples from NICU and SCN and to reduce it up to 50% from baseline (from 13.5% to 6.75%). The specific objectives of this study are:

- To identify the causes that lead to the high rejection of clotted samples in NICU and SCN.
- To formulate and carry out strategies and plan appropriate remedial measures to overcome identified problem
- To evaluate the effectiveness of remedial measures implemented

The indicator used for this study is the percentage of clotted FBC samples from NICU and SCN out of total FBC samples received in our laboratory from these 2 wards. personnel's visual interpretation.

PROCESS OF GATHERING INFORMATION

A cross sectional study was done from January to June 2024. Inclusion criteria includes all FBC samples taken from Neonatal Intensive Care Unit (NICU) and Special Care Nursery (SCN) received in Haematology lab. Cause-and-effect analysis and process map of blood taking procedure were undertaken to identify the reasons and contributing factors for rejections. A checklist was also distributed to staff nurses and medical officers in-charge in NICU and SCN to further identify the main factors of rejection on the ground.

Data of rejected sample and reason of rejection were extracted from Laboratory Information System (LIS). Rejection rate is the percentage of samples that are rejected. Rate is calculated by monthly basis.

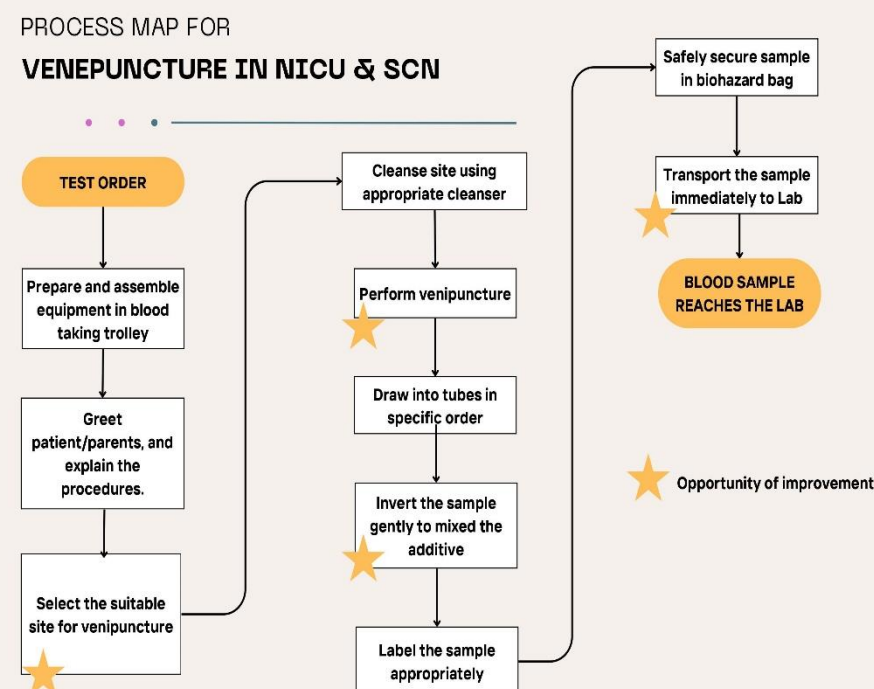
The formula used to calculate the rejection rate is as below:

$$\text{Rejection rate (\%)} = \frac{\text{Number of Rejected sample}}{\text{Total samples}} \times 100$$

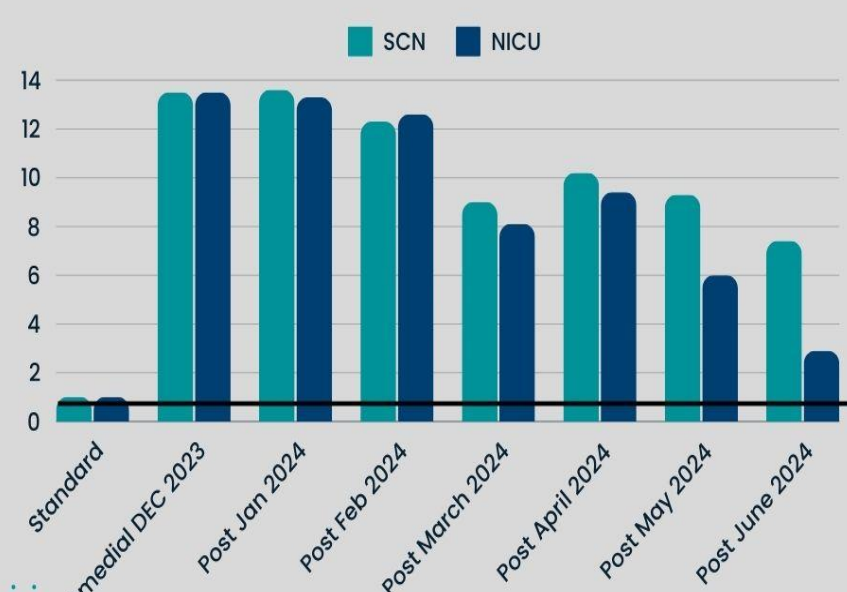
ANALYSIS AND INTERPRETATION

Rejection data shows that the average rejection rate of clotted FBC from NICU and SCN is 13.5% with approximately 98% of the rejected specimens are due to clotted full blood count samples and the Achievable Benefit Not Achieved (ABNA) being 12.5%.

We identified that factors that contributes to clotted blood samples are due to unsuitable site for venipuncture, difficult blood taking leading to many attempts of venesection or prolong blood taking time, inadequate inversion of blood sample and sample did not reach the lab within 2 hours



ACHIEVABLE BENEFIT NOT ACHIEVED



STRATEGIES FOR CHANGE

Opportunities for change	Innovation implemented
Skills and knowledge assessment for specimen collection	<ol style="list-style-type: none"> Small group CME conducted by Paediatric department emphasizing on blood taking skills. (including choosing the suitable vein and inversion technique) Procedure mentoring by specialist and medical officers with direct feedback and teaching given post session. A blood taking technique workshop organised by Pathology department.
Adherence to Standard operating procedure of blood collection practices	<ol style="list-style-type: none"> Randomized assessment of house officer's blood taking techniques. Strengthening venesection skills in the direct observed procedural skills (DOPS) before the house officers can be off tag. Ward orientation is a requirement prior to starting work. Judicious blood taking. For example, fortnightly blood taking for long staying stable patient. Escalation to medical officers if failed attempt to take blood in 2 tries. Dedicated porters to send blood to the lab within stipulated time frame.
Disorganized blood taking trolley	<ol style="list-style-type: none"> All standard equipment/consumables required for phlebotomy were placed in a blood taking trolley to avoid difficulty in finding necessary equipment. The order of draw and inversion technique chart was placed in all blood taking trolley. Items were arranged according to their expiration dates.
Lack of motivation amongst house officers	<ol style="list-style-type: none"> The award for "house officers of the month" will be given to those who perform exceptionally in their everyday work and assessment.

EFFECT OF CHANGE

We can observe the steady decline of rejection after implementing interventions. Although the rate has not yet reached MSQH standard (<1%), we have achieved our general objectives of reducing it up to 50% from baseline. In June 2024, the average rejection rate was 5.2%, which is lower than our target (6.75%). ABNA analysis post intervention was successfully brought down to 1.9% and 6.4% in June 2024 for each ward respectively. However, the most obvious changes that we observed are the improvement in the inter-departmental communication as well as increased awareness amongst the house officers regarding correct blood taking techniques that plays a crucial role in establishing a solid foundation to sustain the effectiveness of the remedial implementation.

THE NEXT STEP

We plan to replicate these strategies and expand to other wards in Hospital Umum Sarawak. Other than clotted blood sample, we plan to analyse other causes of rejection such as insufficient sample and redundant request and take appropriate measures to maintain the standard.

Rejection Rate for SCN and NICU



Note: Based on data for the last 6 months

REFERENCES

- Giddens, Emily. (2021). Decreasing Complete Blood Count Clotting Rates: An Improvement Project in an Academic Neonatal Intensive Care Unit. *Advances in Neonatal Care*.
- Gupta, P., Thomas, M., Sbetan, N., Chacko, G., Savarimuthu, I., Cherian, P., ... Hassan, M. E. (2021). A Quality Improvement Initiative to Reduce Rejected Laboratory Samples and Enhance Specimen Acceptability. *The Joint Commission Journal on Quality and Patient Safety*, 47(8), 519-525.