

Using quality-assured integrated programmes to teach neonatal practical skills

Offering practical skills training, particularly cranial ultrasound scanning, in a structured, flexible format is essential for addressing critical gaps in procedural practice and providing an opportunity for clinicians to gain confidence and proficiency in performing and interpreting cranial ultrasound. Implementing structured training and rigorous quality assurance protocols in cranial ultrasound ensures consistent high quality imaging, reinforces clinician competency, reduces inter-operator variability in interpretation and strengthens confidence in clinical decision-making.

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Key points

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1. A robust stepwise approach must be taken to address the urgent need for a structured teaching programme.
2. Theoretical and practical components should be integrated into an already established teaching schedule.
3. Careful planning is needed to ensure a comprehensive and effective educational experience.
4. Incorporating infection control into teaching sessions fosters consistency in practice, reinforces professional responsibility and creates a culture of safety that extends beyond ultrasound to other clinical procedures.

Introduction

Neonatal cranial ultrasound is a vital tool for paediatric clinicians offering a neonatal intensive care service. Performing serial high quality cranial ultrasound scans in the NICU is crucial for early detection of brain abnormalities, allowing for early intervention, monitoring disease progression and guiding clinical management. It is also important for predicting long-term neurodevelopmental outcomes and aids in prognosis by identifying risk factors associated with neurodevelopmental impairments, enabling early referral to neurodevelopmental follow-up programmes.¹

What problem was addressed?

A lack of a robust procedural teaching system was identified, coupled with a low confidence level of performing and interpreting cranial ultrasound imaging within the middle grade and junior doctors in a district general hospital (DGH). There was a significant gap in structured procedural skills training, particularly in cranial ultrasound scanning. This resulted in inconsistent adherence to scanning protocols, producing images that were often poor quality.²

Methods and intervention

A pre-intervention survey assessed learners' confidence levels on a Likert scale,

namely in understanding the indications, knowledge of cranial anatomy, acquiring the right images and interpreting images.

This work was focused on the babies who required a scan within the scope of the guideline for cranial ultrasound scanning, either admitted to the neonatal unit or on the postnatal ward.

Since this programme was implemented in a DGH, the range of attendees extended beyond paediatric trainees and specialty registrars. This diverse group of learners presented an additional challenge, as their varying levels of prior knowledge and clinical experience required a tailored approach to teaching. Ensuring that each participant gained relevant, practical skills, while also maintaining the depth needed for paediatric trainees and registrars, required adaptability in both content delivery and hands-on training methods.

These sessions were described as milestones to give a sense of achievement to attendees. This was followed by multiple hands-on sessions, with a chance for the participants to book in, accommodating four or five participants each day. These sessions were led by a senior trainee, using their supporting professional activities time. The participants were directly supervised when performing and interpreting the scan, with individualised feedback provided. A post-intervention survey measured confidence changes.

Results and effects of changes

Of the 20 participants who completed the pre-intervention survey, 15 completed the post-intervention survey. Average confidence scores increased in all measured areas. Understanding indications of cranial ultrasound scans improved by 37.1% (from 6.2 to 8.5), understanding cranial anatomy increased by 40.7% (from 5.35 to 7.9), acquiring images improved by 59.0% (from 5.15 to 8.2), interpreting images improved by 66.7% (from 4.5 to 7.5) and overall confidence improved by 58.3% (from 4.8 to 7.6). Additionally, the reported ability to perform cranial ultrasounds independently increased from 50% to 73%. All respondents expressed a strong likelihood of attending and recommending similar training programmes in the future.

Discussion

This educational quality improvement project included a skill-building, knowledge retention teaching programme, followed by personally supervised practical booking-in sessions. The knowledge sharing was structured as a progressive series of four integrated theoretical lectures with interactive activities and feedback mechanisms.

The novelty of this programme lies in its comprehensive and adaptable approach to procedural skills training within a multidisciplinary setting. Unlike traditional teaching models, this programme was designed to cater to a wide range of learners, from GP trainees and foundation year one doctors, to paediatric trainees and specialty registrars, each with varying levels of prior knowledge and skills. To ensure the programme's effectiveness, we conducted a comprehensive needs assessment by surveying doctors and medical students about their knowledge and confidence in performing and interpreting cranial ultrasounds. This helped tailor the programme to address specific areas of concern. The integration of all this programme's components into an already established teaching timetable required careful consideration of time management and scheduling, ensuring it fit seamlessly into the daily workflow of healthcare professionals.

One of the most significant logistical hurdles lay in harmonising the availability of a dedicated trainer and clinically busy trainees. To navigate this effectively, we

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This programme is part of an educational QIP by Heba Hassan ST8 and Ehas Aljoudi ST1, supervised by Dr Rathod. Please help us by completing the form in the QR code.

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FIGURE 1 The implemented teaching programme.

identified training dates and times when our trainer could lend their expertise, making the most of their existing clinical schedule and precious rostered self-development time. In parallel, the process of circulating a booking form allowed participants to indicate multiple dates and times that suited their availability. This required meticulous manual planning to review all submissions and divide participants into small, balanced groups that worked for everyone. Despite the administrative effort involved in this detailed coordination, participants expressed high satisfaction with the booking process, appreciating the flexibility and the effort taken to accommodate their schedules. This approach fostered a deeper sense of ownership and buy-in from our participants.

The programme not only combined theoretical instruction with hands-on practice but also incorporated a unique focus on infection control measures and image interpretation. Teaching infection control within an ultrasound curriculum ensures patient safety and instils best practice habits early in trainees' clinical careers. By embedding infection prevention principles into structured teaching, trainees learn to regard hygiene measures as an integral part of the scanning procedure. This is particularly relevant in the neonatal intensive care setting, where vulnerable patients are at heightened risk of healthcare-associated

infections, and minor failures in infection control measures can have significant consequences. Early exposure to these standards during training encourages long-term adoption of evidence-based practices, reducing variability in technique and improving overall quality of care.³

Furthermore, the tailored approach to different learning styles and competencies ensured that all participants received the level of training they needed, fostering both individual growth and collective improvement across the healthcare team. Feedback was delivered through varied means, including formal observed procedure assessments and verbal feedback during the sessions, and written feedback through different assessment systems used by the trainees. This allowed for real-time improvement and reflection. This multi-dimensional approach to feedback further strengthened the programme's ability to support professional development and continuous learning.

Accommodating varying skill levels and diverse learning styles among attendees added another layer of complexity. The programme needed to be flexible and adaptable to ensure that all attendees could benefit, while also addressing different learning preferences to maximise engagement and effectiveness. This programme relied on the integration of experiential learning, deliberate practice and reflective practice to optimise skill acquisition and clinical competence. Experiential learning allows trainees to gain hands-on experience performing scans under direct supervision with patients, translating theoretical knowledge into practical skills. Through repeated exposure to different pathological cranial anatomy, learners build familiarity with probe handling, image acquisition and subtle anatomical variations. Deliberate practice with targeted feedback involves structured repetition of specific scanning techniques, interpretation of ventricular measurements and identification of common pathologies, combined with immediate, constructive feedback from an experienced instructor. This process helps learners correct errors, refine technique and steadily progress toward proficiency. Reflective practice encourages trainees to critically review their own images, assess their technique and discuss challenges and decision-making with mentors. By fostering self-assessment and critical thinking, reflection consolidates learning

and promotes lifelong professional development. Together, these adult learning strategies ensure that clinicians develop confidence, competence and consistency in performing and interpreting cranial ultrasounds in neonatal care.⁴

Conclusion and lessons learned

Structured teaching programmes can significantly enhance essential neonatal clinical skills. However, developing a robust programme that caters to clinicians with varying levels of prior experience and competence presents a challenge. This underscores the need for adaptable, scalable educational frameworks that can address individual learning needs while fostering collective proficiency. Despite

these challenges, our model, which can be integrated into existing schedules, proved effective.

Having a dedicated individual to drive the programme forward was instrumental in achieving our goals. Looking ahead, we hope that this programme serves as a model for future educational initiatives. We plan to sustain and build on these improvements. This includes expanding practical skills training to other areas and establishing a formal feedback mechanism to ensure ongoing improvement and adaptation of the teaching programme.

Expanding this approach to other neonatal skills and procedures could further improve clinician competency and patient care.

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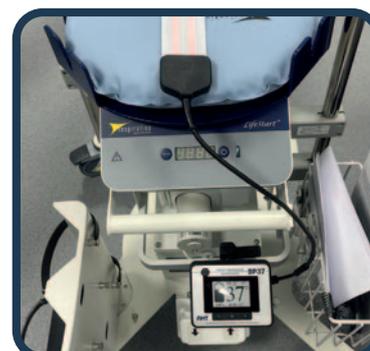
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