Way, S, Cescutti-Butler, L and Irving, M, 2020. A study to evaluate the introduction of the Newborn Infant Physical Examination knowledge and skills into an undergraduate pre-registration midwifery education programme. *Nurse Education Today*, 104656

INTRODUCTION

This article examines the impact and effectiveness of the introduction of the theoretical components of the Newborn Infant Physical Examination (NIPE) into an undergraduate midwifery curriculum in the United Kingdom (UK). The experiences of student midwives are explored in terms of when the content is delivered in the programme and the exposure and ability to practice the skills in the clinical environment.

In the UK the newborn infant is routinely examined by the midwife soon after birth. This is a top-to-toe examination to exclude and/or identify any major abnormalities, following which parents can be reassured that their baby is well (National Institute for Health and Care Excellence [NICE], 2006). This early examination of the baby is part of the midwife's role and as such is taught within the undergraduate midwifery programme (Nursing and Midwifery Council [NMC] 2019).

The newborn infant physical examination (NIPE) screening takes place slightly later, ideally within 72 hours of birth and is more likely to be completed by a doctor. This universal offer of screening is a more detailed examination of the infant to identify early recognition of less obvious adverse conditions in the heart, hips, eyes and testes as well as provide reassurance to parents about the wellbeing of their baby

(National Institute for Health and Care Excellence, 2006). If any abnormalities are detected or any clinical concerns are recognised, prompt referral for early clinical assessment to the relevant clinical expert is recommended (Public Health England [PHE] 2018). Until very recently, NIPE has not been taught in the undergraduate curriculum in the UK. As a result midwives have been encouraged to become skilled in undertaking the NIPE after initial qualification.

It is recommended the examination takes place between six to 72 hours from birth (Davis and Elliman 2008; Public Health England, 2019). Unlike in New Zealand where midwives at the point of qualification have the knowledge and skills to undertake this screening assessment (Midwifery Council of New Zealand, 2019), this option is not widely available in the UK. This in part has been because up until now the UK regulatory body for nurses and midwives, the Nursing and Midwifery Council has not included it in their standards for midwifery education (NMC 2009; NMC 2019), a similar position to that in Australia. For example, in Western Australia, midwives need to have two years' experience as a midwife before undertaking the, 'full physical examination of the newborn by a midwife' programme (Dempsey 2018).

Only a few higher education institutions (HEIs) in the UK currently incorporate the NIPE knowledge, skills and or competencies into their undergraduate midwifery programme (Yearley, 2017; Public Health England, 2017). A variety of models are used to integrate this learning into the curriculum ranging from teaching only the theory (Jones and Furber, 2017), to incorporating the theory and practice so students exit their programme as fully qualified NIPE practitioners (Meegan and Martin, 2020; Yearley et al, 2017).

Recommendations by the seminal EMREN study (Townsend et al., 2004) proposed that examination of the newborn should be part of a midwife's standard practice.

Despite this, Rogers et al. (2015) identified that only 13% of practising midwives are qualified NIPE practitioners. The low numbers are due to a multiple of factors, which include a lack of support from managers, feeling undervalued, no protected time for professional development and an already demanding workload exacerbated by staff shortages (Steele, 2007; Lanlehin et al., 2011; Bartholomew, 2018). Despite this, a recent study by Stanyer and Hopper (2019) exploring the views of NIPE trained midwives, identified that midwives valued the holistic care they were able to offer to the women and their babies by taking on this role.

Blake (2012) has argued persuasively that NIPE should be a compulsory element of the undergraduate midwifery programme. Theory and basic skills could be introduced at an early stage of the curriculum and developed in more detail as the student progresses through the programme culminating in them becoming competent in all aspects of a newborn examination (Lumsdem, 2012). Recent research by McDonald (2018) identifies that NIPE learning should be gained whilst still a student and that it should not be regarded as an advanced or specialist role for only experienced midwives to undertake. The new standards of proficiency for midwives (NMC 2019), reflects this call and now requires all midwives, at the point of registration, to be competent in carrying out a full systematic physical examination of the newborn infant.

In anticipation of the incorporation of the knowledge and skills being a future mandatory requirement, a university in the south of England believed it important to start the process of introducing NIPE knowledge and skills to their undergraduate midwifery students. Two separate, but related studies were undertaken exploring the student experience of introducing the NIPE requirements. The first was to offer several small groups of students in their final year, to join with qualified midwives and

complete the continuous professional development module, Examination of the Newborn (EXON) as an extra-curricular activity (Cescutti-Butler and Way, 2020).

The second approach involved all students (n=80 per cohort) receiving the underpinning theory throughout their programme, and facilitated to practice the skills where they were able to. This conservative approach, supported by practice colleagues, took into account the small number of qualified midwives who practice NIPE being available to mentor and assess students as competent. In view of this, it was agreed that students would not be expected to achieve competence in this area by the end of their programme. Having a staged introduction would also provide valuable preparation towards the next curriculum validation, giving a five year window of opportunity for development. During this time systems could be put in place for growing the number of NIPE trained practising midwives to act as mentors and assessors for the students as well as evaluate the outcome of the impact and effectiveness of introducing the theoretical elements only into the curriculum.

The NIPE learning was included into the indicative contents of the relevant module specifications across all three years of the curriculum, and referred to as EXON (EXamination Of the Newborn), which mimicked the continuous professional development programme for qualified midwives at the university.

AIMS OF THE STUDY

The aim of the study was to explore the experiences of student midwives in relation to the impact and effectiveness of introducing the theoretical elements of EXON into the undergraduate midwifery curriculum. The experience of students practising the skills in the clinical environment, if and when, the opportunity arose was also explored to aid understanding of how best to incorporate the study findings into developing the future curriculum.

METHODS

Design

This was an exploratory study to gain insight into little known experiences of students being taught NIPE within the broader undergraduate midwifery curriculum. A qualitative approach utilising focus groups discussions (FGDs) was identified as the most appropriate methodology to achieve this. (Stewart; Shamdasani and Rook; 2007). The FGDs enabled the research assistant to interact directly with the participants enhancing the ability to clarify and probe responses as well as ask follow-up questions if required (Stewart; Shamdasani and Rook; 2007). In addition, participants were able to share their experiences with each other and respond to other group members experiences of the phenomena under study (Sim and Waterfield, 2019). The open response format enabled a large amount of data from the participants' own words to be captured (van Teijlingen and Pitchforth 2006).

Differing views are articulated in the literature about the optimum size of FGDs, ranging from four to 12 people (Tolley et al., 2016; Holloway and Galvin, 2017). A group size should offer an environment where participants are active contributors to explore the topic(s) in hand however, any group less than eight might prove problematic in generating rich discussions and maintaining an active dialogue between participants (Liamputtong, 2011). Eleven students were recruited to the study, with a split in the focus groups numbers of eight and three. The reason for this was the different geographical locations where the students lived and their availability to come together. In view of this, a pragmatic approach was taken in deciding on the size of the groups as we wanted to offer all those who came forward the opportunity to participate. The researchers were also aware that the students in

the smaller focus group potentially practiced clinically where EXON was not well established and that it would be important to capture their experience.

Participants

All final-year student midwives at the university (n=80), who were coming to the end of receiving their EXON theory, were invited to participate in the study. All other year cohorts were excluded, as they would not have undertaken all elements of the EXON theory. Several other factors were taken into account when considering the inclusion and exclusion criteria of participants. The university has clinical links with nine different hospitals, providing maternity services over a wide geographical area. The hospitals range from large consultant-led units with over 7,000 births to much smaller stand-alone midwife-led birthing centres. It was deemed important therefore to invite students from all the localities in order to tap into the range of experiences that students would encounter.

Letters of invitation and a participant information leaflet were emailed to students and if interested were requested to email back a signed consent form agreeing to take part in a FGD. A further email was sent out two weeks later to remind students of the opportunity to take part.

Data Collection

The FGDs were guided by a semi-structured interview guide (Table 1) and partly directed by the research assistant to enable the participants to remain focused on the topic areas of interest (Stewart; Shamdasani and Rook; 2007). The questions broadly explored three main areas: i) additional theoretical content in the curriculum; ii) practice related experience and iii) what next? Two FGDs lasting between 40 and

60 minutes were undertaken during the student's scheduled lunch hour in a quiet room away from lecture theatres. Refreshments and lunch were provided.

Table 1: Interview guide for FGDs

Section 1: Additional theoretical content in the curriculum;

- Can you remember what you have covered so far in relation to EXON?
- Do you think these elements you have identified should be been seen as discrete learning or should they be integrated into the whole programme?
- From what you have been taught in those session are you are able to distinguish between EXON and the daily examination of the baby?
- Can you identify aspects of EXON you have enjoyed and why?
- What did you find challenging about the current provision of EXON within your curriculum and why?

Section 2: Practice related experience

- How often do you see midwives in practice doing the EXON?
- Have the mentors included you in EXON?
- Who do you see doing EXON?

Section 3: What next?

- Would you recommend completing the EXON knowledge, skills and competencies whilst still a student?
- How could your experience be improved for others in the future?
- How relevant do you think EXON is to your future practice?
- Is there anything else you would like to say about your experience over the

last three years?

Ethical considerations

Ethical approval was received from the University Research Ethics Committee: No.15392. The facilitator of the FGD (an experienced research assistant), was not known to the students in order to facilitate them to be open and honest in their responses and not feel constrained by the presence of one of their tutors (Sim and Waterfield, 2019). A small funding grant from the university was obtained to pay for the research assistant.

Prior to the commencement of the FGDs, participants were made aware of the 'ground rules' which set out the need for confidentiality and anonymity (Sim and Waterfield 2019). It was reiterated to the students that they did not have to take part in the study and could withdraw at any point up until the data were anonymised. Withdrawal would not impact on the progress of their studies. The focus groups discussions were audiotaped and transcribed verbatim by the research assistant.

Data analysis

Thematic Analysis is a recognised process for determining and analysing specific patterns of meaning in a dataset (Braun and Clarke; 2006) and was used analyse the data based on the six-staged framework described by Braun and Clark (2006). The focus group data was initially transcribed in full by the research assistant which enabled familiarity with the data in order to produce an initial list of ideas or codes that were of interest (Ward et al; 2013). Preliminary themes were then collated from merging similar codes and were discussed with the other members of the researcher

team to gain consensus. Finally all of the researchers met to further refine and agree the themes.

Rigour

The students participated voluntarily and the research assistant who led the FGDs was not known to the students. This offered a non-threatening environment for students to articulate their views without feeling judged. To enhance data analysis transparency and therefore trustworthiness of the findings all the research team were involved at various stages of the analysis (Dixon-Woods 2011).

FINDINGS

The themes that emerged from the final process of analysis (Table 2) were from the combined two focus groups and fell into three broad categories: i) timing of theoretical content; ii) applying theory to practice and, iii) holistic care.

Table 2: Themes and subthemes

Theme	Subtheme
Timing of theoretical content	Integration v separation Too much information early on
Applying theory to practice	Availability of clinical experience Creative application of knowledge Variable mentor support
Holistic care	Woman-centred care Baby-focussed care Wider learning

Theme 1:Timing of theoretical content

Subthheme 1: Integration v separation of content

Students generally liked the format used in the curriculum of integrating the EXON knowledge and skills throughout the programme rather than concentrated into one short module, some suggesting that this would be too intense. Students also felt that weaving the content throughout the three years kept their engagement in the topic area.

"… there is a lot of information to take on board, a lot of learning, if that was in one unit [module] it may be an intense unit to study all at once" (FG 1);

"Having it over the three years kept our interest up" (FG 1).

However, integrating EXON content throughout the three years was not the view of all of the students. Some highlighted they liked to organise their lecture notes into sections and felt they could not extrapolate the integrated information into a defined heading of EXON, which was thought easier to do if it had been presented in a single block of study.

"… because the EXON lectures are put throughout I wasn't able to collate all the information in one place" (FG2).

Subtheme 2: Too much information early on

There were comments suggesting that the teaching of EXON should not start in year one of the programme. Some students felt they were already overwhelmed by the content of the programme in their first year, without the addition of EXON.

".. in the second year or third year, in the first year it was so overwhelming" (FG 2).

Theme 2:Applying theory to practice

Subtheme 1: Being with NIPE trained midwives

Students described being motivated when the mentors they worked with were NIPE trained and supported them in undertaking the examinations. Completing the practice element helped with consolidating their learning,

"*she [mentor] is really supportive and has encouraged me from the start as she would with anything, 'oh I can feel the femoral pulses here, do you want to see if you can feel them',*" (FG2).

"Doing the examination is when the knowledge consolidates for me and becomes clear in the practical" (FG1).

Subtheme 2: Lack of available clinical experience

Due to the multiple clinical sites student attend for clinical practice experience and the wide geographical spread it was already known there were differences in the number and availability of NIPE qualified practitioners across the clinical areas. This meant that some students would not often see midwives engaging in this role. At times this did impact on student motivation to engage in EXON teaching as they could not see the relevance of being taught this if they were unable to apply the learning into practice. Examples from both focus groups were given such as,

"I'm not interested at all then if the support is not going to be there, then there is no point me doing it". (FG2);

"Even if I had wanted to do it [practice]…I would have struggled to find midwives to work with" (FG1).

For some, they felt it was more important to learn how to pass the university examinations rather than learn information that in their view would have no opportunity to use or would not contribute to their grades.

"A lot of students wanted to focus on the immediate skills they would need to pass the module and become safe, confident practitioners" (FG1).

Subtheme 3: Creative application of knowledge

Not all students believed that if the practice experience wasn't available that they shouldn't be learning the theory. It was still felt important by some students expressing the view that it was important to have the underpinning knowledge, whatever,

"Love having the underpinning knowledge … I wouldn't be confident in using the practical skills but I still have the knowledge which I use" (FG2);

"able to contribute to the EXON by talking to parents when the midwife is undertaking the EXON" (FG1).

For one student the relevance of the learning became apparent as the programme progressed first of all believing it was not a priority,

"started out feeling it wasn't a priority… can now see how important the teaching has been across all aspects of practice" (FG1).

Theme 3: Holistic care

Subtheme 1: Woman-centred care

Students working with NIPE qualified midwives felt they learnt more from them than other professional groups such as paediatricians. They commented about the holistic care that the midwife brings and seeing the importance of how midwives communicate to parents about what they were doing,

"The few midwife checks I have seen, have been holistic and women-centred… effective communication, universal skills which carry across their [the midwife's] entire practice" (FG1).

"*Midwives can give that really holistic care, they are prime candidates for doing it,"* (FG2).

Subtheme 2: Baby focussed care

In contrast if the examination was undertaken by the paediatrician it was seen as baby focussed, rather than woman-centred. Also, paediatricians appeared not as holistic as midwives in performing the examination or talking to parents and explaining what they were doing.

"They [paediatricians] tend to not even notice that they're [the women] there. I think it [the midwife] that's a much better experience for the woman, it's holistic care, whereas paeds don't give that" (FG2);

"Seeing paediatricians doing EXON they often don't provide time for questions or explanations…they are not as thorough as midwives" (FG1).

Subtheme 3: Wider learning

Students could see wider benefits of midwives being NIPE trained and how it could drive the recent government policy initiative of continuity of care. It also enabled the students to bring together other elements of the role they see that midwives find challenging, such as public health.

"*Better Births [government policy] – continuity of carer, therefore the more skills midwives have the easier the transition is going to be to continuity of care*" (FG1).

"*Ties in a lot of elements that midwives find challenging – I don't think midwives particularly embrace the public health role, safeguarding*…" (FG1)

DISCUSSION

The aim of the study was to explore the experiences of student midwives in relation to the impact and effectiveness of introducing the theoretical elements of infant physical examination into the undergraduate midwifery curriculum and application of these skills within practice, if and when, the opportunity arose. The findings demonstrate that many students were not averse to learning in detail about EXON or to have the information threaded throughout the three-year curriculum which maintained their interest. Progressively revisiting specific learning to add additional tiers with more complex ideas is not a new concept. For example, the basis of a spiral curriculum introduced by Bruner in the 1960s, is often used in the development of healthcare curricula (Harden 1999, Porter and Meddings, 2007), to revisit topics iteratively and each time deepen the learning by building on the previous session and introducing increasing levels of difficulty (Lamont and Chapman, 2018; Blake 2012). This approach can bring more advanced applications of subject knowledge previously covered and increase expertise over time.

For some students, even though they may not have seen EXON being undertaken in practice, this was not a barrier for them to utilise the knowledge they had learnt and apply it in a slightly different way. An example being the increased depth of anatomy and physiology enabled one student to understand more effectively what was happening during the antenatal and postnatal period. It was noted however, that not all students were able to utilise their learning by giving it a different emphasis in practice and so questioned its relevance. In this instance education sessions where students can come together, and through a process of structured critical reflection on

what they have witnessed and learn from each other, may help to bridge this gap (Bass et al., 2017).

Structured reflection is a common education practice gaining popularity in the teaching of healthcare professionals where a large proportion of learning takes place in the practice environment (Dunne et al., 2016; Fragkos, 2016). Reflective techniques can be associated with deep learning and understanding and has the potential to positively meet various learning outcomes. Reflective practice however, may only deepen the learning and understanding of its application, but might not address the deficit of gaining practical skills. Reflection-before-action suggested by Edwards (2017) may help to address this and support the acquisition of specific skills. This format of reflection requires a student to critically examine a practice situation in advance and consider the skills that would be needed. The student is then more informed and better able to seek out relevant practice opportunities to become exposed to, and familiar with, the skills in question. Reflection-before-action enables students to apply previous knowledge and experiences of the challenges they may face and encourage them to single out and structure clinical experiences to obtain the necessary skills (Edwards, 2017).

It is acknowledged however, that a number of students were presented with challenges when trying to find and observe this practice happening, due to the low numbers of midwives practising EXON in the clinical area (Hayes et al., 2003; Rogers et al., 2015). Creative solutions may include midwifery lecturers taking up the role of NIPE mentors and assessors following successful completion their own NIPE training (Yearly 2017). Midwifery lecturers remaining clinically competent is not an unusual concept (Fraser et al 2013) and this would add to the pool of mentors and assessors available to students in practice. Another solution may be students

accessing NIPE clinics which are being set up by many maternity services to avoid delayed discharge for postnatal women (Ghabra et al., 2018). These clinics are either led by midwives (Hempstock and Samanta, 2011) or by junior doctors (Ghabra et al., 2018). Where available, students should take this opportunity to observe and be mentored by NIPE midwife practitioners, although it is accepted that the practice of holistic care maybe more challenging. Some universities however, who have contemplated introducing NIPE into the undergraduate curriculum have decided that including the clinical element is too complex. To address this, in one scenario there was a collaborative agreement between practice and the university for the theory to be taught towards the end of the programme. Once qualified the midwives would be facilitated to complete the clinical components of the NIPE within 18 months (Jones 2017).

Lack of exposure to NIPE practice could be complemented by using simulation in clinical skills laboratories. Simulation is gaining momentum in substituting reduced opportunities for hands-on clinical experience (Martins et al., 2018; NMC, 2019; Chitonga and Suthers, 2019). New, high-quality simulation equipment can lead to skills development for example, hip examination, particularly where clinical experience opportunities are lacking but is not a substitute for the real thing (Hall and Snowden 2018). Simulation for obtaining some of the EXON skills and competencies requires further research.

Analysis of the data collected from the focus groups in this study identified that there were some positive, unintended consequences of introducing EXON into the programme. The concept of holistic care is not necessarily the focus for the EXON content, but students could recognise the advantages that midwives offered to the women and their families when they performed the screening. Paediatricians who

have long had this remit (Jones, 2014) were noted to be less woman-centred and not so skilled at communicating with the woman. It has been perceived elsewhere in the literature that some doctors may regard the infant physical examination as task focused which could be viewed as a technocratic approach to providing healthcare as opposed to overall holistic care (McDonald et al., 2012; Jones, 2014). In this study, students recognised the infant examination was part of the role of the midwife and the unique qualities that the midwife bought to that role. More recently a small qualitative study undertaken by McDonald (2018) appears to support the concept of EXON as enhancing holistic midwifery care.

Finally, in terms of developing the future pre-registration midwifery curriculum, aspects of newborn care will continue to be woven throughout years one and two of the programme to reflect the majority of the students' feedback that liked this approach. However, in order to maintain the synergy between theory and practice (Monaghan 2015) a dedicated newborn infant physical examination module in year three has been included. This may also facilitate the learning for those students that expressed a preference to have the content in one dedicated module. The module would be timetabled early in the academic year in order to give students the best opportunity to achieve the skills and competencies for the physical examination of the newborn at the point of qualification (McDonald, 2018). Taking this considered approach to understanding the student experience and incorporating the findings from this study, it has put the HEI in a good position to meet the newly published NMC standards (NMC 2019) that require the systematic infant newborn physical examination to be included.

LIMITATIONS

The authors acknowledge that this was a small study based in one university in the south of England, however the students that participated came from a diverse range of clinical sites, which ranged from midwife-led birth centres to large consultant units. In some areas there were very few practising NIPE midwives and in other areas midwives undertaking NIPE was not unusual. All this added to the richness of the findings and were important for the development of the new curriculum. It is recognised that one focus group had only three students but when the discussions were combined with that of the larger focus group it was evident that similar themes were emerging.

The students who participated were self-selecting and could be assumed their interest was to articulate a particular view point. Findings from the data do suggest though, a variety of responses that were both positive and critical of the current method of delivery of the EXON theory and practice in the programme.

RECOMMENDATIONS

From this small study the new insights that have been gained can provide a number of recommendations to higher educational institutions. Consideration of when the theory elements are taught in the programme is important to ensure students can apply their knowledge to practice in a timely way, alongside the appropriate use of simulation to enable the opportunity for repetition, feedback, evaluation and reflection. In view of the variety of maternity services available to students at this institution other universities could use these findings to inform their curriculum.

To accommodate the current lack of qualified NIPE assessors, universities need to look for innovative ways to facilitate students to see practice and be assessed as competent in performing NIPE skills. It is important to have a close working relationship with clinical colleagues in order to work in partnership to prepare

practitioners to appropriately support students in gaining this aspect of their clinical experience.

CONCLUSION

The outcomes of this study have helped in the development of the most recent curriculum review where the full newborn infant physical requirements of knowledge, skills and competencies are to be incorporated into the undergraduate programme. It is thought that this development is timely due to the recent publication of the NMC standards of proficiency for midwives (2019) and the emphasis on holistic care of mother and baby, which can be enhanced by the midwife completing the newborn examination.

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