

Blood Sampling Audit of the Shoklo Malaria Research Unit's Field Clinics

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Background

The Shoklo Malaria Research Unit (SMRU) is a field station of the Faculty of Tropical Medicine, Mahidol University, Thailand, and a member of the Mahidol Oxford Tropical Medicine Research Unit supported by the Wellcome Trust. SMRU operates several clinics just off the border of Thailand and Myanmar, devoted to providing care for the Burmese and Karen refugee and migrant worker populations. One of SMRU's most important diagnostic and research tools is the use of blood sampling for the purposes of haematology, blood cultures, blood chemistry, in-vitro sensitivity testing of parasites, and genotyping.

Unfortunately, blood sample contamination rates at SMRU have reached levels as high as 50%, rendering these samples useless for investigation (SMRU unpublished literature). Thus, in order to determine the cause and ensure patient and staff safety, an audit was designed for the three major clinics operated by SMRU: Wang Pha, Mae La, and Mawker Thai. Though evaluations of healthcare quality have been rare in resource-poor settings such as SMRU (Banatvala and Zwi, 2000), similar audits have previously been shown to improve the quality of care, warranting their further use (Siddiqi *et al.*, 2005). For this audit, each step of the blood sampling process was observed to note fidelity to Standard Operating Procedures (SOP). Hand washing and skin sanitizing techniques were of particular concern, as failure to adhere to proper protocol is a major cause of healthcare associated infections (WHO 2009). Furthermore, the local community health workers were assessed to determine their knowledge and understanding of SOP. The results were reported back to the staff and after improvements were suggested, the clinics were re-audited to determine if changes were appropriately implemented.

Methods

Audit Cycle

A thorough checklist of the blood sampling process was created based on the World Health Organization's hand hygiene recommendations and SMRU's blood sampling protocol. The WHO criteria incorporated in this checklist include alcohol vs. soap use, length of time spent washing, thoroughness of washing, and drying method (WHO 2009). After this checklist

was produced, the initial audit was conducted for 2.5 weeks for all types of blood sampling that occurred in the clinics. Thus, the sample size was limited to the 2.5 weeks and staff availability. After analysis of this data, the auditor presented the findings at each of the clinics to indicate areas of improvement. A re-audit was then initiated to determine the intervention's efficacy. Unfortunately, because heavy flooding in the area temporarily shut down two of the clinics, the re-audit was unable to be completed during the auditor's eight-week stay.

Pre and Post Intervention Feedback

Prior to the presentation, all staff members that took blood samples were asked to fill out a questionnaire assessing their basic hygiene and scientific background knowledge. The questions were presented in both English and Burmese to ensure comprehension. After the presentation and during the re-audit process, the same staff members were directed to fill out the questionnaire again to determine if their understanding of appropriate practice increased. Each question in the survey had a single most correct answer.

Tourniquet Contamination Analysis

Tourniquets in each department were swabbed to determine if they were contaminated with any bacterial growth.

Results and Discussion

Initial Audit

The initial audit revealed that adherence to proper hand washing was not observed even once during the 89 separate blood sampling procedures that were surveyed. Additionally, the community health workers often utilized the same gloves for several patients (>50% at each clinic). Furthermore, staff members rarely waited for the alcohol or povidone-iodine solutions to dry prior to performing venepuncture (20% at Mae La, 52% at Mawker Thai, and 72% at Wang Pha), a major concern since these disinfectants kill bacteria upon drying.

Analysis of the questionnaires filled out by community health workers that conduct blood sampling revealed an interesting insight. The majority of staff members who took these questionnaires actually had the appropriate theoretical knowledge of hygiene principles. For example, 76% of the staff at Mae La and 95% at Mawker Thai knew that the WHO

recommended washing hands for 40-60 seconds. In addition, over 67% of the staff at each site understood that best practice involves putting on gloves right before sterile procedures. Finally, more than 95% of the workers at each site comprehended the fact that disinfecting agents must be dry prior to venepuncture. Thus, the SMRU staff were conscious of these important hygiene practices, yet application of this knowledge was subpar.

The last phase of the initial audit involved swabbing the tourniquets utilized for blood drawing and laboratory results revealed that these tourniquets were contaminated with several strains of bacteria both from the environment and from patients' skin, including *Staphylococcus*, *Acinetobacter*, *Pseudomonas*, and *Bacillus* species.

Intervention

In response to these findings, a lecture was held at each clinic in order to emphasize both the results of the audit as well as proper hygiene techniques. A translator was utilized to ensure comprehension. Additionally, after explaining the tourniquet analysis results, a new step was introduced to the blood sampling procedure: disinfecting the tourniquet with alcohol prior to use.

Re-Audit

After the presentations, staff at each clinic were re-audited to determine if appropriate changes had been implemented during blood draws. Unfortunately, due to seasonal flooding and limited time, only 40 blood sampling procedures were observed post-intervention and Wang Pha was unable to be re-audited. However, analysis of the results obtained indicated that practice improved significantly, with the majority of staff following appropriate protocol. Remarkably, 100% of the 40 observed blood draws followed the WHO's hand hygiene recommendations. Furthermore, all surveyed staff members changed their gloves between each patient and they adhered to the new tourniquet disinfecting step. Moreover, the percentage of staff that waited for the alcohol or povidone-iodine disinfectant to dry increased to 83%.

Conclusion

After thorough observations, the major issues detected in SMRU's blood sampling process included the lack of proper hand hygiene and disinfecting procedures. It was interesting to note that although staff members did not adhere to recommendations, the majority had the

proper background knowledge. Thus, a lecture emphasizing the importance of strict adherence to the WHO's guidelines and SOP, was implemented. This led to distinct improvement in the blood sampling process, as indicated by the re-audit. However, blood sample contamination rates must be monitored for at least the next six months to determine whether these improvements in hygiene also lead to a decline in the number of contaminated samples.

References

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