Human factors approach to phlebotomy service review

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SUMMARY

In acute hospital care, sampling a patient's blood is frequently used to help guide diagnosis, or to understand a patient's response to treatment. This means many patients will have their blood taken multiple times during an inpatient stay. The work of phlebotomists has been studied before, and acknowledgements made to how they adjust their practice to balance patient safety in the context of fluctuating demands and challenging work environments and equipment (Pickup et al., 2017). A human factors approach was used to analyse the in-patient phlebotomy service within a local National Health Service (NHS) Trust. Multiple systems related issues particularly at organisational level were identified. Recommendations were made on how to improve the safety and reliability of the process.

KEYWORDS

Phlebotomy, safety, HTA, FMEA, SEIPS

Introduction

Phlebotomy, also known as venous blood sampling, is one of the most common invasive clinical procedures. It is an essential tool in diagnosis and treatment of patients. The risk of harm from testing the wrong patient's blood, due to inaccuracies in sample labelling or patient identification is significant, and sometimes results in patient death. A wrong blood in tube (WBIT) incident will influence the likelihood that a patient efficiently and safely receives the required intervention e.g., the transfusion of the correct blood component (Bolton-Maggs et al., 2013). International evidence cited for WBIT incidents is between 1 in every 1,500 – 3,000 of blood samples taken (Cottrell et al., 2013). Other failures in the process have implications for both the patient and the organisation, including delays in treatment and improper utilization of expensive resources (Bolton-Maggs et al., 2015). In view of this and following identification of several problems by phlebotomy staff working on the in-patient service, a decision was made to conduct a human factors or systems-based review of the in-patient phlebotomy service. The aim was to identify any systems related problems that could be addressed to improve process reliability and patient safety, as well as improving the experience of phlebotomy staff, thereby improving the service, as a whole.

Method

The work was conducted over two hospital sites. A multi-methods approach was used to collect data and analyse it. Phlebotomists working at the two hospital sites were observed whilst conducting their daily in-patient /ward phlebotomy rounds in various hospital wards over several days. Observations were conducted for the duration of the phlebotomists shift on each occasion i.e.,

from 08:00 hours -12:00hours. Phlebotomy outpatient services are also provided at both hospital sites, but these were not included in the study. This was followed by observing ward-based doctors and emergency department staff, over several days. All completion and submission of blood test requests by doctors, as well as all bleeding of patients conducted whilst the observer was on the ward or in the emergency department were included in the study. Observations were combined with semi-structured interviews to further explore in any issues identified. The Systems Engineering Initiative for Patient Safety Framework is a systems analysis tool widely used in healthcare which explores the work system, processes, and outcomes. Findings from the observations and semi-structured interviews were classified according to the categories of the SEIPs work system classification.

Hierarchical task analysis is a popular task analysis tool which 'describes the task under analysis in terms of a hierarchy of goals, sub-goals, operations, and plans. It can be used with other human factors analysis tools in varied ways including design and evaluation, workload assessment and error prediction and analysis. In this study, hierarchical task analysis was used to map out the following key tasks: registering a blood test request (including printing the request form), bleeding patients and processing blood samples in the pathology laboratory.

Failure modes effect analysis (FMEA) is a proactive risk management tool used to identify prospective failures within processes or products, before they occur, and which focuses on system design. It was used to determine failures that could occur in the tasks listed above and the effects of these failures. The failure modes were prioritised using a risk rating matrix. This was based on the frequency of the failure mode and the severity of the effects of the failure, multiplied together to generate a risk priority number (RPN). In addition, the failure modes were ranked in terms of the perceived 'ease of fix'. The RPN and 'ease of fix' were used to determine prioritisation of addressing failure modes.

Findings

Findings were analysed using the Systems Engineering Initiative for Patient Safety (SEIPS) model and fell mainly within the tools and technology and organisational factors work system categories. The following solutions have been identified:

1. Labelling of printers so that request forms are placed in the correct orientation for labels to print on correct side.
2. Extend size of label templates so that all required patient details are captured on the label sticker.
3. Use of the same standard and quality wrist ID bands in all clinical areas.
4. Handover ward list of patients bled and not bled to ward staff by phlebotomists at end of each session.
5. Exploring ways in which all relevant clinical staff can have access to the electronic blood request system.

Conclusion

Human Factors tools, used to analyse a phlebotomy service can identify a significant number of recommendations for risk reduction that the service was unaware of before study. The improvements in phlebotomy service, will impact patient safety throughout the whole hospital.

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