Impact of Implementing an Early Warning System on Neonatal Monitoring on the SSBC Newborn Network

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Introduction
Prior to acute deterioration, children and adults often show subtle signs which can be either unrecognised or not acted upon by nursing and medical staff. Some of these subtle signs can be picked up using early warning scoring systems, which are based on physiological observations (heart and respiratory rate etc) geared towards automatically triggering medical review. These have been validated as possibly useful ways of detecting deterioration and prompting intervention to reduce morbidity in acute care [1-2].

Early warning systems have been implemented in adults, including obstetric populations, and paediatrics in the UK, and are emerging as useful adjuncts in identifying the at-risk-neonate in some parts of the country [3-4]. In a retrospective analysis of such a scoring system in London [3], these charts showed potential to highlight neonates at risk of deteriorating within the first 12 hours of life. They therefore hold potential for improving care provided and reducing morbidity in neonates who are at risk of becoming ill very quickly, very soon after birth.

In an attempt to improve quality of care given to neonates in the post natal and transitional care units within the SSBCNN, we have implemented utility of a standardised early warning recognition system, targeting neonates at risk of becoming ill within the neonatal period. This system was implemented as part of the SSBCNN QUIPP group quality improvement initiative for 2012.

Aim
To assess compliance, user-friendliness and impact of a Neonatal Early Warning System (NeoNEWS) on identification and management of at risk neonates in transitional care/post natal wards in the SSBCNN.

Method
This will be a retrospective, multicentre audit in the neonatal units across the Staffordshire, Shropshire and Black Country Newborn Network. The audit standard will be the Early Warning System for Neonates, embedded in hospital postnatal/ transitional care practice in each of the hospitals.

This audit will comprise three limbs:

a) Assessment of monitoring at-risk neonates (ARN) prior to implementation of the early warning system (NeoNEWS) charts
b) Assessment of monitoring ARN after implementation of NeoNEWS charts
c) Evaluation of usefulness and user-friendliness of pre- and post NeoNEWS observation charts

One hundred neonatal records of babies requiring observations in the first day of life, managed in transitional care/post natal wards of each hospital in the SSBCNN will be studied. These records will be obtained from the labour ward (baby-book) log for outcome of each delivery, and will include babies being observed for meconium exposure, prolonged rupture of membranes and maternal GBS carriage/infection.

Fifty of the 100 records per hospital will be sampled from a random two months predating the implementation of NeoNEWS on the unit, and fifty after the implementation of NeoNEWS.

In the category pre-dating the implementation of NeoNEWS, a retrospective NeoNEWS sheet will be filled in for each baby, based on observations recorded in notes. The information obtained pre- and post- implementation of NeoNEWS will then be compared.

Data regarding observations (whether done, frequency, abnormal observations) will be captured, and correlated to escalation of care (referral to medical/ANNP/neonatal team/senior midwife) in the case of abnormal findings. Time to escalation of care with medical/ANNP intervention (examination, investigations and treatment) will be recorded.

10 Midwife/Nurse questionnaires on use and user-friendliness of old observation charts (meconium observation sheets) compared to NeoNEWS will be conducted per hospital. This will be hand-delivered and collected by the data collector at each hospital.

Analysis
Data will be captured on prepared pro formas and transferred onto excel spread sheets for analysis.
Midwifery/Nursing workload, measured by the frequency and number of observations and escalation of care will be recorded.
Comparisons pre and post implementation of NeoNEWS regarding
- utility of observation charts
- adherence to set standards of monitoring
- detection of abnormal results
- action on abnormal results
- proportion of admissions to NNU

will be recorded.

Data will be analysed in conjunction with statistical support from the University of Birmingham.

Funding
Funding for employment of a part time Band 2/3 Data clerk/research assistant to collect the data will be sought through the SSBCNN.
Six months of research assistant support will be divided as follows:

a) 4 weeks per hospital
   a. week 1: data capture on NeoNEWs used on 50 babies post NeoNEWS implementation
   b. week 2: retrospective NeoNEWS on 50 babies (ten per day) on babies sampled pre-implementation of NeoNEWS
   c. week 3: questionnaire delivery and collection, outstanding data entry
   d. week 4: data entry onto excel spread sheets

b) Funding will be based on Agenda for Change pay scales set by the NHS

**Preparation for research assistant**
The first hospital to be studied will be University Hospital North Staffordshire. This pilot will be undertaken by Grid trainee Matt Nash, allowing the project to be fine-tuned in terms of data collection, in anticipation of the research assistant joining.

In the event that a research assistant cannot be allocated to this study, the results will be reported based on Dr Nash’s data collection.

Prior to commencement of the post, the case notes of the 100 babies to be studied will be made available to the senior sister on the Post natal wards.

**Ethical Approval**
This audit project will be submitted to the audit department of each hospital within the SSBCNN. The data collected will be anonymised, and hard copies stored in Neonatal offices at New Cross Hospital.

**References**